MSEN 403 / MSEN 655 — Materials Design Studio

Department of Materials Science & Engineering, Texas A&M University
Spring 2026

Syllabus Version 2.1 — Last Updated: January 8, 2026

Course Information

Course Numbers: MSEN 403 (Undergraduate), MSEN 655 (Graduate)
Credit Hours: 3 (2 Lecture Hours + 3 Lab Hours)
Lecture Time & Location: MW 1:50–2:40 PM (TBD)
Lab Time & Location: F 1:50–3:40 PM (TBD)
Modality: Face-to-face (in-person studio format)
Term Dates: Classes begin Jan 12, 2026; last class Apr 28, 2026; final exams Apr 30–May 5, 2026

Instructor Details

Instructor: Dr. Raymundo Arróyave
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Office Hours: TR 2:00 PM or by appointment
Zoom Office Link: https://tamu.zoom.us/my/arroyave
Bookable Calendar: Schedule a meeting via the calendar link above (please confirm availability in advance)

Teaching Assistant

TA: Md Shafiqul Islam
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Primary Communication: Canvas and Slack workspace
Slack: https://join.slack.com/t/materialsdesi-jxm7595/shared_invite/zt-3mlefdxly-qbKH0rRKVNjpcf

Course Description

MSEN 655 (Graduate): Project-driven studio based on the integration of informatics and engineering systems design to address problems in materials discovery and development; projects derived from real industry-driven needs.
MSEN 403 (Undergraduate): Project-driven studio course based on the integration of materials science, informatics and engineering systems design. For the UG section, the projects are defined by the instructor and are based on prior work done by the instructor's group or readily available in the literature.

Course Prerequisites

MSEN 403: Grade of C or better in MSEN 330 and MSEN 400; or permission from instructor.
MSEN 655: Graduate standing; recommended background in thermodynamics, data analysis, and Python.

Special Course Designation

Stacked course: MSEN 403 / MSEN 655. Graduate students are expected to complete additional work as described in the grading and project sections below.

Learning Outcomes

MSEN 403 (Undergraduate)
Upon successful completion of this course, undergraduate students will be able to:

- **Analyze** materials design problems using hierarchical systems thinking, identifying functional requirements, constraints, and processing–structure–property–performance (PSPP) relationships.
- **Apply** materials selection methodologies and multi-criteria decision analysis to evaluate candidate materials and justify design choices.
- **Implement** supervised and unsupervised learning techniques to discover patterns, validate models, and build predictive relationships from materials datasets.
- **Construct** Gaussian Process surrogate models to predict materials properties and interpret uncertainty estimates in model predictions.
- **Apply** Bayesian optimization strategies to efficiently explore materials design spaces and identify promising candidates.
- **Integrate** computational methods into a complete materials design workflow—from problem definition through model-guided optimization—demonstrating professional engineering practice.

MSEN 655 (Graduate)
Upon successful completion of this course, graduate students will be able to:

- **Formulate** complex, multi-objective materials design problems using systems engineering principles, integrating computational and experimental perspectives with explicit treatment of constraints and trade-offs.
- **Construct and validate** surrogate models (Gaussian Processes, machine learning) with rigorous diagnostics, cross-validation, and critical assessment of model limitations.
- **Design** Bayesian optimization campaigns using principled acquisition functions, including advanced strategies for constrained, batch, and multi-fidelity problems.
- **Perform** Bayesian uncertainty quantification and apply decision theory to conduct risk-aware materials design under uncertainty.
- **Evaluate** high-throughput discovery approaches and ICME integration strategies for accelerated materials development.
- **Communicate** research-grade findings through critical literature synthesis and professional presentations suitable for conferences and scholarly publications.

Course Modules

The course is organized into six thematic modules that progressively build from foundational design principles to advanced computational methods. An introductory orientation session (L00) covers course logistics before the technical content begins.

0. **Course Orientation (L00)**
   Course policies, syllabus overview, grading, project structure, tools, and expectations.
1. **Module 1: Design Foundations (L01–L06)**
   Introduction to materials design, hierarchical materials systems, design problem definition, functional analysis, materials selection, and the transition from selection to design.
2. **Module 2: Data & Learning Essentials (L07–L10)**
   Data sources for materials informatics, supervised learning, model validation, and unsupervised learning techniques.
3. **Module 3: Probabilistic Modeling with Gaussian Processes (L11–L15)**
   Bayesian inference foundations, introduction to Gaussian Processes, GP hyperparameters and optimization (L13a), GP implementation and pitfalls (L13b), materials science case studies, and surrogate modeling.
4. **Module 4: Bayesian Optimization (L16–L20)**
   Introduction to Bayesian optimization, acquisition functions, advanced BO strategies, BO implementation, and real-world case studies.
5. **Module 5: Uncertainty & Decision (L21–L24)**
   Uncertainty quantification fundamentals, Bayesian UQ methods, decision theory, and risk-aware design.
6. **Module 6: Frontiers & Integration (L25–L27)**
   High-throughput materials discovery, ICME integration, and course wrap-up with future directions.

Texts and Resources

- **Required:** Readings, lecture slides, and datasets provided through Canvas.
- **Recommended Texts:**
  - McDowell et al., *Integrated Design of Multiscale, Multifunctional Materials and Products*, Wiley (2010).
  - Lookman et al., *Information Science for Materials Discovery and Design*, Springer (2016).
  - Rasmussen & Williams, *Gaussian Processes for Machine Learning*, MIT Press (2006) — available free online.
- **Key Review Articles:** Ramprasad et al., "Machine Learning in Materials Informatics: Recent Applications and Prospects" (2017); Himanen et al., "Data-Driven Materials Science" (2019).
- **Software:** Python (Anaconda), Jupyter Notebooks, scikit-learn, GPyTorch/BoTorch for Bayesian optimization, Thermo-Calc (lab access provided).

Lecture Materials

All lecture slides are available on Canvas in PDF format. Two versions are provided for each lecture:

- **Presentation version:** Full slides with animations for in-class viewing.
- **Handout version:** Condensed format (multiple slides per page) without animations for note-taking and study.

Slides follow the ADA-compliant Texas A&M theme with accessible color schemes.

Evaluation and Grading

Component	MSEN 403	MSEN 655
Assignments	20%	30%
Participation & Professionalism	10%	10%
Final Presentation	10%	10%
Projects (Phases 1–4)	60%	50%
Total	100%	100%

Grade Scale: A $\geq$ 90; B = 80–89; C = 70–79; D = 60–69; F $<$ 60.

Description of Graded Activities

Assignments

Six assignments are designed to scaffold the skills required for the four project phases (Establish, Explain, Explore, Exploit). Each assignment builds computational and analytical foundations in hierarchical systems thinking, materials informatics, and uncertainty-aware decision-making.

HW	Released	Due	Topic	Project Connection
1	Week 1	Week 3	PSPP/Olson Framework Analysis	Stage 1 (Establish)
2	Week 4	Week 6	Problem Definition & Functional Analysis	Stage 1 (Establish)
3	Week 5	Week 7	Exploratory Data Analysis & Data Quality	Stage 3 (Explore)
4	Week 8	Week 10	Gaussian Process Regression	Stage 3 (Explore)
5	Week 11	Week 13	Sequential Learning (flexible tracks)	Stage 4 (Exploit)
6	Week 13	Week 15	UQ & Decision Analysis	Stage 4 (Exploit)

Undergraduate (MSEN 403): Undergraduate homework emphasizes conceptual clarity, reproducible analysis, and foundational programming practice. Assignments are 3–5 hours each.

