

MET/MSE 427/527: Ceramics Materials

Fall

Course Information:

Course title: Ceramic Materials
Course number: MET/MSE 427/527, Fall semester
Course credits: 3 credits
Course meeting: MWF 8:30 AM, McClure Room 315

Instructor Information:

Instructor: Prateek Sachdev
Office: McClure Hall, Room 416
Telephone: 885-2849
Fax: 885-4009
E-mail: sach0325@uidaho.edu
Office Hours: MWF, 9:30-10:30 AM (But feel free to contact me by phone or e-mail if you can't make it to my office easily).

Assigned Text: Course handouts and supplemental readings (to be announced)

Reference Texts:

1. James S. Reed, *Principles of Ceramics Processing, Second Edition*, John Wiley & Sons, Inc.
2. Yet-Ming Chiang, Dunbar P. Birnie, W. David Kingery, *Physical Ceramics: Principles for Ceramic Science and Engineering*, John Wiley & Sons
3. D.W. Richerson, *Modern Ceramic Engineering, Second Edition*, Marcel Dekker Inc. (1992).

Course Scope:

This course is designed to introduce ceramic materials to senior/beginning graduate students who already have junior level understanding of physical metallurgy principles. Another objective is to show how ceramics differ from conventional metals in terms of various properties and how to process them

Course Learning Goals:

Upon the completion of this course, students should possess:

1. Knowledge of different ceramic materials
2. Understanding of crystalline and non-crystalline structure of ceramics.
3. Knowledge of processing of ceramic materials.
4. Capability to analyze ceramic materials in term of their mechanical behavior, electrical and magnetic properties.
5. Ability to differentiate ceramics from conventional metals with regards to various properties.

Course Topics:

1. Introduction to ceramic materials
2. Silicate chemistry basics
3. Traditional ceramics
4. Processing of ceramics
5. Glass and glass ceramic materials
6. Mechanical behavior
7. Electrical properties of ceramics
8. Magnetic properties of ceramics

Course Calendar/Schedule:

<u>Lesson</u>	<u>TOPICS TO BE COVERED</u>
1.	Introduction
2.	Crystalline ceramic materials - sintering
3.	Crystalline ceramic materials - sintering
	NO CLASS – LABOR DAY
4.	Crystalline ceramic materials
5.	Crystalline ceramic materials
6.	Crystalline ceramic materials
7.	Crystalline ceramic materials
8.	Noncrystalline ceramic materials
9.	Noncrystalline ceramic materials
10.	Noncrystalline ceramic materials
11.	Noncrystalline ceramic materials
12.	Ceramic phase diagrams
13.	Ceramic phase diagram
14.	Ceramic phase diagrams
15.	Ceramic phase diagrams
16.	Exam
17.	Processing of ceramics
18.	Processing of ceramics
19.	Processing of ceramics
20.	Processing of ceramics
21.	Processing of ceramics
22.	Processing of ceramics
23.	Processing of ceramics
24.	Processing of ceramics
25.	Glass and glass ceramic materials
26.	Glass and glass ceramic materials
27.	Exam
28.	Mechanical behavior of ceramics
29.	Mechanical behavior of ceramics
30.	Mechanical behavior of ceramics
31.	Mechanical behavior of ceramics
32.	Mechanical behavior of ceramics

33.	Mechanical behavior of ceramics
34.	Mechanical behavior of ceramics
35.	Mechanical behavior of ceramics
36.	Electrical properties of ceramics
37.	Electrical properties of ceramics
38.	Electrical properties of ceramics
	THANKSGIVING BREAK
39.	Magnetic Properties of ceramics
40.	Magnetic Properties of ceramics
41.	Presentations
42.	Presentations
43.	Presentations
44.	Review
45.	FINALS WEEK- Final exam according to UI schedule

Grading:

1. Homework

Homework handed in after the due date will be worth a maximum of 50%. However, I will allow extensions if you consult with me in advance and if you have a major schedule conflict.

2. Exams:

This course will consist of three (3) exams. Two midterm and one final exam should be expected.

3. Class project:

A topic will be selected on mutual agreement. A list of topics along with approximate presentation dates will be provided. You are then expected to:

- Write a paper including references (about 20 typed pages).
- Make a 20- minute presentation to the class (provide a hard copy).

Midterm exams	30%
Final exam	30%
Homework	20%
Class project	20%

Standard University of Idaho grading policies will be applied. Students working at the graduate level (527) will be expected to provide more comprehensive responses than those at the undergraduate level (427) to obtain the same grade.

Disability Support Services Reasonable Accommodations Statement:

Reasonable accommodations are available for students who have a documented disability. Please notify the instructor during the first week of class of any accommodation(s) needed for the course. Late notification may mean that requested accommodations might not be available. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 333.

- **885-7200**
- **email at <dss@uidaho.edu>**
- **website at <www.access.uidaho.edu> or <www.webs.uidaho.edu/aap>**