Course title:

Thermodynamics of Materials

Duration [number of hours]: 24

PhD Program [MERC/MPS/SPACE]: MPS

Name and Contact Details of Lecturer:

G. Mensitieri

Course Description:

This course addresses some fundamental issues of the thermodynamics of materials with the aim of discussing the main aspects of macroscopic thermodynamics related to the description of the behaviour of materials in different states.

Topics:
Integral and local forms of energy and entropy balances. Criteria and conditions for equilibrium in multicomponent systems. Effects of the presence of external fields and of the curvature of interfaces on equilibrium conditions. Construction of phase diagrams of materials.

Non-equilibrium thermodynamics. Use of thermodynamics with internal state variables. Applications of entropy balance to non-equilibrium conditions. Procedures for the development of constitutive equations describing the behavior of materials.

Second order transitions. Critical phenomena.