- **HW 1:** Critical review of Olson's (1997) "Computational Design of Hierarchically Structured Materials." Create a PSPP diagram for a case study.
- **HW 2:** Formulate a materials design problem using Solution Neutral Problem Statement (SNPS), functional analysis, and objectives/constraints identification.
- **HW 3:** Exploratory data analysis on a materials dataset: cleaning, visualization, correlation analysis, and dimensionality reduction (PCA).

- **HW 4:** Implement Gaussian Process regression using GPyTorch or scikit-learn. Compare kernels and interpret uncertainty.
- **HW 5:** Choose one track (Optimization, Active Learning, Screening, or Discovery) and implement a model-guided decision strategy.
- **HW 6:** Uncertainty quantification and decision analysis: decompose uncertainty sources, propagate through models, and apply decision criteria.

Graduate (MSEN 655): Graduate assignments extend undergraduate tasks through deeper analysis, additional methods, and scholarly synthesis. Deliverables include mini-reports with code, figures, and critical discussion.

- **HW 1:** Extended analysis connecting Olson framework to current research; include multi-scale considerations and 2–3 additional literature sources.
- **HW 2:** SNPS + discussion of alternative formulations; hierarchical function decomposition with 8+ functions.
- **HW 3:** EDA with statistical tests for missingness; compare PCA with UMAP or t-SNE.
- **HW 4:** GPyTorch with custom training loop; compare 3+ kernels; implement ARD for feature selection.
- **HW 5:** Implement 3+ strategies in chosen track; include statistical significance tests; sensitivity analysis.
- **HW 6:** Compute Expected Value of Perfect Information; compare MC with analytical uncertainty propagation.

Projects

Semester-long, team-based projects are the cornerstone of this course. Teams of 3–4 students complete a four-phase workflow that reflects the logic of modern materials design and Bayesian discovery: Establish, Explain, Explore, Exploit. Each phase builds upon the previous one, culminating in an integrated final report and presentation.

Undergraduate (MSEN 403) projects emphasize structured application of machine-learning and optimization tools on existing datasets, focusing on conceptual understanding and reproducibility. Graduate (MSEN 655) projects extend these efforts through methodological novelty, multi-fidelity modeling, and explicit uncertainty analysis. Graduate reports are roughly 30% longer and require deeper technical and conceptual treatment.

Phase	Title (Weight & Weeks)	MSEN 403: Undergraduate Scope	MSEN 655: Graduate Enhancement
1	Establish Needs (10%) Weeks 1–4	Define the materials design problem in engineering terms. Identify the application, research current solutions, and specify target performance metrics using Olson's framework. Deliverable: 4–6 pages (2,500 words) with clear design goals, metrics, and a concept map.	Develop a quantitative requirements matrix with uncertainty weighting and multi-objective trade-offs. Benchmark two competing design scenarios and justify selected metrics. Deliverable: 6–8 pages (3,500 words).

Phase	Title (Weight & Weeks)	MSEN 403: Undergraduate Scope	MSEN 655: Graduate Enhancement
2	Explain the Science (10%) Weeks 5–8	Connect design ideas to key materials-science principles. Explain the governing mechanisms and structure–property relationships supported by literature and databases. Deliverable: 6–8 pages (3,000 words).	Include a structured literature synthesis (∼10 sources) and quantitative model validation (e.g., CALPHAD, DFT, or experiments). Deliverable: 8–10 pages (4,000 words).
3	Explore the Design Space (20%) Weeks 9–13	Apply informatics and basic ML methods to explore structure–property trends in provided datasets. Focus on data cleaning, visualization, and model interpretation rather than algorithm development. Deliverable: 8–10 pages (4,000 words) + Jupyter Notebook.	Perform comparative modeling (e.g., GP, RF, NN) with uncertainty quantification and feature-importance analysis. Discuss model validation and predictive reliability. Deliverable: 10–12 pages (5,500 words) + interactive Notebook.
4	Exploit the Design Space (20%) Weeks 14–16	Integrate prior work to justify final design decisions. Propose optimal compositions or process parameters; evaluate trade-offs such as strength–density or cost–performance. Deliverables: integrated report (10–12 pages, 5,000 words) and 10–12 min presentation.	Execute Bayesian or multi-objective optimization with quantitative decision metrics (e.g., expected improvement, knowledge gain). Discuss uncertainty propagation and generalization limits. Deliverables: 12–15 pages (6,500 words) report + integrated Notebook + 10–15 slide presentation.

