Introduction to Metallurgy
(MTEN3012)

Required Textbook: The Science and Engineering of Materials, 7th edition
Donald R. Askeland

Professor Donglu Shi
The Materials Science & Engineering
Dept. of Mechanical and Materials Engineering
College of Engineering and Applied Science
University of Cincinnati

493 Rhodes Hall
Tel. 513-556-3100
e-mail: donglu.shi@uc.edu
http://homepages.uc.edu/~shid/

Objective

To introduce various basic concepts of metallurgy, such as crystal structure, defects, phase diagrams, mechanical properties, and hardening mechanisms. Also introduced are strengthening methods and failure process in engineering metals and alloys. The lectures will focus on their unique properties, selection, design, and industrial applications.

Teaching philosophy and policies for assignments/tests

(a) I shall try to cover the different topics from the text book as much as possible within the limits of the class. However, it may be difficult to cover everything in the textbook on a given topic. Therefore, I shall emphasize the important points from different topics.

(b) The Teaching Assistants will be available at their office during office hours for any questions. The TA's will also upload the copies of the solution manual on Blackboard after the deadline of the homework.

(c) All homework assignments are due in class to me on the days indicated. No late home work will be accepted.

(d) No make up exams will be given and I must be notified of any absence in advance.

Grading standard for a class average of 75% or above

90% to 100% - A, 80% to 89% - B, 70% to 79% - C, 60% to 69% - D, 59% or below - F

Grading policy

1.	One midterm	30%
2.	5-6 homework assignments	30%
3.	Final	40%
	Total:	100%

Introduction to Metallurgy *Professor Donglu Shi*
University of Cincinnati

Syllabus

		DRA	Lecture
Part I	Atomic Structure, Arrangement, and Movement		
a.	Atomic Structure	Ch. 2	2
b.	Atomic Arrangement	Ch. 3	3
			4
c.	Imperfection in the Atomic Arrangement	Ch. 4	5
			6
d.	Atomic Movement in Materials	Ch. 5	7
			8
Part II	Controlling the Microstructure and Mechanical Properties of Materials		
a.	Mechanical Testing and Properties	Ch. 6	9
			10
			11
b.	Strain Hardening and Annealing	Ch. 7	12
			13
c.	Principles of Solidification Strengthening and Processing	Ch. 8	14
			15
d.	Solid Solution Strengthening and Phase Equilibrium	Ch. 9	16
			17
e.	Dispersion Strengthening	Ch. 10/11	18
			19
Part III	Engineering Materials		
a.	Ferrous Alloys	Ch. 12	20
			21