EMAT 351 – Fundamentals of Materials  
Fall 2011  
Tu Th 12:30-1:45  ELC 106  

Course Outline  

Instructor:  Dr. Al Meier - ELC 212  
Phone: x4305, email: AMeier@mtech.edu  

Texts:  
Required:  R.E. Reed-Hill, R. Abbaschian, and L. Abbaschian,  
(There is a 3rd edition that can also be used and I have put a copy of this edition on reserve at the library.)  


Credits:  3 Credit Hours - Lecture  

Prerequisite:  M&ME 2510 (EMAT 252) or METE 2020 (EGEN 213) or an equivalent course. If you have not had either of these courses, you will need to catch up this material at the start of the semester.  

Goals:  This course is a required course in Metallurgical and Materials Engineering and for the General Engineering -Welding Option. The goal of this course is to introduce several of the basic deformation and phase transformation mechanisms that are important for materials engineering, with an emphasis on relating properties to structure and processing. There are 3 major objectives for this course:  

1.) To introduce the basic strengthening mechanisms for metallic systems and relate these mechanisms to metal processing and mechanical behavior. While the topics of dislocations and the related strengthening mechanisms are more important for metallic systems, applications to ceramics will also be provided.  

2.) To provide an introduction to phase transformations in material systems. An emphasis will be placed on metallic systems and a specific emphasis will be placed on steel. However, common relationships in ceramic and polymer systems will also be highlighted.  

3.) To introduce some of the materials analysis tools (i.e. diagrams and equations) for materials selection and predicting materials behavior.  

General Topics: