M E C H A N I C A L  E N G I N E E R I N G

Five-year M.Sc. studies
School of Mechanical Engineering
National Technical University of Athens

Athens, September 8, 2010
Semester 1:

- Mathematics Ia (52h lectures and exercises)
- Mathematics Ib (65h lectures and exercises)
- Physics I (65h lectures and exercises)
- Mechanical Engineering Drawing I (52h lectures and exercises + 4h laboratory)
- Introduction to Computer Science (52h lectures)
- Mechanics I (78h lectures and exercises)
- Introduction into Mechanical Engineering (39h lectures)
- Operating Systems (26h lectures)

Semester 2:

- Mathematics IIa (65h lectures and exercises)
- Mathematics IIb (52h lectures and exercises)
- Physics II (65 lectures and exercises)
- Mechanics II (78h lectures and exercises)
- Mechanical Engineering Drawing II (65h lectures and exercises + 6h laboratory)
- Programming Languages (26h lectures and exercises)
- Engineering Materials (52h lectures and exercises)
- Introduction to Electric Circuits and Systems (52h lectures and exercises)

Semester 3:

- Mathematics IIIa (52h lectures and exercises)
- Numerical Analysis (52h lectures and exercises)
- Mechanics III (78h lectures and exercises + 16h laboratory)
- Machine Elements I (78h lectures and exercises)
- Electromechanical Power Conversion Systems (52h lectures)
- Introduction to Mechanical Workshop Technology (52h lectures)
- Engineering Economics (52h lectures)
Semester 4:
- Heat Transfer I (78h lectures and exercises)
- Thermodynamics I (78h lectures and exercises)
- Fluid Mechanics I (78h lectures and exercises)
- Machine Elements II (78h lectures and exercises)
- Mechanisms and Introduction to Machine Design (52h lectures)
- Industrial Electronics (52h lectures)

Semester 5:
- Mechanical Measurements (78h lectures and exercises+6h laboratory)
- Production/Operations Management and Business Administration I (65h lectures)
- Manufacturing Processes I (52h lectures)
- Industrial Fluid Mechanics (52h lectures)
- Steam Generators I (78h lectures)
- Thermal Turbomachines (52h lectures)
- Machine Dynamics I (52h lectures)

Semester 6:
- Hydraulic Turbomachines I (65h lectures)
- Internal Combustion Engines I (78h lectures and exercises)
- Environmental Technology (39h lectures)
- Manufacturing Processes II (52h lectures)
- Operational Research I (52h lectures)
- Analysis of Mechanical Structures I (52h lectures)
- Introduction to Automatic Control Systems (78h lectures)
Semester 7, Energy Engineering Cycle:

I. Core Courses

- Thermodynamics II (52h lectures)
- Internal Combustion Engines II (52h lectures)
- Fluid Mechanics II (52h lectures)
- Hydroelectric Power (52h lectures)
- **Physical Principles of Nuclear Power Reactor Plants (Nuclear Engineering I) (52h lectures)**


II. Elective Courses

Students should also choose two from the following courses:

- Heat Transfer II (52h lectures)
- Thermodynamics Software (52h lectures)
- Transport Phenomena (52h lectures)
- Experimental Fluid Mechanics (52h lectures)
- New and Renewable Energy Sources (52h lectures)
- Optimization Methods in Aerodynamics (52h lectures)
- **Interactions of Ionizing Radiations with Matter (52h lectures + laboratory)**

Sources of radiation (α- β- γ- and neutron sources), interaction of α- and β-particles, photons, neutrons and fission fragments with matter, Introduction to Monte-Carlo computer codes for the simulation of interaction of radiation with matter. Safe use of radioactive sources, Radiation damage. Laboratory Training.

- **Industrial Applications of Nuclear Engineering (52h lectures)**

Semester 8, Energy Engineering Cycle:

I. Core Courses

- Refrigeration I (52h lectures)
- Combustion Theory, Combustion Systems (52h lectures)
- Computational Fluid Dynamics (52h lectures)
- Wind Energy (52h lectures)
- **Nuclear Power Reactor Set-up and Operation (52h lectures)**


II. Elective Courses

Students should also choose two from the following courses:

- Steam Generators II (52h lectures)
- Computational Methods for Transport Phenomena (52h lectures)
- Principles of Jet Propulsion (52h lectures)
- Gas Exchange and Supercharging of Internal Combustion Engines (52h lectures)
- Hydrodynamic Installations (52h lectures)
- Thermal Turbomachines II (52h lectures)
- Computational Project (52h lectures)
- **Radiation Protection and Dosimetry (52h lectures)**


- **Biomedical Engineering – Medical Imaging & Radiotherapy (52h lectures)**

Nuclear Measuring Systems (36h lectures + 16h laboratory exercise)


Semester 9, Energy Engineering Cycle:

I. Core Courses

- Equipment and Systems of Thermal Processing (52h lectures)
- Pollution Abatement Technology for Thermal Plants (52h lectures)
- Air-Conditioning (52h lectures)
- Solar Energy (52h lectures)
- Gas and Steam Turbine Operation (52h lectures)

II. Elective Courses

Students should also choose two from the following courses:

- Combustion/Pollution of Internal Combustion Engines (52h lectures)
- Refrigeration II (52h lectures)
- Combustion/Pollution of Aircraft Engines (52h lectures)
- Thermal Energy in Buildings (52h lectures)
- Hydraulic Turbomachines II (52h lectures)
- Viscous Flows in Turbomachines (52h lectures)
- Aeroelasticity and Aeracoustics (52h lectures)
- Bio-Fluid Mechanics and Biomedical Engineering (52h lectures)
◆ Thermal-Hydraulic Analysis of Nuclear Power Plants (52h lectures + 4h laboratory)


◆ Radioenvironmental Analysis and Protection (52h lectures + project)