

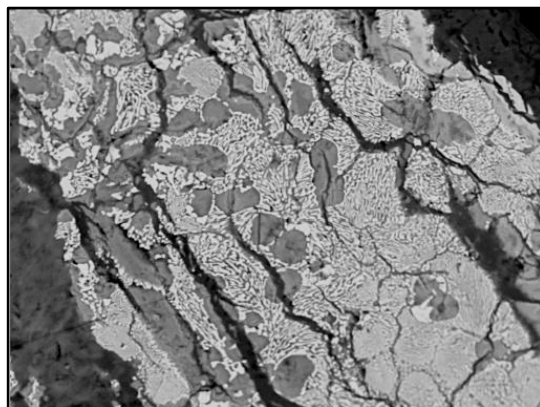
ANTH 304/604: Introduction to Archaeological Materials Analysis

Alice Hunt, PhD (she/hers)
Please call me: Dr. Hunt

Email: alice.hunt@rochester.edu

Office Phone: (585) 273-3209

The best way to communicate with me is by email. Please include the course number and your section in the subject line of the email (e.g., ANTH 304/604, MW 10 am). It can take me 1-2 business days to respond to email, so if you require more immediate assistance, please use the 'Questions' discussion board in Blackboard. Please note that I do not check email regularly after 5 p.m. or on the weekend.



Office Hours

Tuesday, 10-11:30 a.m. via Zoom (<https://rochester.zoom.us/j/XXXXXXX>)

Thursday, 10-11:30 a.m. in Lattimore 209

Teaching Assistants

Travis Jones (he/his), tjones23@rochester.edu – Office Hours and Laboratory



Course Details

Meeting Place & Time

Lecture will meet in Lattimore 430, Monday, and Wednesday, 10-11:30 a.m.

Laboratory will meet in Goergen 409, Friday, 10 a.m.-Noon

Monday	Tuesday	Wednesday	Thursday	Friday
10-11:30 a.m. Lattimore 430 Class	10-11:30 a.m. Zoom Office Hours	10-11:30 a.m. Lattimore 430 Class	10-11:30 a.m. Lattimore 209 Office Hours	10 a.m.-Noon Goergen 409 Lab
Complete: Assigned reading Learning journal		Complete: Assigned reading Learning journal	Complete: Assigned reading Learning journal	Complete: Lab report Learning journal

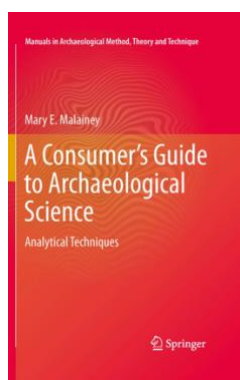
Format

Both lecture and laboratory classes will be conducted in person and will not be recorded.

Description

Archaeology is the study of the human past through analysis of materials (artifacts, architecture, features, and texts) and the relationship of these materials in space and through time. This course is a survey of the analytical methods and techniques used in archaeological materials analysis, the branch of archaeological science that deals with the technology, composition, and distribution of artifacts, to characterize the three classes of archeomaterials: ceramic, glass/frit, and metal/alloy. In this course, you will be introduced to the basics of materials science and equipped with key concepts for evaluating analytical data and integrating archaeological materials analysis within the larger framework of anthropological research.

Required Materials



Malainey, M. E. 2012 A Consumer's Guide to Archaeological Science: Analytical Techniques. Manuals in Archaeological Method, Theory and Technique. Springer, New York.

ISBN: 978-1-4614-3301-9

You can buy this used or as an ebook on [Amazon](#).



In addition to readings from the textbook, you will periodically be assigned articles in peer-reviewed journals, available electronically through the [UR library](#) and [JSTOR](#). We will talk about how to access these websites and resources in class. You can also watch [this video](#) for step-by-step instructions.



Prerequisites

There are no prerequisite courses, although students will find it helpful to have a working knowledge of general chemistry and advanced algebra.

