Syllabus

Description:

- This course provides an introduction to effects of microstructural variations on mechanical properties of steels, with an emphasis on heat treatment.

Educational objectives:

- We use an engineering approach to analyze complex microstructure of steels, with the goal of identifying and understanding the relationship between phase, microstructure, and mechanical properties.

Prerequisites:

Grading Components

Attendance (20%)

Midterm exam (35%)

Final exam (45%)

Calendar

LEC # / date	TOPICS
1-1	Phase and Structure
1-2	Phase and Structure
2-1	Pearlite, Ferrite and Cementite
2-2	Pearlite, Ferrite and Cementite
3-1	Pearlite, Ferrite and Cementite
3-2	Pearlite, Ferrite and Cementite
4-1	Martensite and Bainite
4-2	Martensite and Bainite
5-1/	Martensite and Bainite
5-2/	Martensite and Bainite
6-1/	Isothermal and Continuous Cooling Transformation Diagram
6-2	Isothermal and Continuous Cooling Transformation Diagram
7-1/	Heat Treatment to Produce Ferrite and Perarlite
7-2/	Heat Treatment to Produce Ferrite and Perarlite
8-1	Heat Treatment to Produce Ferrite and Perarlite
8-2	Midterm Exam
9-1	Hardness and Hardenability
9-2	Hardness and Hardenability
10-1	Austenite in Steels
10-2	Austenite in Steels
11-1	Tempering in Steels
11-2	Tempering in Steels
12-1	Tempering in Steels
12-2	Special Heat Treatments
13-1	Special Heat Treatments
13-2	Special Heat Treatments
14-1	Special Heat Treatments
14-2	Special Heat Treatments
15-1	Special Heat Treatments
15-2	Surface Hardening
16-1	Surface Hardening
16-2	Final Exam