

Faculty	Engineering
Bachelor	Mechanical Engineering (CL3)
Year/Semester	2 I/II

Course Title	Applied Physics
ID Course Code	60355
Course Credits (CFU)	12
Scientific-Disciplinary Sector	ING IND 10
Course Type	mono-disciplinary course
Lecturer-in-charge	Prof. Giovanni Tanda

Learning Outcomes:

The course is aimed at giving basic knowledges of Applied Thermodynamics, Energetics and Heat Transfer. Topics will be presented from the theoretical point of view and correlated by numerical examples concerning technical problems of practical interest.

Course Organisation Details

First section:

Thermodynamic systems: definition. Heat and work. First and second laws of thermodynamics. Ideal gas law and properties. Pure substances: properties and thermodynamic diagrams. Numerical examples.

Thermodynamic cycles: Carnot, Joule, Otto, Rankine. Inverse cycles for refrigeration and heat pump appliances.

Thermodynamics of fluids: Equations of Bernoulli and Hugoniot; numerical examples.

Second section:

Energetics: fossile fuels, renewable sources (thermal solar, PV solar, wind, water, biomass, tidal and waves, geothermal), nuclear (fission and fusion) energy. Environmental pollution, greenhouse effect.

Energy consumptions: national and world data, prediction of future energy requirements.

Thermal energy: conduction, convection and radiation. Numerical examples.

Thermal energy saving and recovery; thermal insulation.

Assessment	hours
Lectures	100
Practice	20
Laboratory	0.0
Integrative activities	0.0

References

G.Tanda. Dispense del corso di Fisica Tecnica (parte prima e parte seconda), www.unige.it (aulaweb)

G.Comini, Lezioni di Termodinamica applicata, SGE Padova

G.Comini, G.Cortella, Energetica generale, SGE Padova

G.Guglielmini, C.Pisoni, Elementi di trasmissione del calore, MASSON Ed. Autore/i, Titolo, Editore, anno;

Organization and examinations

The course consists of two parts: technical thermodynamics (first semester) and energetics & heat transfer (second semester). The examination is oral, with written text throughout the course lessons.

Pre-requisites

12 CFU among *Analisi matematica 1*, *Geometria*, *Fisica generale*, *Chimica ed Informatica per l'ingegneria industriale*.