Credit Hours

This is a five-credit, laboratory-based course and follows the College credit hour policy for five-credit courses. This course meets twice weekly for three academic hours per week. The course also includes a lab for two academic hours per week. Questions about what this means can be answered by the [University of Rochester Credit Hour Policy and Compliance](#).

Course Goals and Learning Outcomes

Course Goals

Being a good steward of the past requires balancing the information gained with preservation and conservation. Archaeologists rely on technology, in and out of the field, to help understand the past, make informed decisions about where and how to excavate a site, and how to allocate resources to obtain information and mitigate destructive impact. This course provides you with a basic understanding of archeomaterials analysis – its strengths and limitations – so that you can design rigorous archaeological research projects that consider the nature of the material, the realistic questions that can be answered, and the analytical costs.

The goals of this course are:

- Prepare future archaeologists to design rigorous and realistic research questions and projects using archaeological materials analysis
- Provide an overview of the strengths, limitations, and costs of analytical techniques used in archaeological materials analysis

This course fulfills part of the [Interpretation of Culture](#) cluster (S1ANT001) in the Social Sciences are of the Rochester Curriculum. It also prepares students interested in being field directors on archaeological excavations to think through their research design and incorporate archaeological materials analysis as a component of that design.

Learning Outcomes

By the end of this course, you will be able to:

- **Design** an archaeological materials research project that considers the strengths and limitations of both the archeomaterial and the analytical technique
- **Describe** the material and cultural components of an artifacts and identify those related to its production sequence, life-cycle, and intentional human behaviors or choices
- **Explain** the strengths and limitations of the 17 most common analytical techniques and methods used in archaeological materials analysis
- **Evaluate** and critique published archaeological materials research, specifically:
 - the validity of the research question for the type of material
 - the appropriateness of the technique for the material type
 - the quality of the data
 - whether the data presented supports the conclusions or answers the question
 - the reasonableness of the assumptions made by the author(s)

NOTE: It is not possible to become an expert in archaeological materials analysis in one 15-week semester – that type of knowledge takes years to develop. The skills and application of knowledge you will develop by achieving these learning outcomes are the foundation upon which you will build throughout your career. They are critical components of preparing you to design rigorous and realistic field research that responsibly incorporates archaeological materials analysis – the major purpose and objectives of this course.

Learning Activities and Assignments

Overview

The primary goal of this course is for you to begin developing the skills and knowledge needed to design archaeological materials research. The course is structured so that you will have the basic science and a working knowledge of the different analytical techniques before we explore the three material classes. I am presenting the material this way, so that you can think about the types of questions and nature of the data required to answer those questions as you learn about the different materials. In fact, I will ask you “how would you see that behavior or process

using materials analysis?” several times a class when we are covering a material to get you used to thinking this way before you get the opportunity to design your own research project.

Module I – Basics of Materials Chemistry and Structure

In this module we will explore the basics of chemical bonding and crystal structure from the perspective of a materials scientist. Some of this material may seem familiar, but we are looking at it through a particular lens and using different models for understanding these concepts than you are used to. This module is the foundations for the rest of the course.

Major topics include: elements, atoms, chemical bonding, molecules, crystal lattice structure, material properties (chemical, electrical, thermal, mechanical, optical) and how they relate to chemical bonds and crystal structures.

Module 1

- Physical Chemistry
- Crystal Structure
- Material Properties
- Chemical Bonding

Module II – Analytical Techniques and Instruments

This module provides you with an overview of 17 analytical techniques and instruments, including their analytical strengths, limits of detection, limits of quantification, cost, nature of the analysis (destructive, invasive, non-destructive/invasive), type of data, and how that data is interpreted to answer meaningful archaeological/anthropological questions. Techniques are organized by the underlying science (physics, chemistry, or material property) it uses. We will learn about the following techniques:

Module 2

- Analytical Instruments
- Sampling Methods
- Data Analysis
- Analytical Limitations

radiography

x-ray fluorescence spectrometry (XRF)

pronounced ex-are-eff

scanning electron microscopy (SEM)

pronounced ess-eee-em

electron probe micro-analysis (EPMA)

pronounced eee-pee-em-ay

cathodoluminescence (CL)

pronounced see-el

thermoluminescence (TL)

pronounced tea-el

mass spectrometry (MA)

pronounced em-ay

atomic mass spectrometry (AMS)

pronounced ay-em-ess

chromatography

particle induced x-ray emission (PIXE)

pronounced picks-ee

particle induced gamma emission (PIGE)

pronounced piggy

Raman spectroscopy

x-ray diffraction (XRD)

pronounced ex-are-dee

optical microscopy

metallography

ceramic petrography.

Module III – Ceramic

In this module we explore the geochemical, production, and life-cycle components of archaeological ceramics – from raw material selection and processing, manufacturing ceramic pastes and fabrics, formation, decoration and firing to use, recycling and post-depositional alteration. Along the way we will talk about what can be ‘seen’ through materials analysis, what types of questions can be answered through materials analysis, and how to move from the data to that answer.

Module 3
<ul style="list-style-type: none">• Ceramic raw materials• Geochemistry• Manufacture and Use-life• Analytical Limitations

Module IV – Glass, Glaze and Frit

This module explores the chemical and structural components of glass and frit, and how both are impacted by post-depositional alteration. We will learn about the different types of ancient glass, their raw materials, firing/melting process, formation of the glass, and its alteration, deterioration, and instability as a material. We will also talk about what can be ‘seen’ through materials analysis, what types of questions can be answered through materials analysis, and how to move from the data to that answer.

Module 4
<ul style="list-style-type: none">• Glass raw materials• Manufacture• Deterioration• Analytical Limitations

Module V – Metals and Alloys

In this module we explore the geochemical, production, and life-cycle components of copper and iron alloys, and the precious metals gold and silver – from raw material selection and processing, smelting, alloying and cupellation, slag, and artifact formation, to use, recycling and post-depositional alteration. Along the way we will talk about what can be ‘seen’ through materials analysis, what types of questions can be answered through materials analysis, and how to move from the data to that answer.

Module 5
<ul style="list-style-type: none">• Ores and raw materials• Geochemistry• Manufacture• Analytical Limitations

Module VI – Designing Research

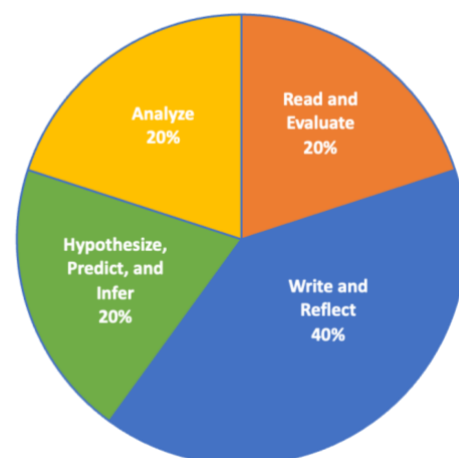
This module prepares you for completing your final project – designing an archaeological research project. Based on your interest, I will provide you each with a collection of artifacts and we will talk through the process of identifying realistic archaeological questions, determining the type of data necessary to answer that question, appropriate sampling and analytical methods based on the material, research question, and archaeological context, and how to move from that data to conclusions.

