# TECHNOLOGICAL EDUCATION INSTITUTION (T.E.I.) OF CHALKIDA

# ECTS GUIDE

FOR

THE DEPARTMENT OF

# ELECTRICAL ENGINEERING

ACADEMIC YEAR 2008-2009

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## 1. General Information

The Department of Electrical Engineering aims in promoting and transferring scientific and technological knowledge in the area of Electrical Engineering through teaching and applied research in order to provide the students with the necessary skills for the advancement of their professional and scientific career. To accomplish this, the scientific and teaching staff of the department makes use of modern teaching methods and technology, monitors the scientific and technological progress in order to develop new courses and improve the existing ones, develops ties with higher education institutions at a national and international level and works closely with companies and research institutions.
The curriculum covers a wide range of courses and topics, such as *the operation and control of the electrical energy systems and installations, the design and implementation of information, telecommunication and automation systems*. Special emphasis is given to the laboratory training and hands on experience of our students. Upon completion of their studies, our students can be employed in positions involving the development, the control and the maintenance of electrical energy systems, the design, the implementation, the control and the maintenance of electrical installations, electronic devices and systems, automated and telecommunication systems, the design and the development of products and services concerning the above areas and applied research and development.

## 2. Degree

The degree conferred upon completion of the curriculum studies is equivalent to a Bachelor of Science (level 5A according to the UNESCO's ISCED classification system).

## 3. Duration and Structure of Studies

The duration of studies is eight semesters. In the first seven semesters, obligatory and elective courses in lecture form are offered in the above areas supported by Laboratory and Applied Exercises sessions. Students are required to attend the lectures and the laboratory sessions, work on individual or team projects and present their results in oral and written form. In the final semesters, students are required to complete their senior project while in the last semester they must do their practical training with a company.

The senior project, compulsory for the completion of one's studies, is based on a topic selected by a student from a list of topics suggested by the teaching staff. It gives the student the opportunity to focus on a topic of their interest, to apply the knowledge and skills acquired during their studies, to participate in medium and large scale experiments, to become familiar with bibliographical research techniques, and apply their technical writing skills.

The practical training with a company, supervised by a member of the teaching staff, is also compulsory for the completion of their studies. It gives the students the opportunity to broaden their knowledge acquiring hands-on experience in real conditions, to familiarize themselves with labor laws and workplace safety procedures and to obtain information necessary for the completion of their senior project.

The Course Syllabus involves Obligatory (O), Obligatory Electives (OE) and Electives (E) that can be Theoretical (T), Laboratory (L) or Mixed (M) courses. According to their content they are classified in General Core (GC), Special Core (SC), Specialization (S) and Human Factors and Legislation Course (HFLC) courses.

The syllabus is structured based on the workload required by an average student ranging from 50 to 60 hours per week depending on the semester level. The hours of class attendance range from 25 to 27 per week depending on the semester. Each semester carries 30 ECTS units while the number of ECTS units of a course depends on the workload required by an average student.

The General and Special Core as well as the Specialization courses fall under one of the two Sectors of the Department:

*The Sector of Energy and Metrology and*
*The Sector Electronics, Control Systems and Informatics*

The tables below show how the courses are classified.

TABLE 1 summarizes the structure of the course syllabus:

**TABLE 1: SUMMARY OF COURSE SYLLABUS**

| Semester | T | M | L | TOTAL | GC | SC | S | HFLC | TOTAL | H/W | % H/W | WL/W | %WL/W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st | 2 | 2 | 2 | 6 | 5 | 1 | 0 | 0 | 6 | 26 | 14,3 | 50 | 12,5 |
| 2nd | 2 | 3 | 0 | 5 | 1 | 3 | 0 | 1 | 5 | 26 | 14,3 | 50 | 12,5 |
| 3rd | 1 | 4 | 0 | 5 | 2 | 3 | 0 | 0 | 5 | 26 | 14,3 | 50 | 12,5 |
| 4th | 2 | 4 | 0 | 6 | 1 | 2 | 3 | 0 | 6 | 25 | 13,7 | 49 | 12,3 |
| 5th | 1 | 4 | 1 | 6 | 0 | 3 | 2 | 1 | 6 | 27 | 14,8 | 49 | 12,3 |
| 6th | 2 | 4 | 0 | 6 | 0 | 1 | 4 | 1 | 6 | 26 | 14,3 | 52 | 13,0 |
| 7th | 2 | 4 | 0 | 6 | 0 | 1 | 4 | 1 | 6 | 26 | 14,3 | 50 | 12,5 |
| 8th | - | - | - | - | - | - | - | - | - | - | - | 50 | 12,5 |
| | 12 | 25 | 3 | 40 | 9 | 14 | 13 | 4 | 40 | 182 | 100 | 400 | 100 |

H/W: Hours/Week, WL/W: Workload/Week

TABLES 2-5 classify the courses according to their category:

| TABLE 2: GENERAL CORE COURSES | | | | |
|---|---|---|---|---|
| | **SEMESTER** | **COURSE TYPE** | **H/W** | **WL/W** |
| MATHEMATICS I | 1st | T | 5 | 11 |
| PHYSICS | 1st | M | 6 | 12 |
| MACHINERY AND TOOLING TECHNOLOGY | 1st | L | 2 | 2 |
| INTRODUCTION TO COMPUTING | 1st | L | 4 | 4 |
| MATERIALS TECHNOLOGY | 2nd | T | 3 | 9 |
| MATHEMATICS II | 2nd | T | 5 | 11 |
| MATHEMATICS III | 3rd | T | 4 | 10 |
| PROGRAMMING | 3rd | M | 4 | 8 |
| ENGINEERING MECHANICS | 4th | T | 2 | 6 |
| | **TOTAL** | | 35 | 73 |

| TABLE 3: SPECIAL CORE COURSES | | | | |
|---|---|---|---|---|
| | **SEMESTER** | **COURSE TYPE** | **H/W** | **WL/W** |
| ELECTRICAL CIRCUITS I | 1st | M | 6 | 12 |
| ELECTRONICS I | 2nd | M | 6 | 10 |
| ELECTRICAL MEASUREMENTS | 2nd | M | 6 | 10 |
| ELECTRICAL CIRCUITS II | 2nd | M | 6 | 12 |
| ELECTRONICS II | 3rd | M | 6 | 10 |
| ELECTRICAL MACHINES I – TRANSFORMERS | 3rd | M | 6 | 12 |
| DIGITAL SYSTEMS I | 3rd | M | 6 | 10 |
| CONTROL SYSTEMS I | 4th | M | 6 | 10 |
| COMPUTER SIMULATION OF ELECTRICAL & ELECTRONIC SYSTEMS | 4th | M | 3 | 7 |
| PRIME MOVERS | 5th | M | 4 | 8 |
| ELECTRICAL INSTALLATIONS I | 5th | M | 6 | 12 |
| DESIGN AND IMPEMENTATION OF ELECTRICAL AND ELECTRONIC CIRCUITS | 5th | L | 3 | 3 |
| POWER SYSTEMS I | 6th | T | 4 | 8 |
| RENEWABLE ENERGY SYSTEMS | 7th | T | 3 | 7 |
| | **TOTAL** | | 71 | 131 |

| TABLE 4: SPECIALIZATION COURSES | | | | |
|---|---|---|---|---|
| | **SEMESTER** | **COURSE TYPE** | **H/W** | **WL/W** |
| DIGITAL SYSTEMS II | 4th | M | 6 | 10 |
| ELECTRICAL MACHINES II | 4th | M | 6 | 10 |
| FOREIGN LANGUAGE - TERMINOLOGY | 4th | T | 2 | 6 |
| CONTROL SYSTEMS II | 5th | M | 6 | 10 |
| POWER ELECTRONICS - INDUSTRIAL ELECTRONICS | 5th | M | 6 | 10 |
| ELECTRICAL INSTALLATIONS II | 6th | M | 5 | 9 |
| ELECTRICAL MOTION SYSTEMS | 6th | M | 5 | 9 |
| MICROPROCESSORS | 6th | M | 5 | 9 |
| ELECTROTECHNICAL APPLICATIONS – LIGHTING TECHNOLOGY | 6th | M | 4 | 8 |
| POWER SYSTEMS II | 7th | M | 6 | 10 |
| HIGH VOLTAGE TECHNOLOGY | 7th | M | 4 | 8 |
| MEASUREMENTS TECHNOLOGY | 7th | M | 5 | 9 |
| PLC – AUTOMATION | 7th | M | 6 | 10 |
| | **TOTAL** | | 66 | 118 |

| TABLE 5: HFLC COURSES | | | | |
|---|---|---|---|---|
| | **SEMESTER** | **COURSE TYPE** | **H/W** | **WL/W** |
| α) INTRODUCTION TO ECONOMICS or<br>β) ECONOMIC-TECHNICAL ANALYSIS | 2nd | T | 3 | 7 |
| α) BUSINESS ADMINISTRATION or<br>β) PROJECT MANAGEMENT | 5th | T | 2 | 6 |
| LAW & WORKPLACE SAFETY | 6th | T | 3 | 9 |
| α) PROFESSIONAL ETHICS ή<br>β) ENVIRRONMENTAL PROTECTION | 7th | T | 2 | 6 |
| | **TOTAL** | | 10 | 28 |

TABLE 6 presents the distribution of the lecture hours and the workload per course type:

| TABLE 6: STATISTICS PER COURSE TYPE | | | | | | |
|---|---|---|---|---|---|---|
| **Total number of courses: 40** | **Total number of hours** | **WL** | **Course Type** | | | |
| | **182** | **350** | G | SC | S | HFLC |
| | **Number of courses** | | 9 | 14 | 13 | 4 |
| | **Hours** | | 35 | 71 | 66 | 10 |
| | **%** | | 19,2 | 39,0 | 36,3 | 5,5 |
| | **Workload** | | 73 | 131 | 118 | 28 |
| | **%** | | 20,9 | 37,4 | 33,7 | 8,0 |

