

<b>Course Code</b>	GP109
<b>Course Title</b>	Materials Science
<b>No. of Credits</b>	3
<b>Pre-requisites</b>	-
<b>Compulsory/Optional</b>	Compulsory
<b>Aim(s):</b> Introduce the structure and properties of Engineering Materials, Relate Material properties to atomic, molecular and microstructural features.	
<b>Intended Learning Outcomes:</b> On successful completion of the course, the students should be able to:	
<ol style="list-style-type: none"> <li>1. Describe materials in Major classes of engineering materials</li> <li>2. Use Equilibrium Phase diagrams of Binary alloys to obtain the constitution at a given state.</li> <li>3. Appreciate structure, property, process relationships and applications of each class of materials.</li> <li>4. Perform different testing methods to evaluate properties of different materials</li> </ol>	
<b>Time Allocation (Hours):</b> Lectures: 38    Tutorials: 1    Practical: 12    Assignments:	
<b>Course Content/Course Description:</b>	
<ol style="list-style-type: none"> <li>1. Introduction to the structures and properties of engineering materials; bonding of solids; atomic arrangements and crystallography</li> <li>2. Principles underlying structure-property relationships; crystal structures; defects in crystals</li> <li>3. Phase equilibrium; diffusion and phase transformation kinetics; heat treatment of metals</li> <li>4. Structures and properties of cement and timber</li> <li>5. Properties and applications of polymers, ceramics and glass</li> <li>6. Properties and applications of composites; metal-matrix; polymer-matrix; and ceramic-matrix composites</li> <li>7. Mechanical testing of engineering materials and interpretation of results</li> <li>8. Laboratory practices: tensile testing of metals; impact and hardness testing; microscopically examination of metals; heat treatment of steel; cement testing; fabrication of polymer-matrix composite and measuring its mechanical properties</li> </ol>	
Recommended Texts (if any) :	
<ol style="list-style-type: none"> <li>1. <i>Engineering Materials 1, An introduction to their Properties and Applications</i></li> <li>2. <i>Engineering Materials 2: An Introduction to Microstructures, Processing and Design</i>, Michael F. Ashby and David R. H. Jones, Butterworth-Heinemann, 1999</li> <li>3. <i>The Science and Engineering of Materials</i>, Donald R. Askeland, Pradeep P. Fulay and Wendelin J. Wright, Sixth Edition, Cengage Learning, Inc., 2010;</li> <li>4. <i>The Science and Engineering of Materials</i>, Donald R. Askeland, SI Edition, Nelson Thomas Ltd, 1998.</li> </ol>	
<b>Assessment</b>	<b>Percentage Marks</b>
<b>In-Course</b>	
Tutorials/Quizzes/Assignments/Course Work	20
Mid-semester examination	30
<b>End-semester</b>	50