Module 6
<ul style="list-style-type: none">• Developing analytical questions• Designing research• Evaluating data• Reaching conclusions

Learning Activities

You will engage with the course material through a series of activities, in and out of class. These activities are designed to provide you with opportunities to practice and receive feedback on the key skills and application of knowledge necessary to successfully achieve the course learning outcomes. You will be asked to:

- **Read and Evaluate** both ‘textbook’ material and peer-reviewed articles in the field. The purpose of these readings is slightly different: in the first, you are gathering information about a material or technique and begin to build a mental archeomaterials toolkit; in the second, you are applying your mental toolkit to assess archeomaterials research. I have provided you with guiding questions for each type of reading to help you get the most out of this assignment. We will talk about the best way to approach reading an academic article in a science-based discipline during our first class meeting.
- **Write and Reflect** on course readings, your evaluation of peer-reviewed academic articles, what you are learning about the analytical instruments in class and lab, and how you would approach the analysis of each material class. These writings and reflections are short entries in your learning journal, which is a combination of reading notes, lab notebook and reflection – here is where you answer the guiding questions, record data from your experiments, and make general observation.
- **Hypothesize, Predict, and Infer** the answer or result to questions about materials, instruments, and analyses. These questions will occur several times during the class and will require you to apply and synthesize information to arrive at a conclusion that has not been directly presented in class or your readings. These questions are designed to help you start to think like a materials scientist.
- **Analyze** archaeological materials using twelve different analytical instruments, using established protocols and best-practices in the field of archaeological materials analysis.



Assignments

What:	When:	How often:	Instructions:	How to submit:
Learning Journal	5 pm Sunday	every week	Blackboard > Assignment Instructions > Learning Journal	Blackboard
Lab Reports	5 pm Friday	every week	Blackboard > Assignment Instructions > Lab Report	Blackboard
Application Quizzes	Wednesday	every 2 weeks	Blackboard > Assignment Instructions > Quizzes	In class
Research Proposal	5 pm 12/20/23	once	Blackboard > Assignment Instructions > Research Proposal	Blackboard

You will be asked to complete 4 types of assignments in this course. Detailed instructions, guidelines, and rubrics for completion can be found in Blackboard under Assignment Instructions.

Learning Journal – this assignment is to be **completed weekly** and submitted as a **word document, video, or screencast by 5:00 pm each Sunday**. You can submit your journal by uploading the file to Blackboard. We will go over how to upload your assignments during the first lab session and you can find detailed instructions about submitting assignments in Blackboard on [the Anthology website](#).



Purpose: this assignment is designed to develop your knowledge of archeological materials, analytical methods, and critical reading and reasoning skills – all of which are essential for designing rigorous research questions and fundable research proposals. It also provides you with the opportunity to practice the skills from Learning Outcomes 2, 3 and 4, and receive feedback as you develop these skills.

Task: Your learning journal should take 90 minutes to complete, 30 min for each section, and have the following components:

Before Class/Lab Meeting

Reading: Academic Article

- What do the authors say they are going to do? What is their research question?
- What data do they need to answer that question?
- What assumptions are they making?
- Will the analytical methods used provide the type of data they need? Explain.
- Is the sample size appropriate for the question being asked? (e.g. is it representative of the population? is there enough sample taken for the analysis to be accurate, comprehensive or sound?)
- Do the data support the conclusions? Explain.

Reading: Textbook

About the Archaeomaterial

- What are the chemical, electrical, thermal and optical properties of the material?
- Which of these properties are determined by the raw materials? By the material class? By the production sequence? By intentional human behavior?
- What is the value of each property for performance or use of the artifact?

About the Analytical Technique

- What are the strengths, limitations, and potential uses of this technique/instrument?
- Why would someone choose this instrument or technique over other analytical methods?

After Class

Reflection

- How has my understanding changed as a result of class discussion?
- What questions do I still have?
- Where will I look for answers/clarification for these questions?

After Lab

Observation/Data Collection

About the Instrument

- What are the health and safety considerations when operating this instrument?
- How much training is required to use the instrument?
- Is the instrument portable, field-based, or bench/lab-based?
- What are the instrument's limits of detection? Limits of quantification?
- Are there materials or elements that cannot be analyzed by this instrument? Which ones? And why?

About the Sample

- How much sample is required?
- What kind of sample preparation is required?
- How long does it take to prepare a sample?
- What are the strengths and weaknesses of the amount and preparation of the sample required?
- Are alternative amounts and/or preparations acceptable?
- Why and when might these be used?
- What are the draw backs to these alternative sample preparations?

About the Analysis

- How much time does it take to run an analysis?
- How many samples can be run at a time?
- How much does it cost per sample to use this method?
- Is there sample left after analysis? What condition is it in?
- Can the same sample be analyzed more than once?

About the Data

- What kind of data is generated by the analysis (quantitative, qualitative, spectra, images)?
- Does the data need to be cleaned, processed, and analyzed before it can be used? If so, how must the data be handled? What kind of experience, expertise and/or knowledge are required to make sense of the data?

Reflection

- Why would someone choose this analytical technique over others?
- When is this not the best analytical method to choose?
- What questions do I still have?

Success Criteria/Rubric: Late days may be used on this assignment. Copy/past the rubric below on a separate page at the end of your learning journal and use the highlighting feature or a colored font to indicate your ratings. On the same page as the rubric, answer the following:

- What did you do well in this week's journal?
- What did you struggle with?
- What is one specific thing you would like feedback about from me this week?
- What else, if anything, would you like me to know about this week's journal and your process completing it?

	A, A-, B+	B, B-, C+	Below C+
Attention to task	Thoughtfully addresses all parts of the assignment prompt Final learning product demonstrates significant time, effort, and learning	Adequately addresses all parts of the assignment prompt Final learning product demonstrates adequate time, effort, and learning	Neglected to address some or all parts of the prompt or does so inadequately Final learning product demonstrates little time, effort, or learning
Critical Thinking	Issue/problem to be considered critically is stated clearly and described comprehensively Examples and evidence and are interpreted and evaluated to develop a comprehensive analysis or synthesis	Issue/problem considered is critically stated but the description leaves some ambiguities or room for misunderstanding Examples and evidence are presented with some interpretation but not enough for a comprehensive analysis or synthesis	Issue/problem considered is presented without clarification or description Failed to present accurate, relevant examples, evidence, or explanation
Analytical Reasoning	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities	Organizes evidence but the organization is not effective in revealing important patterns, differences or similarities and lacks synthesis	Evidence is listed but it is not organized or is unrelated to the prompt
Self-Reflection	Reviews prior/current learning in depth, revealing significantly changed perspectives about educational or life events, which provide foundation for expanded knowledge and growth	Reviews prior/current learning with some depth, revealing clarified meanings or indicating broader perspectives about educational or life events	Reviews prior/current learning at a surface level,

Lab Reports – [assignment description removed].

Application Quizzes – this assignment will be given **during class time on Wednesdays**, at the end of a module, approximately every 2 weeks.

Purpose: each quiz is an opportunity for you to challenge your growing knowledge of archaeological materials analysis by thinking critically about the module’s content and concepts. The questions on these quizzes are reflective of the critical thinking and analytical reasoning that are necessary to design and conduct archaeological materials research.

Task: each quiz has 10 multiple choice or short answer questions. Application quizzes will draw from the reading, class discussion, and labs and will ask you to apply concepts and demonstrate critical thinking. Questions that could show up on an application quiz include:

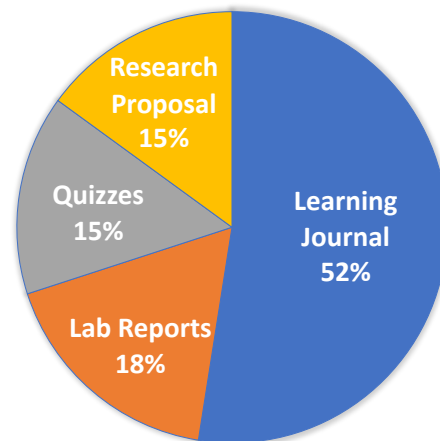
- What does grain size of inclusions tell you about the ceramic manufacturing process? How can you differentiate between natural inclusions and temper? Why is this an important distinction?
- If you cannot use destructive or invasive sampling methods, how could you determine provenience of a collection of Viking swords? Glass trade beads? Explain your answer.
- What are the possible geological and anthropological explanations for sulfur in bronze artifacts?

Success Criteria: Many of these questions have a correct answer, arrived at through thoughtful synthesis and recall of information. These questions, usually the multiple choice, will be graded on the correctness of the answer. Some application quiz questions are open, with more than one right solution. These questions, usually the short answer, will be graded on how well you support your argument/answer using evidence and information.

Research Proposal – [assignment description removed].

Grades and Related Policies

This course, like all interdisciplinary courses, is challenging and requires you to think in new ways and develop and apply complex knowledge and skills. There is rarely a simple or single correct answer to the questions we are exploring and that can be frustrating. ***I know that each and every one of you can be successful in this course*** and, as your professor, I want you to have the tools you need to succeed. Therefore, if I notice you are struggling or if I haven't seen or heard from you for a period of time, I may message you with suggestions for ways to connect to appropriate resources. I ask that you respond to this outreach, whether or not you plan to use the support – responding to offers of support is an important skill to build.



Your grade in this course is earned by completing the following:

Learning Journal	14 entries @ 30 pts. each	420 pts	52.5%
Lab Reports	14 reports @ 10 pts. each	140 pts	17.5%
Application Quizzes	6 quizzes @ 20 pts each	120 pts	15%
Research Proposal	1 proposal @ 120 pts.	120 pts	15%
<i>total</i>		<i>800 pts</i>	<i>100%</i>

According to the AS&E Grading Scheme, your letter grade equivalent is:

A	A-	B+	B	B-	C+	C	C-	D	E
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>740	740	660	600	540	460	400	340	200	0
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Grading is hard. In addition to ensuring that grades are meaningful, I must take into account the needs and values of individual students, the class as a whole, those of the department, university, and discipline, and also my own needs and values. I've developed the following grading policies to address these varied needs and values and to emphasize fairness, flexibility, and compassion. If you have a question about any of these policies, please come see me and we can talk about your concerns.

Late Days: Each student has a total of 5 late days that may be used on the following assignments without any consequence to the assignment grade: Learning Journal and Lab Report. Late days may not be used on the Research Proposal. *To use late days:* notify me by email at least 30 minutes before the assignment is due. Late days start immediately after the due date and run for 24 hours. If more than 5 late days are accumulated, or if you do not notify me in advance, the assignment will be graded as late.

Late Work: Late assignments cannot earn a grade higher than a B.

Revise and Resubmit: If you receive a grade lower than B on the Learning Journal or Lab Report, you may revise and resubmit it once for regrading. No other assignments may be revised and resubmitted. In order for the assignment to be regraded, I need you to submit a document in which you have tracked all of the changes or provided a detailed list of all of the changes with page and paragraph numbers where they can be located. Revised and resubmitted work will be graded as late.

File Formats: In order for me to grade work as on time, I need it to be submitted by the due date to the correct location in a format that I can access. If you submit the wrong file, submit a file I cannot open, or submit to the wrong location, you may resubmit; however, the submission will be counted as late.

Academic Honesty: All assignments and activities associated with this course must be performed in accordance with the University of Rochester's [Academic Honesty Policy](#). Science is collaborative by nature. And you are encouraged to discuss your findings, interpretation of data, and analyses with each other. However, your written lab reports and papers are an individual product. Just as not two analyses will yield exactly the same data, no two lab reports should contain matching or identical sections, paragraphs, or sentences – even among lab partners. In addition, an important part of scientific writing is clearly distinguishing information, data, and ideas that are original and those derived from another source. The scientific papers we read in class will give you a good idea of when and how to correctly cite a reference in your lab reports and papers. If you have questions about the proper way to cite a particular source, please refer to the [Society for American Archaeology style guide](#).