Finally, TABLE 7 summarizes the distribution of teaching hours in theoretical, laboratory and Applied Exercises sessions.

| TABLE 7: HOUR DISTRIBUTION | | |
|---|---|---|
| | H/W | % |
| THEORY | 84 | 46,2 |
| APPLIED EXERCISES | 40 | 22,0 |
| LABORATORY | 58 | 31,9 |
| **TOTAL** | 182 | 100,0 |

## 4 Course syllabus

| FIRST SEMESTER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **COURSE** | **O/OE** | **Category** | **T H/W** | **AE H/W** | **L H/W** | **Total H/W** | **WL** | **ECTS PTS** |
| 1 | MATHEMATICS I | O | G | 3 | 2 | 0 | 5 | 11 | 7 |
| 2 | PHYSICS | O | G | 3 | 1 | 2 | 6 | 12 | 7 |
| 3 | ELECTRICAL CIRCUITS I | O | SC | 3 | 1 | 2 | 6 | 12 | 7 |
| 4 | MACHINERY AND TOOLING TECHNOLOGY | O | G | 0 | 0 | 2 | 2 | 2 | 2 |
| 5 | INTRODUCTION TO COMPUTING | O | G | 0 | 0 | 4 | 4 | 4 | 2 |
| 6 | MATERIALS TECHNOLOGY | O | G | 3 | 0 | 0 | 3 | 9 | 5 |
| | **TOTAL** | | | **12** | **4** | **10** | **26** | **50** | **30** |
| **SECOND SEMESTER** | | | | | | | | | |
| | **COURSE** | **O/OE** | **Category** | **T H/W** | **AE H/W** | **L H/W** | **Total H/W** | **WL** | **ECTS PTS** |
| 1 | MATHEMATICS II | O | G | 3 | 2 | 0 | 5 | 11 | 7 |
| 2 | ELECTRONICS I | O | SC | 2 | 2 | 2 | 6 | 10 | 6 |
| 3 | ELECTRICAL MEASUREMENTS | O | SC | 2 | 2 | 2 | 6 | 10 | 6 |
| 4 | ELECTRICAL CIRCUITS II | O | SC | 3 | 1 | 2 | 6 | 12 | 7 |
| 5 | a) INTRODUCTION TO ECONOMICS or<br>b) ECONOMIC-TECHNICAL ANALYSIS | OE | HFLC | 2 | 1 | 0 | 3 | 7 | 4 |
| | **TOTAL** | | | **12** | **8** | **6** | **26** | **50** | **30** |
| **THIRD SEMESTER** | | | | | | | | | |
| | **COURSE** | **O/OE** | **Category** | **T H/W** | **AE H/W** | **L H/W** | **Total H/W** | **WL** | **ECTS PTS** |
| 1 | MATHEMATICS III | O | G | 3 | 1 | 0 | 4 | 10 | 6 |
| 2 | DIGITAL SYSTEMS I | O | SC | 2 | 2 | 2 | 6 | 10 | 6 |
| 3 | ELECTRONICS II | O | SC | 2 | 2 | 2 | 6 | 10 | 6 |
| 4 | ELECTRICAL MACHINES I – TRANSFORMERS | O | SC | 3 | 1 | 2 | 6 | 12 | 7 |
| 5 | PROGRAMMING | O | G | 2 | 0 | 2 | 4 | 8 | 5 |
| | **TOTAL** | | | **12** | **6** | **8** | **26** | **50** | **30** |

| FOURTH SEMESTER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **COURSE** | **O/OE** | **Category** | **T H/W** | **AE H/W** | **L H/W** | **Total H/W** | **WL** | **ECTS PTS** |
| 1 | CONTROL SYSTEMS I | O | SC | 2 | 2 | 2 | 6 | 10 | 6 |
| 2 | DIGITAL SYSTEMSII | O | S | 2 | 2 | 2 | 6 | 10 | 6 |
| 3 | ELECTRICAL MACHINES II | O | S | 2 | 2 | 2 | 6 | 10 | 6 |
| 4 | COMPUTER SIMULATION OF ELECTRICAL & ELECTRONIC SYSTEMS | O | SC | 2 | 0 | 1 | 3 | 7 | 4 |
| 5 | ENGINEERING MECHANICS | O | G | 2 | 0 | 0 | 2 | 6 | 4 |
| 6 | FOREIGN LANGUAGE - TERMINOLOGY | O | S | 2 | 0 | 0 | 2 | 6 | 4 |
| | **TOTAL** | | | **12** | **6** | **7** | **25** | **49** | **30** |
| **FIFTH SEMESTER** | | | | | | | | | |
| | **COURSE** | **O/OE** | **Category** | **T H/W** | **AE H/W** | **L H/W** | **Total H/W** | **WL** | **ECTS PTS** |
| 1 | CONTROL SYSTEMS II | O | S | 2 | 2 | 2 | 6 | 10 | 6 |
| 2 | PRIME MOVERS | O | SC | 2 | 0 | 2 | 4 | 8 | 5 |
| 3 | POWER ELECTRONICS - INDUSTRIAL ELECTRONICS | O | S | 2 | 2 | 2 | 6 | 10 | 6 |
| 4 | ELECTRICAL INSTALLATIONS I | O | SC | 3 | 1 | 2 | 6 | 12 | 7 |
| 5 | DESIGN AND IMPEMENTATION OF ELECTRICAL AND ELECTRONIC CIRCUITS | O | SC | 0 | 0 | 3 | 3 | 3 | 2 |
| 6 | α) BUSINESS ADMINISTRATION or β) PROJECT MANAGEMENT | OE | HFL | 2 | 0 | 0 | 2 | 6 | 4 |
| | **TOTAL** | | | **11** | **5** | **11** | **27** | **49** | **30** |
| **SIXTH SEMESTER** | | | | | | | | | |
| | **COURSE** | **O/OE** | **Category** | **T H/W** | **AE H/W** | **L H/W** | **Total H/W** | **WL** | **ECTS PTS** |
| 1 | ELECTRICAL INSTALLATIONS II | O | S | 2 | 1 | 2 | 5 | 9 | 5 |
| 2 | POWER SYSTEM ANALYSIS I | O | SC | 2 | 2 | 0 | 4 | 8 | 5 |
| 3 | ELECTRICAL MOTION SYSTEMS | O | S | 2 | 1 | 2 | 5 | 9 | 5 |
| 4 | MICROPROCESSORS | O | S | 2 | 1 | 2 | 5 | 9 | 5 |
| 5 | LAW & WORKPLACE SAFETY | O | HFL | 3 | 0 | 0 | 3 | 9 | 5 |
| 6 | ELECTROTECHNICAL APPLICATIONS – LIGHTING TECHNOLOGY | O | S | 2 | 0 | 2 | 4 | 8 | 5 |
| | **TOTAL** | | | **13** | **5** | **8** | **26** | **52** | **30** |

| SEVENTH SEMESTER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **COURSE** | **O/OE** | **Category** | **T H/W** | **AE H/W** | **L H/W** | **Total H/W** | **WL** | **ECTS PTS** |
| 1 | POWER SYSTEM ANALYSIS II | O | S | 2 | 2 | 2 | 6 | 10 | 6 |
| 2 | HIGH VOLTAGE TECHNOLOGY | O | S | 2 | 0 | 2 | 4 | 8 | 5 |
| 3 | α) PROFESSIONAL ETHICS or<br>β) ENVIRRONMENTAL PROTECTION | OE | HFL | 2 | 0 | 0 | 2 | 6 | 4 |
| 4 | ALTERNATIVE ENERGY RESOURCES | O | SC | 2 | 1 | 0 | 3 | 7 | 4 |
| 5 | MEASUREMENTS TECHNOLOGY | O | S | 2 | 1 | 2 | 5 | 9 | 5 |
| 6 | PLC – AUTOMATION | O | S | 2 | 2 | 2 | 6 | 10 | 6 |
| | **TOTAL** | | | **12** | **6** | **8** | **26** | **50** | **30** |
| **EIGHTTH SEMESTER** | | | | | | | | | |
| | **COURSE** | **O/OE** | **Category** | **T H/W** | **AE H/W** | **L H/W** | **Total H/W** | **WL** | **ECTS PTS** |
| 1 | PRACTICAL TRAINING | O | | 0 | 0 | 0 | 0 | 20 | 10 |
| 2 | SENIOR PROJECT | O | | 0 | 0 | 4 | 4 | 30 | 20 |
| | **TOTAL** | | | **0** | **0** | **4** | **4** | **50** | **30** |

**Notation:**

**O**=Obligatory course, OE=Obligatory Elective, E=Elective
**G**= General Core Course, **SC**= Special Core Course, **S**=Special Course
**HFL**= Human Factors and Legislation Course, **H/W** = Hours per Week **WL** = Work Load
**T**=Theoretical Course, **AE**= Applied Exercises, **L**=Laboratory Course

## 4.1 Course Description

**First Semester**

| | | | |
|---|---|---|---|
| **Title** | **MATHEMATICS I** | | |
| **Semester** | **1st** | | |
| **Department** | **General Department of Applied Sciences** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **3 Lecture** | **2 Applied Exercises** | **Laboratory** |
| **Workload/Week** | **11** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Menelaos Labiris, +30-22280-99631, labiris@teihal.gr | | |

**Learning Outcomes**
To provide the students with basic knowledge of the mathematics used in most of their courses.

**Course Description**
The course is an introduction to differential and integral calculus covering differentiation and integration techniques using examples from the area of Electrical Engineering. It also offers an overview of linear algebra with emphasis in matrices, determinants and the solution of linear systems. Finally, it offers an introduction to complex numbers and their operations.