Teamwork and Evaluation

Each team submits one report per phase and a short individual reflection outlining contributions and lessons learned. Peer evaluations may adjust individual grades (5%). Projects are graded on:

- Technical and scientific quality (40%): soundness, rigor, originality
- Integration and analysis depth (30%): cross-phase coherence, linkage of models and data
- Clarity and professionalism (20%): organization, visuals, writing
- Collaboration and accountability (10%): team dynamics, communication, peer feedback

Final Presentation

Each team will deliver a formal presentation during finals week, summarizing the entire design workflow (Establish, Explain, Explore, Exploit). Presentations should use a professional slide deck (10–12 minutes plus 5 minutes for Q&A) and clearly communicate both the technical results and the design rationale.

MSEN 403 (Undergraduate): Undergraduate teams are evaluated primarily on clarity, narrative coherence, and effective data visualization. The presentation should emphasize how conceptual understanding and data analysis informed design decisions. Slides should focus on motivation,

methods, results, and conclusions, using clear figures and minimal text.

MSEN 655 (Graduate): Graduate presentations are expected to demonstrate methodological sophistication, including uncertainty quantification, model validation, and critical assessment of trade-offs. Graduate teams must also submit a two-page extended abstract summarizing the methodology, key findings, and broader implications of their design framework.

Evaluation Criteria:

- Technical Content (40%): accuracy, rigor, and integration of project results
- Organization & Clarity (25%): logical flow, effective visuals, concise storytelling
- Delivery (25%): professionalism, engagement, balanced team participation
- Q&A / Discussion (10%): depth of responses and ability to defend design decisions

Participation & Professionalism

Active participation and professional conduct are essential components of this studio course. Because much of the learning takes place through collaboration and discussion, engagement, consistency, and accountability directly impact both team success and course outcomes.

Expectations:

- Attendance and Preparedness: Attend all lectures and labs punctually, complete pre-class readings or coding exercises, and arrive ready to contribute.
- Teamwork and Collaboration: Participate constructively in group work, share tasks equitably, and maintain respectful communication with peers.
- Professional Conduct: Demonstrate integrity, reliability, and courtesy in all academic interactions. Treat teammates, instructors, and TAs with respect.
- Engagement and Feedback: Contribute meaningfully during discussions, peer reviews, and project critiques; offer constructive and specific feedback.
- Documentation and Accountability: Maintain clear records of your contributions in project reports and version-control repositories (e.g., GitHub or shared drives).

Assessment:

- Consistent engagement and preparedness during studio and lab sessions.
- Quality of collaboration as evidenced in team reflections and peer evaluations.
- Professionalism in communication, time management, and adherence to course policies.

Outstanding participation reflects initiative, intellectual curiosity, and leadership within the team. Chronic absences, disengagement, or unprofessional behavior will result in deductions from this component.

Course Schedule (Spring 2026)

Note: Lecture numbers (L00–L27) correspond to the slide decks available on Canvas. L00 covers course policies and logistics; L01–L27 cover technical content.

Week	Date	Lecture / Lab Topic	Notes / Deliverables
Module 0: Course Orientation			
1	Jan 12 (M)	L00: Course Overview & Policies	
Module 1: Design Foundations			
1	Jan 14 (W)	L01: Introduction to Materials Design	HW 1 assigned

Week	Date	Lecture / Lab Topic	Notes / Deliverables
1	Jan 16 (F)	Lab 1: Python/Linux Pre-reqs	Teams formed; begin project ideation
2	Jan 19 (M)	Holiday: Martin Luther King Jr. Day	No class
2	Jan 21 (W)	L02: Hierarchical Systems	
2	Jan 23 (F)	Lab 2: Composition-Agnostic Design I	
3	Jan 26 (M)	L03: Design Problem Definition	
3	Jan 28 (W)	L04: Functional Analysis	**HW 1 due**; project ideas submitted
3	Jan 30 (F)	Lab 3: High-Throughput Design	Begin Report 1
4	Feb 2 (M)	L05: Materials Selection	HW 2 assigned
4	Feb 4 (W)	L06: Selection to Design	
4	Feb 6 (F)	Lab 4: Machine Learning Models I	Report 1 due
Module 2: Data & Learning Essentials			
5	Feb 9 (M)	L07: Data for Materials Informatics	HW 3 assigned
5	Feb 11 (W)	L08: Supervised Learning	
5	Feb 13 (F)	Lab 5: ML Potentials for DFT I	
6	Feb 16 (M)	L09: Model Validation	
6	Feb 18 (W)	L10: Unsupervised Learning	**HW 2 due**
6	Feb 20 (F)	Lab 6: ML Potentials for DFT II	
Module 3: Probabilistic Modeling with Gaussian Processes			
7	Feb 23 (M)	L11: Bayesian Inference	
7	Feb 25 (W)	L12: Gaussian Processes Introduction	**HW 3 due**
7	Feb 27 (F)	Lab 7: Bandits and Gaussian Processes	
8	Mar 2 (M)	L13: GP Regression in Practice	
8	Mar 4 (W)	L14: GP Materials Cases	HW 4 assigned
8	Mar 6 (F)	Lab 8: GPs and Bayesian Optimization	
9	Mar 9–13	Spring Break	No classes or labs
10	Mar 16 (M)	L15: Surrogate Modeling	Report 2 due
Module 4: Bayesian Optimization			
10	Mar 18 (W)	L16: Introduction to Bayesian Optimization	**HW 4 due**
10	Mar 20 (F)	Lab 9: Active Learning (Project Day)	
11	Mar 23 (M)	L17: Acquisition Functions	
11	Mar 25 (W)	L18: Advanced Bayesian Optimization	HW 5 assigned
11	Mar 27 (F)	Lab 10: Advanced Bayesian Optimization I	
12	Mar 30 (M)	L19: BO Implementation	
12	Apr 1 (W)	L20: BO Case Studies	Project Day
12	Apr 3 (F)	Reading Day	
13	Apr 6 (M)	L21: UQ Fundamentals	
Module 5: Uncertainty & Decision			

Week	Date	Lecture / Lab Topic	Notes / Deliverables
13	Apr 8 (W)	L22: Bayesian UQ	**HW 5 due**; HW 6 assigned
13	Apr 10 (F)	Lab 11: Open Topic (Class Interest/Project)	Report 3 due
14	Apr 13 (M)	L23: Decision Theory	
14	Apr 15 (W)	L24: Risk-Aware Design	
14	Apr 17 (F)	Lab 12: High-Throughput Workshop	
15	Apr 20 (M)	L25: High-Throughput Discovery	
Module 6: Frontiers & Integration			
15	Apr 22 (W)	L26: ICME Integration	**HW 6 due**
15	Apr 24 (F)	Lab 13: Final Project Work Session	
16	Apr 27 (M)	L27: Course Wrap-Up	
16	Apr 29 (W)	Project Presentations (Overflow)	
16	May 1 (F)	Final Project Presentations	Report 4 Due
16	May 4 (M)	Last Day of Finals	

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.
Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.
Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.
Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor (Student Rule 7, Section 7.4.1).
The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence (Student Rule 7, Section 7.4.2).
Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code (Student Rule 24).

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."
"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the

work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).
You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at https://aggiehonor.tamu.edu.

