**PAP 715 – Materials Physics**

**Aims and Objectives**

a. To provide a good understanding of modern thermodynamics and its applications in nanoscale materials;
b. To help the students to master the basic scheme to establish the quantitative models based on the thermodynamics;
c. To teach the students the synergetics approach to deal with the nonlinear phenomena, such as, phase transition, pattern formation, etc.

**Syllabus**

Topics to be covered include:
- Modern thermodynamics --- microstructural evolution equations, dissipative structures, etc;
- Solid state physics --- phase transition, phenomenological and mechanism-based models;
- Continuum mechanics --- defect mechanics, strain effect;
- Partial differential equations --- stability analysis, synergetics approach.

**Assessment**

Term Project 70%
Class Participation and Activity 30%

**Prerequisites**

PAP442 Solid State Physics II or By approval

**Recommended Text**