**Recommended Reading:**


1. Tom Apostol, CALCULUS, Volume I.
2. Ralph, Palmer. Agnew, Analytical Geometry and Calculus with vectors (Calculus), McGraw-Hill, 1962.
3. Applied Linear Algebra, Ben Nobles Prentice Hall, 1969.

| | | | |
|---|---|---|---|
| **Title** | **ELECTRICAL CIRCUITS I** | | |
| **Semester** | **1st** | | |
| **Department** | **Electrical Engineering Department** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **3 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **12** | | |
| **ECTS credits** | **7** | | |
| **Prerequisites** | | | |
| **Contact Person** | Konstantinos Papadopoulos, +30-22280-99603, cpap@teihal.gr | | |

**Learning Outcomes:**
To provide the students with a better understanding of the elements comprising an electrical circuit, the effect of direct current (DC) on circuit elements, the laws and theorems pertaining to DC circuits and their solution methods.

**Course Description:**
DC voltage - current. Current and voltage supplies. Resistors. Electrical circuit. In series and parallel resistors. Y connections. Ohm's law. Kirchhoff laws. Theorems of Thévenin and Norton. Maximum power transfer theorem. Millman thorem. Methods for solving DC electrical circuits. Power in DC circuits. Magnetic field. Electrostatic field – Capacitors. Faraday's law. Coils – self and mutual inductance

**Recommended Reading:**

1. W. Hayt, J. Kemmerly, Engineering Circuit Analysis, Fourth Ed., Mc Graw Hill.
2. Allan H. Robbins, Wilhelm Miller, Judd Robbins, Alan R. Miller, Circuit Analysis: Theory & Practice, Εκδόσεις Delmar Learning, 1999.

| | | | |
|---|---|---|---|
| **Title** | **PHYSICS** | | |
| **Semester** | **1st** | | |
| **Department** | **General Department of Applied Sciences** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **3 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **12** | | |
| **ECTS credits** | **7** | | |
| **Prerequisites** | | | |
| **Contact Person** | Andreas Rigas, +30-22280-99543, arigas@teihal.gr | | |

**Learning Outcomes:**

To provide the student with a global perception of Physics, with emphasis in field theory and its use in technological applications.

**Course Description:**

Principles and methods of physics, units, study of motion, forces, Newton's Law of Motion, conservation of energy, conservation of momentum, conservation of angular momentum.
Gravity, electrical field, magnetic field, direct and alternating current, electromagnetic energy, elementary principles of solid state physics.

**Recommended Reading:**


1. D. Halliday – R. Resnick, Physics, volumes 1,2, Wiley, 1996
2. H. C., Ohanian, Physics, Norton, 1985
3. Hudson Alvin- Nelson Rex, University physics, Philadelphia Saunders College Publishing, 1990

| | | | |
|---|---|---|---|
| **Title** | **MACHINERY AND TOOLING TECHNOLOGY** | | |
| **Semester** | **1st** | | |
| **Department** | **Mechanical Engineering** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Laboratory** | | |
| **Hours/week** | **Lecture** | **Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **2** | | |
| **ECTS credits** | **2** | | |
| **Prerequisites** | | | |
| **Contact Person** | George Kapetanios, +30-22280-99645, kapetanios@teihal.gr | | |

**Learning Outcomes:**
To familiarize the students with the operation and usage of basic work-shop measuring tools and metal processing methods.

**Course Description:**
Introduction to the use of micrometers and thickness measuring tools
Applied machinery lab (file, rotary drill, thread grooving tools, saws)
Alluminum casting in silica sand and lead casting in preformed molds
Metal sheets and arc welding
Welding with electrodes
Piping and soft welding

**Recommended Reading:**

Notes by the instructor

| | | | |
|---|---|---|---|
| **Title** | **INTRODUCTION TO COMPUTING** | | |
| **Semester** | **1st** | | |
| **Department** | **General Department of Applied Sciences** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Laboratory** | | |
| **Hours/week** | **Lecture** | **Applied Exercises** | **4 Laboratory** |
| **Workload/Week** | **4** | | |
| **ECTS credits** | **2** | | |
| **Prerequisites** | | | |
| **Contact Person** | Stefanos Tsitmidelis, +30-22280-99618, st@teihal.gr | | |

**Learning Outcomes:**
To introduce the students to the most commonly used computer operating systems and software packages used for data processing and reporting in engineering.

**Course Description:**
Principles, structure and operation of computers – hardware – software.
Description of basic I/O devices. Number systems and conversions. Boolean algebra. Truth tables. Comparative study of various computer languages and design concepts. Design techniques and compilation of algorithms. Networks. Operating systems.
Personal Computing. Word processing, spreadsheets, presentation software, use of Internet and electronic mail.

**Recommended Reading:**
1. Peter Norton, Introduction to Computers, 2000.
2. Manual Microsoft Word, Microsoft Press.
3. Manual Microsoft Excel, Microsoft Press.
4. Manual Microsoft Power Point, Microsoft Press.

| | | | |
|---|---|---|---|
| **Title** | **MATERIALS TECHNOLOGY** | | |
| **Semester** | **1st** | | |
| **Department** | **General Department of Applied Sciences** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **3 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **9** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Andreas Rigas, +30-22280-99543, arigas@teihal.gr | | |

**Learning Outcomes:**
The aim of this course is to gain the basic knowledge regarding the science of materials with emphasis in their electrical properties and their behavior in electric and electronic applications.

**Course Description:**
Introduction to materials science.
Conductors. Semiconductors. Superconductors. Magnetics. Insulators.
Technological application materials – Electrical application materials
Resistors, coils, capacitors (properties and materials), electrical connections and contacts, semiconductor technology.
Reliability of materials and devices.

**Recommended Reading:**

Notes by the instructor

## *Second Semester*

| | | | |
|---|---|---|---|
| **Title** | **MATHEMATICS II** | | |
| **Semester** | **2nd** | | |
| **Department** | **General Department of Applied Sciences** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **3 Lecture** | **2 Applied Exercises** | **Laboratory** |
| **Workload/Week** | **11** | | |
| **ECTS credits** | **7** | | |
| **Prerequisites** | **MATHEMATICS I** | | |
| **Contact Person** | Menelaos Labiris, +30-22280-99631, labiris@teihal.gr | | |

**Learning Outcomes:**
Familiarization with differential equations, multivariable analysis, line and double integrals.

**Course Description:**
Linear and non-linear ordinary differential equations and systems of differential equations. Multivariable functions. Partial derivatives. Vector analysis – Divergence, Curl. Gradient. Applications. Line integrals and double integrals.

**Recommended Reading:**
1. Tom Apostol, CALCULUS.

| | | | |
|---|---|---|---|
| **Title** | **ELECTRICAL CIRCUITS II** | | |
| **Semester** | **2nd** | | |
| **Department** | **Electrical Engineering** | | |
| **Κατηγορία / Επίπεδο μαθήματος** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **3 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **12** | | |
| **ECTS credits** | **7** | | |
| **Prerequisites** | **ELECTRICAL CIRCUITS I** | | |
| **Contact Person** | Konstantinos Papadopoulos, +30-22280-99603, cpap@teihal.gr | | |

**Learning Outcomes:**
To familiarize the student with ac circuit analysis techniques.

**Course Description:**
Alternating current and voltage sources. Complex number form representation. Resistors – coils – capacitors in AC. Ohm's law – Kirchhoff 's laws – Thévenin and Norton equivalent circuits – Maximum power transfer theorem in AC. Circuit analysis techniques. Power in AC circuits. Resonance. Filters. Three-phase systems. □Ỹ connections. Power in three-phase systems. Transient response in AC circuits.

**Recommended Reading:**


1. W. Hayt, J. Kemmerly, Engineering Circuit Analysis, Fourth Ed., Mc Graw Hill.
2. Allan H. Robbins, Wilhelm Miller, Judd Robbins, Alan R. Miller, Circuit Analysis: Theory & Practice, Delmar Learning, 1999.

| | | | |
|---|---|---|---|
| **Title** | **ELECTRONICS I** | | |
| **Semester** | **2nd** | | |
| **Department** | **Electrical Engineering** | | |
| **Κατηγορία / Επίπεδο μαθήματος** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | | | |
| **Contact Person** | Stelios Halkiadis, +30-22280-99637, sxalkiadis@teihal.gr | | |

**Learning Outcomes:**
To introduce the student to the basics of electronic components and electronic circuit analysis and design.

**Course Description:**
Analog and digital circuits. Semiconductors. Diodes – pn junction – forward and inverse bias – V-I characteristic. Zener diodes – applications. Diode applications – clamping and clipping circuits- rectifiers. Thyristors (SCR, DIAC, TRIAC). Optoelectronics - Photodiodes – LED – Phototransistots – Laser diodes. Transistors – BJT – JFET- Biasing circuits – PUT transistors.

**Recommended Reading:**


1. Paul Horowitz, Winfield Hill, The Art of Electronics, Cambridge University Press.
2. Floyd, Electronic Devices, Prentice Hall, 1999
3. MALVINO, Electronics, 2000:
4. Paul Scherz, Practical Electronics for Inventors, McGraw-Hill, 2000
5. Hatch, John J. Electronics for Technicians, 1999.

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|---|---|---|---|
| **Title** | **ELECTRICAL MEASUREMENTS** | | |
| **Semester** | **2nd** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | | | |
| **Contact Person** | Aphrodite Ktena, +30-22280-99606, aktena@teihal.gr | | |

**Learning Outcomes:**
To introduce the student to the basics of measurements with an emphasis to electrical measurements and the instruments used.