Course Policies
Communication

Please keep in touch with us – frequent communication is not a burden!

In this course, we learn from and with each other through dialogue and conversation. Sometimes you might have an idea, question, or comment outside of regularly scheduled class meetings. Please use the 'Questions' discussion board in Blackboard to post these questions and ideas. If you have a question about it, someone else probably does too! Travis will respond to the 'Questions' board each morning (except on weekends), but feel free to answer each other's questions as you are able.



Email is the best way for you to communicate with me. I respond to email Monday-Friday from 8:00 am – 5:00 pm and will try to respond to your email questions and concerns within one business day. Please be patient if from time to time the demands of my job cause me to be a bit slower in responding to you.

A few things that will help me respond to your email quickly are:

- Adding the course number and section (ANTH 304/604, MW 10 a.m.) to the subject line.
- Send it from your official UR email address.

Travis prefers you to communicate with him via the 'Questions' discussion board. He will check the discussion board each morning and respond to posts before 9:00 am.



My preferred way to communicate with you is via the Announcement feature in Blackboard. Please make sure your [email address is correct](#) in Blackboard.

Some of your questions can be answered more effectively in person than by email or discussion post. This is because questions about content and concepts tend to be conversational rather than informational. Please come see Travis and me during office hours when you have a question about the course – content, assignments, or structure. No question is too small. We want you to be successful and are happy to help.

Office hours are Tuesday, 10-11 a.m., via [Zoom](#) and Thursday, 10-11 a.m., in Lattimore 209.

If you need to communicate something of a personal nature, please contact me by email to set up an appointment. I will be happy to meet with you and offer what assistance I can.

Classroom Culture and Environment

I am committed to creating a learning environment for you that supports diversity of thought, perspective, and experience, and honors your identities (including race, ethnicity, national origins, gender, gender identity, age, sexuality, religion, ability). To help accomplish this:

- If you have a name and/or set of pronouns that differ from those that appear in your official UR records, please let me know!
- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you. If you prefer to speak with someone outside of the course, you can use the [Complaint Portal](#) and/or contact the Office of Minority Student Affairs (omsa@ur.rochester.edu).

Learning requires us to be open to the views and experiences of people different from ourselves. I am committed to creating an inclusive learning environment where diverse perspectives are recognized, respected, and seen as a source of strength. Each voice in our classroom is important and brings with it a wealth of knowledge, values, and beliefs. Please honor the uniqueness of your fellow classmates and appreciate the opportunity we have to learn from each other. Please respect your fellow students' opinions and refrain from personal attacks or demeaning comments of any kind. If something is said in class that made you or others feel uncomfortable (including by me!), please do not hesitate to let me know or submit [anonymous feedback](#) to protect your privacy.

As a community for and of learning, it is important that we have shared expectations for our time together. We will establish some [group norms](#) during the first day of class, particular to our needs. Please find below some general expectations for our time together.

You can expect me to:

- Be passionate about your learning and success.
- Cultivate a culture and classroom climate of mutual respect, active listening, critical thinking, and honest collaboration.
- Provide you with thoughtful, constructive, and timely feedback on your assignments.
- Show up prepared and on time for class meetings and office appointments.
- Respond swiftly and effectively to your concerns, feedback, and/or suggestions.

I expect you to:

- Actively participate and engage in the learning process through self-reflection and an open mind.
- Contribute actively to the course culture of mutual respect, active listening, critical thinking, and honest collaboration.
- Embrace the opportunity to learn from and with each other.

- Submit thoughtful responses to assignments.
- Communicate with me frequently so I know best how to support your learning and success in this course.

