THE UNIVERSITY OF UTAH

MSE-6001 Engineering Materials
Fall 2018
Department of Materials Science and Engineering

Instructor:	Prof. Ashutosh Tiwari
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Instructor:	Prof. Ling Zang
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Pre-requisites:	Full Major Status in Materials Science & Engineering
Lecture:	MWF 09:40 AM-10:30 AM; WEB2460
Credit Hours:	3

Text(s):
Canvas
Intro to Solid State Physics, Charles Kittel
Materials Science and Engineering W. D. Callister
Polymer Science and Technology (3rd Ed), Joel R. Fried

Course Description:
Required to all new MSE Graduate Students. MSE 6001 must be taken during the first fall semester new students enrolled. Introduction to general classes of materials: ceramics, polymers, metals and semiconductors. Materials properties and structure property relations. Contemporary research topics in different classes of materials

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Content Overview:

MSE 6001 is one of the core classes for graduate students in Materials Science and Engineering. The main topics covered in this class will be electronic structure and bonding, structure and defects, electronic properties, and mechanical properties. These topics will be taught in the context of a wide variety of engineering materials ranging from inorganics, to ceramics, metals, glasses, liquid crystals, polymers, and semiconductors.

Grading & Evaluation Methods:

1st half semester:
Quiz (2): 10%; Paper/Presentation: 15%; Exam: 25%
2nd half semester:
Quiz (2): 30%; Paper/Presentation: 20%

Key Dates:

Friday, August 31 - **Last day to add and drop**
Monday, September 3 - **Labor Day**
Sunday-Sunday, October 7– 16 - **Fall Break**
Friday, October 19- **Last day to withdraw**
Thursday-Friday, November 22– 23- **Thanksgiving**
Thursday, December 6- **Last day of classes**
Friday, December 7- **Reading Day**
Monday-Friday, December 10 – 16 - **Final Exam Period**

Americans with Disabilities Act Statement:

"The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodation in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations."

Faculty and Students' Responsibilities:

"All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well

as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, and I will do so, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee."

Class schedule:

week	Date	Instructor	Topic
1	Monday, Aug. 20	Tiwari	Crystal structure, structure-property correlation, materials processing
1	Wednesday, Aug. 22	Tiwari	"
1	Friday, Aug. 24	Tiwari	"
2	Monday, Aug. 27	Tiwari	"
2	Wednesday, Aug. 29	Tiwari	"
2	Friday, Aug. 31	Tiwari	Quiz-1 (10)
3	Monday, Sep. 3		**Labor Day Holiday (no class)**
3	Wednesday, Sep. 5	Tiwari	Electronic Materials/Ceramics
3	Friday, Sep. 7	Tiwari	"
4	Monday, Sep. 10	Tiwari	"
4	Wednesday, Sep. 12	Tiwari	"
4	Friday, Sep. 14	Tiwari	Quiz-2 (10)
5	Monday, Sep. 17	Tiwari	Magnetic Materials/ Thermoelectrics/Quantum Materials
5	Wednesday, Sep 19	Tiwari	"
5	Friday, Sep. 21	Tiwari	**"**
6	Monday, Sep. 24	Tiwari	**Paper presentation (15)**
6	Wednesday, Sep. 26	Tiwari	**Paper presentation**
6	Friday, Sep. 28	Tiwari	**Paper presentation**
7	Monday, Oct. 1	Tiwari	Opto and optoelectronics/other emerging materials
7	Wednesday, Oct. 3	Tiwari	"
7	Friday, Oct. 5	Tiwari	First Examination (15)
8	Sunday-Sunday, Oct. 7-14		**Fall Break (no class)**
9	Monday, Oct. 15	Zang	Atomic structure and interactions
9	Wednesday, Oct. 17	Zang	Organic Molecules: Structure, Property and Function
9	Friday, Oct. 19	Zang	Materials engineering at molecular and nanometer scale
10	Monday, Oct. 22	Zang	Microscopy characterization of materials: optical, electronic and scanning probe

10	Wednesday, Oct. 24	Zang	IR Spectrometry and application in structure characterization
10	Friday, Oct. 26		Engineering materials for renewable energy
11	Monday, Oct. 29	Zang	Quiz 1
11	Wednesday, Oct. 31	Zang	Polymer: basics
11	Friday, Nov. 2	Zang	Polymer synthesis
12	Monday, Nov. 5	Zang	Block co-polymers
12	Wednesday. Nov. 7	Zang	Crystalline Polymers
12	Friday, Nov. 9	Zang	Polymer Composites and Self-organized nanostructures
13	Monday, Nov. 12	Zang	Conducting polymers and optoelectronics
13	Wednesday, Nov. 14	Zang	Quiz 2
13	Friday, Nov. 16	Zang	Soft-lithography of polymers
14	Monday, Nov. 19	Zang	Molecular Self-assembly
14	Wednesday, Nov. 21	Zang	Liquid crystal: basics
14	Friday, Nov. 23		**Thanksgiving break (no class)**
15	Monday, Nov. 26	Zang	Liquid crystal: applications
15	Wednesday, Nov. 28	Zang	Open discussion: Engineering materials for clean environment
15	Friday, Nov. 30	Zang	Paper presentation
16	Monday, Dec. 3	Zang	Paper presentation
16	Wednesday, Dec. 5	Zang	Paper presentation
Final Exam	**No final exam**		