



MATSCEN 5193.02: Individual Studies in Materials Science & Engineering
Structure and Properties of Amorphous Materials

7/20/2021

Instructor information

Name	Prof. Jonathan Brown
Contact Info	brown.4972@osu.edu
Office location	Fontana 4018
Office hours	TBD

Meeting Days, Times, and Location

Meets Weds/Fri at 11:30am-12:25pm in MacQuigg 159

- **Undergraduate class number: 30101**
- **Graduate class number: 37952**

No online section will be offered.

Format of instruction, credits, grading, and prerequisites

Format: Lecture

Credit Hours: 2

Final course grade: Letter graded

Offered once per year (AU)

Prerequisites:

- **Undergraduate:** MSE 2241, MSE 2251, MSE 3151, and MSE 3261; or permission of instructor.
- **Graduate:** Graduate student standing at the university

Course Description

- Covers structure and properties of oxide, metallic, semiconducting, and polymeric glasses emphasizing viscosity, glass transition, structural relaxation, and microstructure.

Learning Objectives

- Students will learn basics of atomic level structure and defects of amorphous materials including oxide, metallic, semiconducting, and polymeric glasses.
- Students will learn about theories of the temperature dependence of the viscosity of melts and of super-cooled liquids.
- Students will learn about the factors that promote glass formation in systems.
- Students will learn about microstructure that is present in many glass forming systems.
- Students will learn about the factors that influence the properties of amorphous materials.

Learning Resources

- **Book:** Fundamentals of Inorganic Glasses (3rd edition) by Arun Varshneya and John Mauro
 - **eBook ISBN:** 9780128162262
 - **Paperback ISBN:** 9780128162255

Course Schedule

Below is a general outline of the course. Specific assignment details and due dates are on the course Carmen page.

Week	Wednesday		Friday		HW due by following Weds
1	25-Aug	Intro	27-Aug	Intro	HW1
2	1-Sep	Glass formation	3-Sep	Glass formation	HW2
3	8-Sep	Viscosity	10-Sep	Viscosity	
4	15-Sep	Viscosity	17-Sep	Viscosity	HW3
5	22-Sep	Glass transition	24-Sep	Glass transition	
6	29-Sep	Glass transition	1-Oct	Glass transition	HW4
7	6-Oct	Microstructure	8-Oct	Microstructure	
8	13-Oct	Mid-term exam	15-Oct	No Class	
9	20-Oct	Microstructure	22-Oct	Microstructure	HW5
10	27-Oct	Atomic structure	29-Oct	Atomic structure	
11	3-Nov	Atomic structure	5-Nov	Atomic structure	HW6
12	10-Nov	Atomic motion	12-Nov	Atomic motion	
13	17-Nov	Atomic motion	19-Nov	Atomic motion	HW7
14	24-Nov	No Class	26-Nov	No Class	
15	1-Dec	Electrical/optical	3-Dec	Electrical/optical	HW8
16	8-Dec	Review			

Final Exam:	Thursday 16-Dec
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Assessments and grading

The final course grade will be calculated using the following categories:

Assessment	Percentage of Final Grade
Attendance and participation (two dropped)	10%
In class quizzes and homework (one dropped)	30%
Mid-term exam	30%
Final Exam	30%



Students will be assigned the following final letter grades, based on calculations coming from the course assessment section.

Grade	Percentage Threshold
A	93%
A-	90%
B+	87%
B	83%
B-	80%
C+	77%
C	73%
C-	70%
D+	67%
D	60%
E	<60%

Grading Policies

- **Late-work policy:** Late work will be accepted up to one class period after it was due. Late assignments will be graded with a 30% penalty. If you have special circumstances requiring an adjusted due date, please discuss with me in advance of the due date.
- **Make-up policy:** Make up exams will be available for students having documented work, class conflict, or illness. You must notify me in advance. There is no make-up for the final exam.
- **Re-grade policy:** If you believe that there was an error in the grading of an assignment or exam, you may request a re-grade in writing (via email) within one week of receiving the graded assignment.
- **Attendance and participation policy:** Attendance to class is expected, please sign-in when you come to class.
- **Dropped assignments:** Your lowest graded homework/quiz assignment will be dropped, and two class periods will not be counted toward your attendance/participation grade.



Course Policies

- **Academic misconduct**

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity of the University, or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, *I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct.* If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

- **Accommodations for students with disabilities**

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process (<http://slds.osu.edu/covid-19-info/covid-related-accommodation-requests/>), managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; <http://slds.osu.edu>; 098 Baker Hall, 113 W. 12th Avenue.

- **Statement on student wellness**

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting ccs.osu.edu or calling (614)292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at (614)292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-(800)-273-TALK or at suicidepreventionlifeline.org

- **Statement on Diversity**

The Ohio State University affirms the importance and value of diversity of people and ideas. We believe in creating equitable research opportunities for all students and to providing programs and curricula that allow our students to understand critical societal challenges from diverse perspectives and aspire to use research to promote sustainable solutions for all. We are committed to maintaining an inclusive community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among all members; and encourages each individual to strive to reach their own potential. The Ohio State University does not discriminate on the basis of age, ancestry, color, disability, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, race, religion, sex, gender, sexual



orientation, pregnancy, protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment.

To learn more about diversity, equity, and inclusion and for opportunities to get involved, please visit:
<https://odi.osu.edu/>

- **Sexual harassment/Title IX**

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

Online reporting form at equity.osu.edu,

Call 614-247-5838 or TTY 614-688-8605,

Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.