UNIVERSITY of NICOSIA

Course Code	Course Title	ECTS Credits
MENG-260	Thermodynamics I	6
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	PHYS-150, CHEM-106
Type of Course	**Field**	**Language of Instruction**
Required	Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
1st Cycle	2nd	Dr Constantinos Hadjistassou
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The entire electrical energy generation starting from the steam power plants, nuclear power stations, gas turbines etc. as well as all types of combustion engines are based on the principles of thermodynamics. The thorough understanding of these principles is hence of prior necessity for all energy related engineering studies as is Oil and Gas Energy Engineering. In the present course the student is being taught the assessment of various thermo-dynamic processes based on the Carnot Cycle, Rankine Cycle, Brayton Cycle or other via the pressure-volume PV and temperature-entropy TS diagram analysis leading him through the successive Isothermic, Isobaric, Isochoric, Adiabatic and Isentropic processes.

Learning Outcomes:

After completion of the course students are expected to:

- produce all major laws and equations related to thermo-dynamics as:
  First Law: $dE = dQ - dW$
  Second Law: $dS > 0$
  Ideal Gas Law: $pV = Nrt$
- distinguish and assess all major thermo-dynamic processes
- analyze a specific thermo-dynamic processes from the steam-tables via parameters
  -Temperature
  -Pressure
  -Density
  -Enthalpy
  -Entropy
  and thus derive (for example) the energy balance of the system, efficiency.

Course Contents:

- First Law of Thermodynamics
- Avogadro's Number
- Ideal Gases

- Pressure-volume PV-Diagram
- Isothermal, Isobaric, Isochoric, Isentropic else Adiabatic processes.
- Irreversible Processes and Entropy
- Second Law of Thermodynamics
- Temperature-Entopy TS-Diagram
- Steam Tables
- Basic Thermodynamic Cycles
- Electrical Power Plants
- Combustion Engines, four stroke/ two stroke engines
- Efficiency of engines

Learning Activities and Teaching Methods:

The course is being taught through lectures providing the theoretic fundamentals. Solving extensive examples through a continuous exchange with the students creates firm understanding of the various topics. Referring to practical aspects related to the topics matures the general concept of the students about their studies. The course is being accompanied on occasions by practical presentations of functioning principles on demonstrative examples in class.

Assessment Methods:

Homework, midterm exam, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Sanford Klein & Gregory Nellis	Thermodynamics	Cambridge Univ.Press	2012	9780521195706

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Thomas Engel & Philip Reid	Statist.Thermodyn. & Kinetics	Prentice- Hall	2012	9780321766182
Patrick Jacobs	Thermodynamics	Imperial College Press	2013	9781848169708