**Course Description:**
Introduction to measurements. SI units. Primary and secondary standards. Introduction to error analysis – Systematic and random errors. Analog instruments – structure – classification. AC & DC bridges. Transformers. Oscilloscope. Power measurements – DC- AC- three-phase systems. Electronic & digital instruments. DACs & ADCs. Counters. Data acquisition techniques. Sensors. Special cases.

**Recommended Reading:**


1. M. Stout, Basic Electrical Measurements, Prentice-Hall, Inc., 1960
2. D. Owen, Alternating Current Measurements, Pitman, London, 1963
3. H. Buckingham, Principles of Electrical Measurements, English University Press, London, 1966

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|---|---|---|---|
| **Title** | **INTRODUCTION TO ECONOMICS** | | |
| **Semester** | **2nd** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **HFL** | **Obligatory Elective** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **1 Applied Exercises** | **Laboratory** |
| **Workload/Week** | **7** | | |
| **ECTS credits** | **4** | | |
| **Prerequisites** | | | |
| **Contact Person** | Pantelis Koukos, +30-22280-99651, pankoukos@teihal.gr | | |

**Learning Outcomes:**
To offer the prospective electrical engineer basic knowledge of economics useful in his/her career as a company employee or entrepreneur.

**Course Description:**
ECONOMICS- Introduction to economics. Supply and demand. Microeconomics. Cost. Competition. Salaries. Market structures. Macroeconomics. Economic theories. Fiscal policy. National and international economics. Unemployment and inflation.
ECONOMIC MANAGEMENT – Business structures. Business plans. Accounting. Book keeping. Annual reports. Forecasting. Budgeting. Case studies.

**Recommended Reading:**


1. Wessel, Economics, Barrons.
2. Siegel, Smith, Economic Management, Singular.

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|---|---|---|---|
| **Title** | **ECONOMICAL- TECHNICAL ANALYSIS** | | |
| **Semester** | **2nd** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **HFL** | **Obligatory Elective** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **1 Applied Exercises** | **Laboratory** |
| **Workload/Week** | **7** | | |
| **ECTS credits** | **4** | | |
| **Prerequisites** | | | |
| **Contact Person** | Pantelis Koukos, +30-22280-99651, pankoukos@teihal.gr | | |

**Learning Outcomes:**
To offer the prospective electrical engineer the basic knowledge needed to understand and conduct an economical-technical analysis, a useful tool in his/her career as a company employee or entrepreneur.

**Course Description:**

Financial and feasibility studies.
Key elements for the Establishment, Evaluation and Reengineering of Enterprises, Organizations and Business or Production Processes
Elements of Cost Analysis and Business or Investment Financing.

Applied Exercises, Examples and Case studies

**Recommended Reading:**

1. D.L. Johnston, Management for Engineers, Peter Peregrinus.

## *Third Semester*

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|---|---|---|---|
| **Title** | **MATHEMATICS III** | | |
| **Semester** | **3rd** | | |
| **Department** | **General Department of Applied Sciences** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **3 Lecture** | **1 Applied Exercises** | **Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | | | |
| **Contact Person** | Menelaos Labiris, +30-22280-99631, labiris@teihal.gr | | |

**Learning Outcomes:**
To familiarize the student with the basics of waveform analysis in the frequency and time domain. The examples used are taken from problems encountered in the discipline of electrical engineering.

**Course Description:**
Transforms – Laplace - Fourier – Z. Inverse transforms. Application in differential equations. Fourier analysis. Applications and examples from control systems, circuit analysis, filters, signal processing.

**Recommended Reading:**

Notes by the instructor

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|---|---|---|---|
| **Title** | **DIGITAL SYSTEMS I** | | |
| **Semester** | **3rd** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | | | |
| **Contact Person** | Stamatis Voliotis, +30-22280-99641, svoliotis@teihal.gr | | |

**Learning Outcomes:**
To introduce the student to the basics of digital circuits and digital design, the tools used and their applications.

**Course Description:**
Binary numbers. Number systems – binary – decimal – octal – hexadecimal. Base conversion methods. Complements. Binary codes.
Boolean algebra. Funcitons. Logic gates. Integrated circuits.
Minimizaton. K-map design. Don't care entries. Design process.
Adders. Comparators. Encoding and Decoding. Multiplexing. ROM. Programmable Logic Array.

**Recommended Reading:**
1. M. Morris Mano, *Digital Design*, Prentice Hall, 1992.

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|---|---|---|---|
| **Title** | **ELECTRONICS II** | | |
| **Semester** | **3rd** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | **ELECTRONICS I** | | |
| **Contact Person** | Stelios Halkiadis, +30-22280-99637, sxalkiadis@teihal.gr | | |

**Learning Outcomes:**
To offer the student the necessary knowledge in order to analyse and design electronic circuits.

**Course Description:**
Amplifier circuits using BJTs and JFETs. Power amplifier circuits. Switching circuits. Operational amplifier. Oscillators. Regulators. Feedback. Pulse generators. Modulation & demodulation. AM, FM, PCM. Introduction to transmission lines & antennas.

**Recommended Reading:**


1. Paul Horowitz, Winfield Hill, The Art of Electronics, Cambridge University Press.
2. Floyd, Electronic Devices, Prentice Hall, 1999.
3. MALVINO, Electrionics, 2000:
4. Paul Scherz, Practical Electronics for Inventors, McGraw-Hill, 2000.
5. Hatch, John J. Electronics for Technicians, 1999.

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|---|---|---|---|
| **Title** | **ELECTRICAL MACHINES I - TRANSFORMERS** | | |
| **Semester** | **3rd** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | | **Obligatory** |
| **Type** | **Mixed** | | |
| **Hours/week** | **3 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **12** | | |
| **ECTS credits** | **7** | | |
| **Prerequisites** | | | |
| **Contact Person** | Christos Vafiadis, +30-22280-99602, vafeiadsi@teihal.gr | | |

**Learning Outcomes:**
To introduce the student to transformers and DC motors and generators.

**Course Description:**
Transformers: Structure, types, characteristics. Principle of operation. Ideal transformer. Single-phase transformer. Equivalent circuit. Losses & performance. Auto transformer. Three-phase transformer.
DC machines: Structure, types, characteristics. Magnetization curves. Commutator. Compensating windings.
DC generators: Structure, types, characteristics. Categories. Equivalent circuits. Load lines. Power flow and loss diagrams. Calculations.
DC motors: Structure, types, characteristics. Categories. Applications. Equivalent circuits. Loadlines. Power flow and loss diagrams. Calculations.

**Recommended Reading:**


1. Stephen J. Chapman, Electrical Machines AC – DC.
2. Fitzgerald A. E., C. Kingsley, Jr., and S. D. Umans, Electric Machinery, 5th ed. New York: McGraw-Hill, 1990.
3. McRherson, George, An Introduction to Electrical Machines and Transformers, New York: Wiley, 1981.
4. National Electrical Manufacturers Association, Motors and Generators, Publication No. MG1-1993, Washington, D.C.: NEMA, 1993.

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|---|---|---|---|
| **Title** | **PROGRAMMING** | | |
| **Semester** | **3rd** | | |
| **Department** | **General Department of Applied Sciences** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **8** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | **INTRODUCTION TO COMPUTING** | | |
| **Contact Person** | Stefanos Tsitmidelis, +30-22280-99618, st@teihal.gr | | |

**Learning Outcomes:**
To introduce the students to programming and a programming language.

**Course Description:**
Introduction to number systems and logic algebra. Data structures. Programming languages. Fortran 90/95 – variables – data structures – I/O commands – loops – functions – matrices – files.
Applications in electrical engineering – calculations – matrices – simulations – statistical analysis et. al.

**Recommended Reading:**


1. Larry Nyhoff, S. Leestma, Introduction to FORTRAN 90.
2. Stephen Chapman, Fortran 90/95 for Scientists and Engineers, McGraw Hill, 1977
3. William Press, Numerical Recipes in Fortran, Cambridge University Press, 1992.

## *Fourth Semester*

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|---|---|---|---|
| **Title** | **CONTROL SYSTEMS I** | | |
| **Semester** | **4th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | **MATHEMATICS III** | | |
| **Contact Person** | Dimitrios Bargiotas, +30-22280-99640, bargiotas@teihal.gr | | |

**Learning Outcomes:**
To offer the student the necessary background on control systems and an understanding of their role and applications.

**Course Description:**
Introduction to systems. Basic control systems. Transfer Function. Signal flow diagrams. Introduction to state space. Feedback systems. Servomechanisms. Time response. Stability – Routh-Hurwitz criterion – Nyquist criterion – Nichols – Bode diagrams. Computer simulation of systems. Computer analysis of control systems.

**Recommended Reading:**


1. Kuo Benjamin, Automatic Control Systems Prentice Hall, 1987
2. C. Rohrs, J. Melsa, D, Schultz, Linear Control Systems.
3. J. D'Azzo, C. Houpis, Linear Control System, Analysis & Design. Conventional and Modern.McGraw-Hill, 1988.
4. J. Distefano, A. Stubberud, I. Williams, Control Systems, Schaum series.

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|---|---|---|---|
| **Title** | **DIGITAL SYSTEMS II** | | |
| **Semester** | **4th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | **DIGITAL SYSTEMS I** | | |
| **Contact Person** | Stamatis Voliotis, +30-22280-99641, svoliotis@teihal.gr | | |

**Learning Outcomes:**
To introduce the student to sequential digital system design.

**Course Description:**
Flip-flops. Triggering. Analysis of clocked sequential circuits. State minimization/maximization. Flip-flop triggering tables. Design process. Counters. Registers. Shift registers, ripple counters, synchronous counters, timing sequences,
Random Access Memory. Memory decoders. Error control coding. ASM diagrams. Timing issues, implementation of control sequences, implementation with multiplexers, implementation of control sequences with PLA.
Analysis of asynchronous sequential circuits. Latching.
Designing process, Minimization of state tables and state diagrams. State coding.

