

MSE 2101 (Fall 2024)

MATERIALS SCIENCE INVESTIGATIONS: *PROPERTIES*

THERE ARE TWO WAYS OF EXERTING ONE'S **STRENGTH**. ONE IS PUSHING DOWN. THE OTHER IS PULLING UP. *Booker T. Washington*

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Graduate TA: Fanyue Kong, xwr8yd@virginia.edu

Undergraduate TA: Nico Fonseca Alva

Lecture: M/W 9:00 – 9:50 am; Jesser Hall, room 171

Lab: Wilsdorf Hall 103:

Tues 3-5pm

Weds 1-3pm

Weds 3-5pm

Other TBD (awaiting When2meet poll)

Office Hours: Not sure what I am expecting in a lab report? Swing by for chat. Curious or confused about some MSE topic? Swing by for a chat. Something else on your mind? Yep...

Prof. Floro office hours: Mon 2-3:30, Thurs 12-1:30, or by appointment; in WDF 216

Textbook: none required, but you really should have access to the MSE 2090 textbook (Callister & Rethwisch).

Equipment: notebook for labs.

Course Description: Materials are valuable to us when they serve a useful purpose - they carry, they contain, they conduct, they transmit, they resist, they compute, they adorn, they save, and yes, they kill. How well a material performs in YOUR application depends on its relevant properties. Materials properties are a bit like human behaviors: they vary greatly from material to material, and in an individual material, they can be modified and improved, albeit with effort. How do we do that? And how do we accurately measure what we've done? That's what *MSI: Properties* is all about. This is your opportunity to measure key properties in common and important materials. You will also get to change the internal structure of your materials, to see firsthand how the properties depend on structure. This will deepen your appreciation of the process-structure-properties design paradigm of Materials Science. *MSI:P* will help you become: a better experimentalist and observationalist, a thoughtful interpreter of data, and a more confident communicator of your accomplishments.

Our Objectives: By the end of the semester, here is what you will be able to do:

- Accurately measure specific materials properties across different materials classes.
- Analyze data to ascertain key quantities, identify behavioral trends, and convey meaning.

- Interpret experimental outcomes in the context of core materials knowledge.
- Effectively present your results.
- Be a valuable collaborator.

Assessments: The course has both classroom and laboratory components. In terms of grading, *it is all about the lab reports.*

Weekly Topical Quizzes: Incentivizes you to review the lecture topic of the week.

Labs: Each week your team will explore how properties differ within and across different materials classes and modify microstructure to control the properties. You will analyze the data to determine meaningful results. Lab Outcomes reports will improve your ability to parse and present results in context and with clarity.

Final Project: The final project will be a reading/online research project into some specific property and the related characterization technique that should go beyond what we do in class.

Grading:

Activity	Percentage of Total Grade
Lab Outcomes (full reports and analysis reports)	80
Final Project	20
Total	100

Schedule of Activities: to be provided separately on Canvas

SAFETY:

A lab course will always present some potential dangers. We must work together to minimize risk, in part by raising awareness of how to build safety into your plan of work, and being cognizant of hazards.

Expectations and Policies

Attendance: You learn more if you come to class and participation in the labs is pretty much the whole reason to take this class. I can work with you when you're sick or have one-off commitments, **but you must communicate with me ahead of time whenever possible.**

Lab Reports: Doing neat, organized work will be important, always, both to me and to your future employers. Submit your reports on time.

Honor System: Every student in this course must comply with all provisions of the UVa honor system. On tests and exams you pledge that you have neither received nor given unauthorized aid.

From your Honor Reps: *The School of Engineering and Applied Science relies upon and cherishes its community of trust. We firmly endorse, uphold, and embrace the University's Honor principle that students will not lie, cheat, or steal, nor shall they tolerate those who do. We recognize that even one honor infraction can destroy an exemplary reputation that has taken years to build. Acting in a manner consistent with the principles of honor will benefit every member of the community both while enrolled in the Engineering School and in the future.*

If you have questions about your Honor System or would like to report suspicions of an Honor Offense, please contact a SEAS Honor Committee member.

Students with disabilities or learning needs

It is my goal to create a learning experience that is as accessible as possible. If you anticipate any issues related to the format, materials, or requirements of this course, please meet with me outside of class so we can explore potential options. Students with disabilities may also wish to work with the Student Disability Access Center to discuss a range of options to removing barriers in this course, including official accommodations. Please visit their website for information on this process and to apply for services online: sdac.studenthealth.virginia.edu. If you have already been approved for accommodations through SDAC, please send me your accommodation letter and meet with me so we can develop an implementation plan together.

Discrimination and power-based violence

The University of Virginia is dedicated to providing a safe and equitable learning environment for all students. To that end, it is vital that you know two values that I and the University hold as critically important:

1. Power-based personal violence will not be tolerated.
2. Everyone has a responsibility to do their part to maintain a safe community on Grounds.

If you or someone you know has been affected by power-based personal violence, more information can be found on the UVA Sexual Violence website that describes reporting options and resources available - www.virginia.edu/sexualviolence.

As your professor and as a person, know that I care about you and your well-being and stand ready to provide support and resources as I can. As a faculty member, I am a responsible employee, which means that I am required by University policy and federal law to report what you tell me to the University's Title IX Coordinator. The Title IX Coordinator's job is to ensure that the reporting student receives the resources and support that they need, while also reviewing the information

presented to determine whether further action is necessary to ensure survivor safety and the safety of the University community. If you wish to report something that you have seen, you can do so at the [Just Report It portal](#). **The worst possible situation would be for you or your friend to remain silent when there are so many here willing and able to help.**

Religious accommodations

It is the University's long-standing policy and practice to reasonably accommodate students so that they do not experience an adverse academic consequence when sincerely held religious beliefs or observances conflict with academic requirements.

Students who wish to request academic accommodation for a religious observance should submit their request in writing directly to me by email as far in advance as possible. Students who have questions or concerns about academic accommodations for religious observance or religious beliefs may contact the University's Office for Equal Opportunity and Civil Rights (EOCR) at UVAEOCR@virginia.edu or 434-924-3200.

Undergraduate Programs team

You have many resources available to you when you experience academic or personal stresses. In addition to your professor, the School of Engineering and Applied Science has three staff members located in Thornton Hall who you can contact to help manage academic or personal challenges. **Please do not wait until the end of the semester to ask for help!**

Lisa Lampe, Director of Undergraduate Education (academic), l4uu@virginia.edu

Blake Calhoun, Director of Undergraduate Success (academic), bic4sc@virginia.edu

Alex Hall, Assistant Dean of Students (non-academic issues), aec5d@virginia.edu

In addition to having an Assistant Dean of Students embedded in Engineering, we are also fortunate to have two CAPS counsellors embedded in our School. You may schedule time with *Elizabeth Ramirez-Weaver* or *Katie Fowler* through Student Health (<https://www.studenthealth.virginia.edu/getting-started-caps>). When scheduling, be sure to specify that you are an Engineering student.