Attendance in class is recommended. The material in the readings and presented in class complement, rather than supplement, each other. To succeed in this course, it is important to understand both. Class meetings are intended to be a space where you can:

- 1) practice the skills and apply the knowledge about materials analysis you are learning,
- 2) ask questions for clarification, to improve comprehension, and explore new ideas, and
- 3) find a supportive community for learning.

Inclusion and Access

The University of Rochester, this course, and I are committed to inclusion, and welcome students of all backgrounds and abilities. Services and reasonable accommodations are available to students with temporary and permanent disabilities, to students with DACA or undocumented status, to students facing mental health issues, other personal situations, and to students with other kinds of learning needs. Please feel free to let me know if there are circumstances affecting your ability to participate in class or your full participation in this course. Some resources that might be of use include:

- [Office of Disability Resources](mailto:disability@rochester.edu) (disability@rochester.edu; (585) 276-5075; Taylor Hall)
- [Undocumented/DACA Student Support](#)
- [University of Rochester CARE Network](#)

Arts, Sciences and Engineering policy and practice are that classes not to be dismissed on religious holidays. However, you will not be penalized in any way for observing religious holidays. I have done my best not to schedule examinations in conflict with such holidays, but if an assignment or exam conflicts with your religious observance, I am happy to provide you with an equivalent opportunity to make up the work requirements or exams without penalty.

The University of Rochester respects and welcomes students of all backgrounds and abilities. In the event you encounter any barrier(s) to full participation in this course due to the impact of a disability, please contact the Office of Disability Resources. The access coordinators in the Office of Disability Resources can meet with you to discuss the barriers you are experiencing and explain the eligibility process for establishing academic accommodations. You can reach the Office of Disability Resources at: disability@rochester.edu; (585) 276-5075; Taylor Hall; www.rochester.edu/college/disability.

Health and Wellness

University of Rochester is a vibrant community, full of tremendous vitality and richness that offers abundant opportunities for meaningful work and play. This abundance brings with it the challenge of maintaining a healthy, balanced life – a life characterized by productive tension among such competing needs as work and play, sleep and wakefulness, solitude, and

sociability. All members of university communities – students, staff, and faculty – have the responsibility to promote balance in their lives by making thoughtful choices.

Balanced choices flow from an understanding that human flourishing requires the fulfillment of very real physical, emotional, spiritual, and social needs. Take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, getting enough sleep and taking time to relax, reset, and restore. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is almost always helpful.

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. The University Counseling Center (UCC) is here to help. Call (585) 275-3113 and visit their website at <https://www.rochester.edu/uhs/ucc/>.

Consider reaching out to a friend, faculty, or family member you trust for help getting connected to the support that can help.

Course Schedule

[Abbreviated Note: there is also a schedule for lab meetings]

Date	Reading Prior to Class	Class Content	Class Learning Goals
8/30/23		<ul style="list-style-type: none">• Introduction• Uncovering Prior Knowledge and Misconceptions	<ul style="list-style-type: none">• Evaluate baseline knowledge• Learn how to be successful in this course
9/6/23	Malainey, ch 1-4	<ul style="list-style-type: none">• Atomic structure and electrochemical properties• Elements – properties and behaviors• Bonding – types and properties	<ul style="list-style-type: none">• Build foundational knowledge of materials• Start to see atomic chemistry through the lens of materials science• Correct misconceptions/prior knowledge of atoms, electrons, and chemical bonding (e.g., the models

			used in Gen Chem won't work here)
9/11/23	Bengisu, ch 1 Yacobi & Holt, ch 2 Malainey, pp 76–81	<ul style="list-style-type: none"> • Molecules – types, properties, electrochemical geometry/structure • Matter – states of matter, electrochemical geometry/structure of each state, properties, limitations, and strengths 	<ul style="list-style-type: none"> • Build foundational knowledge of materials • Begin to understand how crystals form (bonding, states, atomic behaviors) • Recognize the types of bonds associated with each state of matter and explain why/how these bonds create the properties of that state