**Recommended Reading:**

1. M. Morris Mano, Digital Design, Prentice Hall, 1992.
2. Z. Kohavi, Switching and Automata Theory, Εκδόσεις McGraw-Hill, 1978.
3. F.J. Hill και G.R. Peterson, Introduction to Switching Theory and Logical Design, John Wiley, 1981.

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|---|---|---|---|
| **Title** | **ENGINEERING MECHANICS** | | |
| **Semester** | **4th** | | |
| **Department** | **Mechanical Engineering** | | |
| **Category** | **G** | **Obligatory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **6** | | |
| **ECTS credits** | **4** | | |
| **Prerequisites** | Stamatis Mavromatis, +30-22280-99643, smavrom@teihal.gr | | |

**Learning outcomes:**
To acquire the basic knowledge of a) statics of a rigid body b) dynamics and kinematics necessary in system modeling.

**Course Description:**
Introduction – Vector analysis – Force – Moment of a force – Equivalent systems of forces – Sum of forces – Free body diagram – Equilibrium of a particle in space - Equilibrium of a rigid body.
Trusses – Analysis by the method of joints – Analysis by the method of sections.
Laws of friction. Centre of gravity and centroids.
Beams – shear and bending moment of a beam – loading and support – concentrated
Kinmeatics of particle. Rectangular and cylindrical coordinates. Conservation of linear momentum.
Newton's law. Conservation of angular momentum.
Work. Energy. Power. Conservative forces.
Linear and angular momentum of a system of particles.
Rigid body kinematics – relative motion.
Rigid body dynamics.
Lagrange equations.

**Recommended Reading:**

1. W. Mc Lean and W. Nelson, Engineering Mechanics, Schaum's Outline Series, McGraw - Hill, New York.
2. F. Beer and E. Johnston, Vector Mechanics for Engineers, McGraw - Hill, New York.

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|---|---|---|---|
| **Title** | **ELECTRICAL MACHINES II** | | |
| **Semester** | **4th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | | | |
| **Contact Person** | Christos Vafiadis, +30-22280-99602, vafeiadis@teihal.gr | | |

**Learning Outcomes:**
To offer an overview of AC machines and their use as well as of the basic techniques for the determination of their electromechanical characteristics.

**Course Description:**
AC machines: Structure and characteristics. Rotating magnetic field. Revolutions – Frequency – Harmonics.
Synchronous three-phase generators: Structure and principle of operation. Equivalent circuit. Vector equation – vector diagram. Measurement of the equivalent circuit parameters. Power flow diagram – losses. Autonomous operation. Parallel operation. Specifications.
Synchronous three-phase motors: Structure and principle of operation. Equivalent circuit. Vector equation – vector diagram. Power flow diagram – losses. Starting.
Asynchronous or induction three-phase motors: Structure and principle of operation. Slip. Types. Equivalent circuit. Power flow diagram – losses. Torque – speed characteristic.
Asynchronous or induction single-phase motors: Structure and principle of operation. Equivalent circuit. Starting. Motors for special applications. Universal motors. Step motors. Hysteresis motors.

**Recommended Reading:**


1. Stephen J. Chapman, Electrical Machines AC - DC.
2. Fitzgerald A. E., C. Kingsley, Jr., and S. D. Umans, Electric Machinery, 5th ed. New York: McGraw-Hill, 1990.
3. McRherson, George, An Introduction to Electrical Machines and Transformers, New York: Wiley, 1981.
4. National Electrical Manufacturers Association, Motors and Generators, Publication No. MG1-1993, Washington, D.C.: NEMA, 1993.

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|---|---|---|---|
| **Title** | **COMPUTER SIMULATION OF ELECTRICAL & ELECTRONIC SYSTEMS** | | |
| **Semester** | **4th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **1 Laboratory** |
| **Workload/Week** | **7** | | |
| **ECTS credits** | **4** | | |
| **Prerequisites** | | | |
| **Contact Person** | Theodore Zachariadis, +30-22280-99550, zahariad@teihal.gr | | |

**Learning Outcomes:**
To offer an understanding of the basics in the analysis and design of electrical and electronic circuits using computer software.

**Course Description:**
Design and simulation of electrical and electronic circuits.
Model of the basic elements of an electrical circuit – resistors, coils, capacitors, transistors, thyristors, ac and dc current and voltage sources.
Design, analysis and simplification of electrical and electronic circuits, analog an digital, in the time and frequency domain using commercial software - Orcad / Spice, Multisim, Workbench, et. al.
PCB design.

**Recommended Reading:**
1. Manual Orcad.
2. Manual P-Spice.
3. Manual Multisim.
4. Manual Workbench.

## *Fifth Semester*

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|---|---|---|---|
| **Title** | **CONTROL SYSTEMS II** | | |
| **Semester** | **5th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | **CONTROL SYSTEMS I** | | |
| **Contact Person** | Dimitrios Bargiotas, +30-22280-99640, bargiotas@teihal.gr | | |

**Learning Outcomes:**
To introduce the students to the theory and methodology for the design, analysis and compensation of control systems with emphasis to the use of microcontrollers.

**Course Description:**
Compensation of feedback systems. Time domain and frequency domain compensation. Case studies.
Overview and analysis of PID controllers. Digital control. Sampling.
Control systems with embedded microprocessors.
Control systems optimization – optimization criteria.
Introduction to non-linear systems. Applications in the state-space.

**Recommended Reading:**


1. Kuo Benjamin, Automatic Control Systems Prentice Hall, 1987
2. C. Rohrs, J. Melsa, D, Schultz, Linear Control Systems.
3. J. D'Azzo, C. Houpis, Linear Control System, Analysis & Design. Conventional and Modern.McGraw-Hill, 1988.
4. J. Distefano, A. Stubberud, I. Williams, Automated Systems Controls, Schaum series.

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|---|---|---|---|
| **Title** | **PRIME MOVERS** | | |
| **Semester** | **5th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **8** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Nikos Orfanoudakis, +30-22280-659, norfan@teihal.gr | | |

**Learning Outcomes:**
An introduction to thermodynamics and fluid mechanics as well as thermal machines and pumps.

**Course Description:**
Introduction to thermodynamics. Laws of ideal gases. State equation. Axioms. Carnot cycle. Entropy.
Thermal machines. Boilers. OTTO and DIESEL machines. Turbines.
Introduction to fluid mechanics. Pumps. Hydraulic machines. Compressors.
Cooling systems. Tele-heating and tele-cooling. Heat & Electricity Co-generation.

**Recommended Reading:**
1. J. P. Holman, Thermodynamics, McGraw- Hill, 1988

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|---|---|---|---|
| **Title** | **ELECTRICAL INSTALLATIONS I** | | |
| **Semester** | **5th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **3 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **12** | | |
| **ECTS credits** | **7** | | |
| **Prerequisites** | | | |
| **Contact Person** | Aphrodite Ktena, +30-22280-99606, aktena@teihal.gr | | |

**Learning Outcomes:**
To offer an overview of the basic elements and experience in the design and implementation of indoors electrical installations, lighting, and industrial electrical installations.

**Course Description:**
Introduction to design. CAD.
Regulations and Standards of Indoors Electrical Installations.
Basic elements of an installation – their operation and characteristics.
Protection methods. Earthing. Cables. Switches. Fuses. Connections. Lighting. Voltage drop calculation. Case study of the electrical installation of a average size house. Testing and inspection methods.
Industrial use electrical installations. Load calculation. Power calculation, selection, installation, starting and control of motors. Classical automation circuits.

**Recommended Reading:**


1. HD384 - Electrical Installations Regulations
2. B.D. Jenkins, Mark Coates, Electrical Installation Calculations: For compliance with BS 7671: 2001 (The Wiring Regulations), Third Edition, Wiley, 2002
3. H. Wayne Beaty, Handbook of Electric Power Calculations, McGraw-Hill Professional, 2000
4. Donald G. Fink, H. Wayne Beaty, Standard Handbook for Electrical Engineers, McGraw-Hill Professional, 2006

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|---|---|---|---|
| **Title** | **POWER ELECTRONIS – INDUSTRIAL ELECTRONICS** | | |
| **Semester** | **5th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | **ELECTRONICS I & II** | | |
| **Contact Person** | Nikos Tsoligas, +30-22280-99607, tsoligas@teihal.gr | | |

**Learning Outcomes:**
To offer the student basic knowledge of simple single and three phase converters using thyristors, power transistors and IGBT's and an overview of the modern industrial techniques of temperature, light and motor control.

**Course Description:**
Introduction to power and industrial electronics: symbols and characteristics of power semiconductors. Power electronic circuits.
Power diode. Characteristics, types, single- and three- phase rectifying circuits.
Thyristor: characteristics, types, triggering, commutation techniques.
Power transistors, MOSFETs, SITs and IGBTs.
DC – DC converters. Choppers. INVERTERS. PWM. Motion control systems in AC and DC.

**Recommended Reading:**
1. P.C. Sen,. Power Electronics, McGraw Hill co.
2. V. Subrahmanyam,. Thyristor control of electric drives, McGraw Hill co.
3. B.W. Williams, Power Electronics, devices, drivers application and passive components, Macmillan.

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|---|---|---|---|
| **Title** | **DESIGN AND IMPEMENTATION OF ELECTRICAL AND ELECTRONIC CIRCUITS** | | |
| **Semester** | **5th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | | **Obligatory** |
| **Type** | **LABORATORY** | | |
| **Hours/week** | **Lecture** | **Applied Exercises** | **3 Laboratory** |
| **Workload/Week** | **3** | | |
| **ECTS credits** | **2** | | |
| **Prerequisites** | | | |
| **Contact Person** | Vasilis Karagiannis, +30-22280-99604, karagiannis@teihal.gr | | |

**Learing Outcomes:**
To sharpen the students' ability to read and understand the pecification sheets of the semiconductor manufacturers and to design and build electronic circuits and devices.

