DEPARTMENT OF PHYSICS AND ASTRONOMY

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<tr>
<th>PHY190</th>
<th>Magnetism and Thermodynamics</th>
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<td><strong>SPR</strong></td>
<td>10 Credits</td>
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Outline Description
This module covers a subset of first year physics content, namely magnetism and thermodynamics. Specific topics include, thermal expansion of matter, heat transfer mechanisms, kinetic theory of gasses, heat engines, zero-th and first law of thermodynamics, magnetic fields, Lorentz force, magnetic forces on currents, the Hall effect, the Biot-Savart law, Ampere’s law, magnetic materials.

Restrictions
None

Pre-requisites
None

Co-requisites
None

Approx Time allocation (hours)
Lectures - 30, Problem classes - 20, Independent studies - 48

Assessment (%) Written examination -80%, Other - 20%

Aims
To provide a students with a fundamental understanding of thermodynamics and magnetism, specifically the following topics:

**Thermal Physics**
1. Temperature and the zeroth law of thermodynamic, Temperature scales
3. Stress and strain
5. The first law of thermodynamics. Internal energy, work and heat  
6. Heat engines, Efficiency of heat engines, refrigerators and heat pumps |
|---|---|
|**Magnetism** | 1. Introduction: Fields, Magnetic Field, Electromagnetic Field.  
2. Magnetic forces on moving charges.  
4. Motion of charged particles in a magnetic field.  
5. Magnetic forces on conductors and conducting loops.  
7. Magnetic dipole in non-uniform magnetic field.  
8. The Hall effect.  
|Outcomes | By the end of the unit, candidate will be able to demonstrate:  
1. A knowledge and understanding of physical laws and principles, and competence in application of these principles to diverse areas of physics  
2. an ability to solve problems in physics using appropriate mathematical tools  
3. an ability to identify the relevant physical principles and make approximations necessary to obtain solutions. |
|Recommended Books |  |
|Syllabus |  |
|Academic Notes |  |