**Course Description:**
Design and implementation of preamplifiers, power amplifiers, regulators, voltage sources, oscillators, modulation and demodulation AM circuits, PCM.

**Recommended Reading:**


1. Paul Horowitz, Winfield Hill, The Art of Electronics, Cambridge University Press.
2. Floyd, Electronic Devices, Prentice Hall. 1999
3. MALVINO, Electronics, 2000:
4. Paul Scherz, Practical Electronics for Inventors, McGraw-Hill, 2000.

Hatch, John J. Electronics for Technicians, 1999.

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|---|---|---|---|
| **Title** | **BUSINESS ADMINISTRATION** | | |
| **Semester** | **5th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **HFL** | **Obligatory Elective** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **6** | | |
| **ECTS credits** | **4** | | |
| **Prerequisites** | | | |
| **Contact Person** | Pantelis Koukos, +30-22280-99651, pankoukos@teihal.gr | | |

**Learning Outcomes:**
To offer the Electrical Engineering students basic knowledge of Business Administration and management necessary in their carrer with companies and in the industry.

**Course Description:**

The Strategic Management Process. Developing strategic and corporate vision, setting objectives.
Industry and Competitive Analysis, Company Situation Analysis, Market Analysis
Strategic and Competitive Advantage. Marketing Mix
Decision Making and Supporting tools.
Leadership theories and Human Resource Management
Management of change and Business Reengineering
Type of companies in Greece and the world. Doing Business in Greece.

Examples and case studies

**Recommended Reading:**


1. Thomson Stricland Strategic Management, McGraw Hill/ Irwin, 1996 .
2. E. Turban, Decision Support and Expert Systems Management Support Systems, Prentice Hall, 1995.

| | | | |
|---|---|---|---|
| **Title** | **PROJECT MANAGEMENT** | | |
| **Semester** | **5th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **HFL** | **Obligatory Elective** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **6** | | |
| **ECTS credits** | **4** | | |
| **Prerequisites** | | | |
| **Contact Person** | Pantelis Koukos, +30-22280-99651, pankoukos@teihal.gr | | |

**Learning Outcomes:**
To offer the Electrical Engineering students basic knowledge of administration issues and project management, necessary in their career in construction and in the industry.

**Course Description:**
Introduction to project management.
Life cycle of a project. Operational infrastructure,
Methods, tools and information systems used for project monitoring
Human resources involved.
Design and analysis of the project phases.
Time scheduling and resources scheduling.
Budgeting. Cost-time vs resources. Contract management.
Execution, control, finalization and close out of a project

Examples and case studies.

**Recommended Reading:**

1. J Rodney Turner, The Handbook of Project- Based Management, Εκδόσεις McGraw Hill Book Company.
2. Burke R, Project Management Planning and Control, John Wiley.
3. Burke R, Project management planning and control, Wiley, 1993
4. E. Turban, “Decision Support and Expert Systems Management Support Systems”, Prentice Hall, 1995

## *Sixth Semester*

| | | | |
|---|---|---|---|
| **Title** | **POWER SYSTEMS I** | | |
| **Semester** | **6th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **Laboratory** |
| **Workload/Week** | **8** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Christos Manassis, +30-22280-99652, manasis@teihal.gr | | |

**Learning Outcomes:**
To train the student in the structure and operation, the computation methods and the steady state analysis of the Electrical Power Systems (EPS).

**Course Description:**
Introduction to EPS: Structure, Electrical energy generation and transport. Electrical Loads.
Basics of AC networks. Vector representation. Resistivity – conductivity. Voltage and current in single- and three-phase systems.
EPS representation: symmetric systems, equivalent generator and motor circuits, transmission line equivalent circuits, single phase equivalent circuits, resistance diagrams. Circuit analysis in the SI and in the per unit (pu) system.
Load flow: node equations, bus admittance ($Y_{BUS}$) and bus impedance ($Z_{BUS}$) matrix , load flow equations (LFE), numerical methods for the solution of LFEs

**Recommended Reading:**


1. J. J. Grainger, W. D. Stevenson, Jr, Power System Analysis, McGraw-Hill Book Company, 1994.
2. E. Guile, W. Paterson, Electrical Power Systems (vol. 1), Pergamon Press, 1977.
3. O. I. Elgerd, Electric Energy Systems Theory: An Introduction, 2nd edition, McGraw-Hill Book Company, 1982.
4. C. Gross, Power Systems Analysis, John Wiley & Sons, 1979.
5. M. Weedy, Electric Power Systems, 3rd edition, John Wiley & Sons, 1979.

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|---|---|---|---|
| **Title** | **ELECTRICAL INSTALLATIONS II** | | |
| **Semester** | **6th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **9** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | **ELECTRICAL INSTALLATIONS I** | | |
| **Contact Person** | Aphrodite Ktena, +30-22280-99606, aktena@teihal.gr | | |

**Learning Outcomes:**
To offer the students the necessary knowledge for the design and implementation of advanced industrial and commercial use electrical installations, and substation design

**Course Description:**
Industrial use of electrical calculation. Improvement of power factor – quadrature power – compensating capacitors.
Medium voltage consumers' substation design: selection and protection of transformers, earthling, materials and devices used in substations.
Introduction to intelligent installations. Bus systems – EIB.
Case studies of electrical installations of advanced specifications using commercial software.
Automation circuits for central heating, light control, fluid level control, fire protection.

**Recommended Reading:**


1. HD384 - Electrical Installations Regulations
2. B.D. Jenkins, Mark Coates, Electrical Installation Calculations: For compliance with BS 7671: 2001 (The Wiring Regulations), Third Edition, Wiley, 2002
3. H. Wayne Beaty, Handbook of Electric Power Calculations, McGraw-Hill Professional, 2000
4. Donald G. Fink, H. Wayne Beaty, Standard Handbook for Electrical Engineers, McGraw-Hill Professional, 2006

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|---|---|---|---|
| **Title** | **ELECTRICAL MOTION SYSTEMS** | | |
| **Semester** | **6th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **9** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | **ELECTRICAL MACHINES I – TRANSFORMERS, ELECTRICAL MACHINES I I** | | |
| **Contact Person** | Theodore Maris, +30-22280-99595, maris@teihal.gr | | |

**Learning Outcomes:**

To offer the student the necessary knowledge concerning the structure of electrical motors depending on its type and operation conditions, its mechanical and electrical characteristics, the starting and speed control methods and the power requirements.

**Course Description:**

Basic equations of AC and DC motors.
Friction. Inertia.
Electrical motor – structure – types – AC and DC motor characteristics.
Motion transmission mechanisms – types.
Moment balancing and stability in an electrical motor. Starting and speed control of motors – classical and modern methods. Energy losses in the transient state. Selection process of an electrical motor. Operating conditions. Protection index. Cooling methods. Commercial motor specifications.
Calculation of power, moment and speed requirements.

**Recommended Readings:**


1. Stephen J. Chapman, Electrical Machines AC – DC.
2. T.Wildi, Electrical Machines, Drives and Power Systems, Prentice-Hall, 2nd Edition, 1994.
3. B. Bose, Power Electronics & A.C. Drives, Prentice-Hall, 1st Edition, 1984.

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|---|---|---|---|
| **Title** | **MICROPROCESSORS** | | |
| **Semester** | **6th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **9** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Stamatis Voliotis, +30-22280-99641, svoliotis@teihal.gr | | |

**Learning Outcomes:**
To introduce the students to the structure, operation and uses of mcriprocessors.

**Course Description:**
History of microprocessors. Basic uses. Architecture – CPU, memory, control systems, bus systems, I/O. Basic operations analysis using time diagrams – writing to memory, reading from memory, data processing, I/O operations. Addressing. Commands. Special operations – dtacks – queues, DMA, interrupt. Peripheral interface, I/O operation – serial and parallel ports – networking. Design, implementation, execution and testing of programs. Operating systems – memory management – file management – peripherals. Standard Ics. Applications – commands – flow charts.

**Recommended Reading:**
1. Thom Luce, Ohio University, Computer Architecture Software-Hardware
2. G.M. Gilmore, Microprocessors – Theory & Applications, McGraw-Hill, 1999.

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|---|---|---|---|
| **Title** | **ELECTROTECHNICAL APPLICATIONS – LIGHTING TECHNOLOGY** | | |
| **Semester** | **6th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **8** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Aphrodite Ktena, +30-22280-99606, aktena@teihal.gr | | |

**Learing Outcomes:**
The training in the design of industrial automation and the lighting technology.

**Course Description:**
Introduction to automation. Components. Symbols. Circuit design. Applications. Testing. Trouble-shooting.
Introduction to lighting engineering. Photometry. Luminance. Luminous intensity Luminous flux. Luminous exitance.
Types of lighting. Shading. Efficiency.
System of units and standards.
Measurements and instruments.
Light sources – fixtures – specifications – requirements – connections- special cases.
Design of internal and external lighting using coomercial software.

**Recommended Reading:**


1. Thilo Sauter , Dietmar Dietrich, Wolfgang Kastner (Eds), EIB: Installation Bus System, Wiley-VCH, 2002
2. Notes by the instructor

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|---|---|---|---|
| **Title** | **LAW AND WORKPLACE SAFETY** | | |
| **Semester** | **6th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **HFL** | **Obligatory** | |
| **Type** | | | |
| **Hours/week** | **3 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **9** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Pantelis Koukos, +30-22280-99651, pankoukos@teihal.gr | | |

**Learning Outcomes:**
To offer the Electrical Engineering students the necessary knowledge of the regulations and legal issues related to their profession.

**Course Description:**
Professional rights.
Institutions and regulations in electrical and mechanical installations in the industry, houses, buildings, telecommunications.
Advertising, executing and auditing of public works – invoicing.
The legal responsibility of the industrial engineer and project manager.
The new institutional framework concerning workplace safety and the responsibility of engineers.

**Recommended Reading:**

1. Hellenic Standards Organization handbooks
2. Notes by the instructor

## *Seventh semester*

| | | | |
|---|---|---|---|
| **Title** | **POWER SYSTEMS II** | | |
| **Semester** | **7th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | **POWER SYSTEMS I** | | |
| **Contact Person** | Christos Manassis, +30-22280-99652, manasis@teihal.gr | | |

**Learning Outcomes:**
To offer the students the necessary knowledge for the analysis and computation of the basic parameters of Electrical Power Systems (EPS) in extraordinary situations – faults – as well as in the minimization of the production and transmission cost.

**Course Description:**
Symmetrical fault analysis. Short circuit capacity. Three-phase faults in synchronous machines. Unbalanced fault analysis. Symmetric components. Sequential networks. Single-phase to ground fault. Phase-to-phase fault. Double phase to ground fault. Numerical methods in fault calculation.
EPS operation: Optimization. Cost criterion. Load distribution among the units of a power station. Load distribution among power stations. Automatic control. Unit commitment.

**Recommended Reading:**


1. J. J. Grainger, W. D. Stevenson, Jr., Power System Analysis, McGraw-Hill Book Company, 1994.
2. E. Guile, W. Paterson, Electrical Power Systems (vol. 2), Pergamon Press, 1977.
3. O. I. Elgerd, Electric Energy Systems Theory: An Introduction, 2nd edition, McGraw-Hill Book Company, 1982.
4. C. Gross, Power Systems Analysis, John Wiley & Sons, 1979.
5. M. Weedy, Electric Power Systems, 3rd edition, John Wiley & Sons, 1979.

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|---|---|---|---|
| **Title** | **HIGH VOLTAGE TECHNOLOGY** | | |
| **Semester** | **7th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **8** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Christos Manassis, +30-22280-99652, manasis@teihal.gr | | |

**Learning Outcomes:**
To introduce the students to the high voltage science and engineering related to transmission networks.

**Course Description:**
High voltage generation: Test transformers, Cascade rectifiers, Impulse generators.
High Voltage measurements: Electrostatic Voltmeter, Sphere Gap, Voltage Dividers.
Lightning and Switching over voltages.
Insulators: air, liquid, solid.
Electrical Breakdown of gases.
Transmission line insulation coordination.

**Recommended Reading:**

1. Nils Hylten-Cavallius, High Voltage Laboratory Planning, Emil Haefely & co., 1986
2. M.S. Naidu, V. Kamarayu, High Voltage Engineering, McGraw-Hill, 1982
3. E. Kuffel, W.S. Zaengl, High Voltage Engineering, 2nd Edition, Pergamon Press, 2000

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|---|---|---|---|
| **Title** | **PLC - AUTOMATION** | | |
| **Semester** | **7th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | | **Obligatory** |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **2 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **10** | | |
| **ECTS credits** | **6** | | |
| **Prerequisites** | | | |
| **Contact Person** | Dimitrios Bargiotas, +30-22280-99640, bargiotas@teihal.gr | | |

**Learning Outcomes:**
To offer the students an overview of automation techniques and PLCs and the opportunity to gain hands-on experience regarding their uses, installation and programming.

**Course Description:**
Process automation. Classical automation. Introduction to PLC and principle of operation. Automated system design methodology using PLCs. The use of microcontroller in the industry. Automation systems using microprocessors. Advanced programming techniques. Analog and servo systems control using PLCs. PID control with PLCs. PLC interface. PLC networking. Case studies.

**Recommended Reading:**
1. Petruzella F, PLC.
**2.** Collins –Lane, Programmable controllers.

| | | | |
|---|---|---|---|
| **Title** | **RENEWABLE ENERGY SYSTEMS** | | |
| **Semester** | **7th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **SC** | **Obligatory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **1 Applied Exercises** | **Laboratory** |
| **Workload/Week** | **7** | | |
| **ECTS credits** | **4** | | |
| **Prerequisites** | | | |
| **Contact Person** | Dimitrios Bargiotas, +30-22280-99640, bargiotas@teihal.gr | | |

**Learning Outcomes:**
To provide the prospective graduates with the necessary scientific, technological and institutional background required to work in the alternative energy resources area.

**Course Description**
The new insititutional framework for the Renewable Energy Resources. Recent technological developments. State of the art at the national and international level.
Solar energy. Conversion to thermal energy. Thermal systems. Solar energy conversion to electrical energy. Photovoltaics. Sustainability analysis.
Wind energy. Wind potential. Advantages and Disadvantages. Generators, parks. Sustainability analysis.
Biomass. Geothermal energy, Other alternative energy recourses.

**Recommended Readings:**


1. P. Gipe, K. Perez, A guide to small and micro wind systems, Chelsea Green Pub Co., 1999
2. V. Rezendes, Geothermal Energy, Diane Pub Co., 1994
3. T. Burton, D. Sharpe et al, Wind Energy Handbook, Wiley, 2001

| | | | |
|---|---|---|---|
| **Title** | **MEASUREMENTS TECHNOLOGY** | | |
| **Semester** | **7th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Mixed** | | |
| **Hours/week** | **2 Lecture** | **1 Applied Exercises** | **2 Laboratory** |
| **Workload/Week** | **9** | | |
| **ECTS credits** | **5** | | |
| **Prerequisites** | | | |
| **Contact Person** | Stamatis Voliotis, +30-22280-99641, svoliotis@teihal.gr | | |

**Learning Outcomes:**
To introduce the students to the science and technology of metrology and the use of sensors and data acquisition systems.

**Course Description:**
Introduction of Measurements Technology. Analog-to-Digital and Digital-to-Analog conversion errors. Sensors and digital measurement systems. Data acquisition and processing. Applications.
Measurements of non-electrical sizes: force and torque, velocity and acceleration, pressure, flow and fluid level, temperature
Special type sensors and applications

**Recommended Reading:**

1. Capel Vivian, Home security: Alarms, sensors and systems
2. Morriss S. Brian, Automated manufacturing systems: Actuators, controls, sensors and robotics.
3. Soloman Sabrie, Sensors handbook.
4. Busch-Vishniac, Electromechanical sensors and actuators.
5. Bishop, Practical electronic sensors.

| | | | |
|---|---|---|---|
| **Title** | **PROFESSIONAL ETHICS** | | |
| **Semester** | **7th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **HFL** | **Obligatory Elective** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **6** | | |
| **ECTS points** | **4** | | |
| **Prerequisites** | | | |
| **Contact Person** | Pantelis Koukos, +30-22280-99651, pankoukos@teihalg.r | | |

**Objective:**
To enable the student to understand the principles of professional and scientific ethics, to introduce the topics of welfare and preservation of natural resources.

**Course Description:**
Ethics: basics, definitions. Theories of ethics. International and national ethics codes. Philosophical and legal issues. Ethical dilemmas anatomy. Decision making methodology. The personality of the individual as a key element in the decision making process. Responsibility issues. The rights and needs of the consumers. Labor Ethics. Scientific community ethics. Scientific publications. Copyright, patenting, trademark, etc…

**Suggested Readings:**


1. Oakley.J, Virtue Ethics and Professional Roles. Cambridge University Press, 2001
2. Bouchoux.D.E., Protecting Your Company's Intellectual Property: A Practical Guide to Trademarks. Copyrights. Patents&Trade Secrets. AMACOM, 2001.
3. Rugiero.V.R., Thinking Critically about Ethical Issues. May-field Pub. Co., 2000.
4. Ferrel,O.C., Fraedrich.J.. Ferrel.L., Business Ethics: Ethical decision Making and Cases. Houghton Miffin College. 2000.
5. Rosenthal.S.B.. Buchholz.R.A., Rethinking Business Ethics: A pragmatic Approach. Oxford University Press, 1999.
6. Carrol,A.B.. Bucholz.A.K., Business and Society: Ethics and Stakeholder Management. 4th edition. South-western Pub, 1999.
7. Davis.M., Thinking Like an Engineer: Studies in of a Profession. Oxford University Press, 1998.
8. Deveer. Van D.. Pierce.C.. VanDeVeer.D., Environmental Ethics and Policy Book: Philosophy, ecology. Economics. WadsvvorthPub Co, 1997

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|---|---|---|---|
| **Title** | **ENVIRONMENTAL PROTECTION** | | |
| **Semester** | **7th** | | |
| **Department** | **Electrical Engineering** | | |
| **Category** | **HFL** | **Obligatory Elective** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **6** | | |
| **ECTS points** | **4** | | |
| **Prerequisites** | | | |
| **Contact Person** | Pantelis Koukos, +30-22280-99651, pankoukos@teihal.gr | | |

**Objective:**
To give the graduating students of the Department the basic guidelines of the sustainable development and the green technologies, that will allow and help them to practice their profession within the framework for the environment protection and development described by the European Union.

**Course Description:**
The European Union policies for the environment and the sustainable development; the European and national operational framework.
Company growth and the environment. Engineering projects and the environment.
Bioclimatic Architecture and Construction techniques, Energy Saving Techniques Alternative Energy Production and Processes.
Recycling and new Collecting and Processes for the garbage.
The Green Industry as a new productive sector

Case studies

**Suggested Readings:**
1. Business and the Environment, Documents of the E.U and Greek Ministry for the Environment.

## *Eighth Semester*

| | | |
|---|---|---|
| **Title** | **PRACTICAL TRAINING** | |
| **Semester** | **8th** | |
| **Department** | **Electrical Engineering** | |
| **Category** | | **Obligatory** |
| **Workload/Week** | **20** | |
| **ECTS points** | **10** | |
| **Prerequisites** | | |

**Objective**

Before a student can graduate from the Department, they must do their practical training with a company in an area related to their studies. The practical training gives them the opportunity to apply and enrich their knowledge in a real life working environment, familiarize themselves with safety in the workplace procedures and labor issues, and gain information that may be used in their senior projects.

| | | |
|---|---|---|
| **Title** | **SENIOR PROJECT** | |
| **Semester** | **8th** | |
| **Department** | **Electrical Engineering** | |
| **Category** | | **Obligatory** |
| **Workload/Week** | **30** | |
| **ECTS points** | **20** | |
| **Prerequisites** | | |

**Objective/ Course Description:**

The senior project is mandatory for the completion of one's studies at the Electrical Engineering Department. The student is free to choose the topic of the project from a list of topics suggested by the teaching staff. The senior project offers the students the chance to study in depth a certain topic, to familiarize themselves with the research process, and the information and bibliography search and processing, to apply knowledge they have acquired over the previous years of their studies in order to build a device or implement an arrangement, to participate in medium or large scale experiments and practice their technical writing skills.

## 4.2 Language

*All courses are taught in Greek except from the English language module.*

## 4.3 Final exams - Evaluation Procedures

Students' performance in purely theoretical courses or in the theoretical aspect of mixed courses is evaluated through written examinations at the end of the semester. Optionally, there can be mid-term exams.

In a laboratory course, students' performance is assessed regularly with a relevant written report at the end of each lab session while there is also an overall assessment at the end of the semester.

For their practical training students' assessment is largely based on their employer's report which is concerned mainly with the conscientiousness and competence of the trainee; this one is a Pass/Fail course.

The progess of a senior project is monitored and evaluated by a supervising academic who assesses the performance of the student while working on it, the final outcome, and the student's presentation/oral examination before a three-member committee.

## 4.4 ECTS coordinator

Dr Aphrodite Ktena, Assistant Professor, tel.: +30-22280-99606, e-mail: aktena@teihal.gr

# 5. Department of Foreign Languages

## 5.1 General Information

The department of Foreign Languages offers courses in four foreign languages including English, French, German and Greek. The academic staff of the department aim at the fulfillment of current and future language needs of the TEI students and the development of the required skills by the students so that they can meet those needs and acquire a competitive advantage when they enter the arena of their professional life.

A recently initiated course in the department focuses on the Greek language and Greek history addresses the academic and linguistic needs of foreign students studying at TEI. It consists of 4 academic hours per week for the Greek Language, and 2 for the cultural seminars which include excursions in archaeological sites around Halkida.

The learning process of specialised English language in the T.E.I of Chalkida, Greece gives the students an opportunity to broaden their knowledge of English language skills in a variety of forms and genres and in response to numerous socio-cultural, economical and technological developments emerging as an outcome of globalisation and Information Age. English language courses in TEI involve the enactment of an ongoing learning process engendering the following fundamentals:

1. **A learner- and learning-centred approach** - a move from teaching to learning
2. **A communicative and task-based approach** with authentic communication tasks and learning tasks
3. Emphasis on **developing language skills and strategies**
4. Emphasis on **creativity**
5. **ESP in higher classes** - better preparation for work or study tasks
6. More intensive use of the **modern language** in the classroom developing **language awareness** and familiarity with multicultural perspectives in different academic disciplines
7. **Variety** in working methods
8. Use of **information technology, multimedia, E-mail** etc.
9. Encouraging **learner autonomy, self-assessment, cross-cultural awareness**
10. **Project work** (based on authentic, real-life situations, also lab exercises)

The specialised English language courses for the TEI students have been designed on the guidelines of the "**Common European Framework of Reference for Languages"** which was constituted in 2001 and amended in the follow up report entitled **"EU Action Plan 2004-2006** - **Promoting Language Learning and Linguistic Diversity"** (See APPENDIX 1). According to this framework the main aims of the EU policy are:

- **Ä** Expansion of benefits through life-long foreign language learning to all citizens
- **Ä** Improvement of foreign language teaching methods and
- **Ä** Development of a friendlier environment for languages.
- **Ä** Building language-friendly communities

For further information contact
Ms Lefki Papacharalambous
Office Phone Number: +30 2228 99562

E-mail: lefkipapacharalambous@yahoo.gr
Office Hours: Monday and Wednsday, 10am-2pm.

## 5.2 Course Syllabus

| | | | |
|---|---|---|---|
| **Title** | **ELECTRICAL ENGINEERING – ENGLISH I** | | |
| **Semester** | **2ND** | | |
| **Department** | **Foreign Languages** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **6** | | |
| **ECTS points** | **3** | | |
| **Prerequisites** | | | |

**Objective:**

To familiarize the students with the electrical, electronic and computer engineering terminology in the foreigh language of their choice and train their written and oral skills.

**Course Description:**

*Specialised terminology on:*

- Measurements, electrical fields and circuits.

- Magnetism, machines and electronics.

*Reading and listening comprehension of technical and scientific texts.*
*Grammar exercises*

**Suggested Readings:**

1.PEPPA, IF., 2008, "THE LANGUAGE OF TECHNICAL ENGLISH", ION PUBLICATIONS

2. EASTWOOD, J., 2007, "OXFORD LEARNER GRAMMAR INTERMEDIATE**,** OXFORD.

| | | | |
|---|---|---|---|
| **Title** | **ELECTRICAL ENGINEERING – ENGLISH II** | | |
| **Semester** | **3RD** | | |
| **Department** | **Foreign Languages** | | |
| **Category** | **S** | **Obligatory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture** | **Applied Exercises** | **Laboratory** |
| **Workload/Week** | **6** | | |
| **ECTS points** | **3** | | |
| **Prerequisites** | **ENGLISH I**<br><br>To enroll in this course, students need to have successfully completed 1 semester of studies in the English Language Level I in TEI; alternatively they should own a universally recognised certificate of English language competence (e.g. *Lower* or *Advanced* or *Proficiency* Certificate issued by Cambridge/Michigan University or or an equivalent certificate issued by the Greek Ministry of Education, YPEPTH). | | |

**Objective:**

To familiarize the students with the electrical, electronic and computer engineering terminology in the foreigh language of their choice and train their written and oral skills.

**Course Description:**

*Specialised terminology on:*

- Measurements, electrical fields and circuits.

- Magnetism, machines and electronics.

*Reading and listening comprehension of technical and scientific texts.*
*Grammar exercises*

**Suggested Readings:**

1. KIRIAZI-PAPAKONSTANTINOU, 2005, "ENGLISH FOR ELECTRICAL ENGINEERING AND ELECTRONICS - BOOK II", ELLIN PUBLICATIONS

2. GLENDINNING, E. H. & MCEWAN, J., 2005, "BASIC ENGLISH FOR COMPUTING", OXFORD, UK

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| **Title** | **ELECTRICAL ENGINEERING –**<br><br>**ENGLISH LANGUAGE TERMINOLOGY** | | |
| **Semester** | $4^{th}$ | | |
| **Department** | **Department of Foreign Languages** | | |
| **Category** | Optional | **Compulsory** | |
| **Type** | **Theoretical** | | |
| **Hours/week** | **2 Lecture Hours** | | |
| **Workload/Week** | **10** | | |
| **ECTS points** | **4** | | |
| **Prerequisites** | **ENGLISH I & II**<br><br>To enroll in this course, students need to have successfully completed 2 semesters of studies in the English Language Level I and Level II in TEI; alternatively they should own a universally recognised certificate of English language competence (e.g. *Lower* or *Advanced* or *Proficiency* Certificate issued by Cambridge/Michigan University or or an equivalent certificate issued by the Greek Ministry of Education, YPEPTH). | | |

**Objective:**

This module is aimed for the students who are at the B2-C1 level of language competence on the CEF board and need to enhance their knowledge of the specialised foreign language used in their academic discipline to the extent that they will become able to literary or not, sophisticated and lengthy excerpts from specialized articles and lengthy technical guidelines related to their job specialty. Also on successful completion of this module learners should be able to understand the oral speech with no difficulty either in conditions of direct interaction or via mass communication media even when the fellow conversers talk fast, provided that there is adequate time for them to get familiar with a particular manner of speaking. Finally, they should also be able to identify the differences between different writing formats and produce written work of different formats (e.g. essays, articles, memos, reports, guidelines, etc).

**Course Description:**

- The module includes reading comprehension and analysis of technical texts relevant to the area of Electrical Engineering at an advanced level of competence, ie: description of electronic components and devices, sources of electric energy, magnetism, cells and batteries, electromechanical devices, electronic communication systems, etc.
- The teaching methodology involves complex listening and writing activities, speaking tasks, acquisition of technical terminology as well as a thorough revision of all the foreign language grammatical and syntactical phenomena that have been taught in previous levels.

**Teaching Methods**

- Lecture

- Seminar
- Project work

**Assessment Methods**

Assessment takes place on a continuous basis and involves oral and written tests, presentations, assignments and project work. Most frequently used assessment methods are:

- End-of-term written exam paper
- In-term Assignment
- Poster presentation

**Suggested Readings:**

1. PAPACHARALAMBOUS, L. & PEPPA, IF., 2007, "ENGLISH FOR ENGINEERS", ELLIN PUBLICATIONS

2. KIRIAZI-PAPAKONSTANTINOU, 2005, "ENGLISH FOR ELECTRICAL ENGINEERING AND ELECTRONICS- BOOK IV", ELLIN PUBLICATIONS