Notice of Nondiscrimination and Civil Rights

Texas A&M University is committed to providing safe, equitable, and non-discriminatory learning and work environments for all community members. The University prohibits discrimination and harassment based on race, color, sex (including pregnancy, childbirth, or related conditions), sexual orientation, gender identity, religion, national origin, age, disability, genetic information, or veteran status. Texas A&M promptly, thoroughly, and fairly investigates all complaints of discrimination and harassment in accordance with System Regulation 08.01.01 and University Rule 08.01.01.M1.
Title IX Coordinator: Jennifer M. Smith, Associate Vice President & Title IX Coordinator, YMCA Bldg Ste 108, College Station TX 77843, 979-458-8407, civilrights@tamu.edu.
Additional resources: https://titleix.tamu.edu

Civil Rights, Free Speech, and Title IX Policies

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit discrimination and harassment based on an individual's race, color, sex (including pregnancy and related conditions), religion, national origin, age, disability, genetic information, veteran status, or any other legally protected characteristic. This includes forms of sex-based violence, such as sexual assault, sexual harassment, sexual exploitation, dating/domestic violence, and stalking.
Students can report discrimination/harassment, access supportive resources, or learn more about their options for resolving complaints on the University's Civil Rights & Title IX webpage. Students should be aware that all university employees (except medical or mental health providers) are mandatory reporters. If they observe, experience or become aware of an incident that they reasonably believe to be discrimination/harassment alleged to have been committed by or against a person who was a student or employee at the time of the incident, the employee must report the incident to the university.

Americans with Disabilities Act (ADA)

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.
To request academic accommodations, contact the designated ADA office based on your location:

- Texas A&M University, College of Nursing, College of Dentistry, Irma Lerma Rangel College of Pharmacy (College Station), College of Medicine, School of Public Health, Institute of Biosciences and Technology, EnMed Program, Bush School in Washington DC, Mays Business School – CityCentre, TAMU Engineering Academies, Texas A&M University Higher Education Center at McAllen, and Texas A&M University at Galveston: Disability Resources at

(979) 845-1637 or disability@tamu.edu.
- Texas A&M University School of Law: Office of Student Affairs at (817) 212-4111 or law-disability@law.tamu.edu.
- Irma Lerma Rangel College of Pharmacy in Kingsville: Disability Resource Center at Texas A&M University – Kingsville at (361) 593-3024 or drc.center@tamuk.edu.
- Texas A&M University College of Veterinary Medicine & Biomedical Sciences in Canyon: Office of Student Accessibility at West Texas A&M University – Canyon at (806) 651-2335 or osa@wtamu.edu.
- Texas A&M University at Qatar (TAMUQ): campus psychologist, Dr. Steve Wilson, +974-4423-0047 or stephen.wilson@qatar.tamu.edu.

If you are experiencing difficulties with your approved accommodations, contact the office responsible for approving your accommodations or the Texas A&M ADA Coordinator Julie Kuder at ADA.Coordinator@tamu.edu or (979) 458-8407.

Pregnancy Accommodations

Texas A&M provides reasonable accommodations for students related to pregnancy, childbirth, recovery, and lactation. Students should contact the University's Pregnancy Coordinator as soon as the need arises: TIX.Pregnancy@tamu.edu.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors influencing a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care practices by utilizing the resources and services available through University Health Services on its mental health webpage. The TELUS Health Student Support app provides access to professional counseling in multiple languages anytime, anywhere by phone or chat, and the 988 Suicide & Crisis Lifeline offers 24-hour emergency support at 988 or 988lifeline.org.
Texas A&M College Station: Students needing a listening ear can contact University Health Services (979.458.4584). 24-hour emergency help is also available through the 988 Suicide & Crisis Lifeline (988) or at 988lifeline.org.
Texas A&M at Galveston: Students who need someone to talk to can call (409) 740-4736 from 8:00 a.m. to 5:00 p.m. weekdays or visit tamug.edu/counsel. For 24-hour emergency assistance during nights and weekends, contact the TAMUG Police Dept at (409) 740-4545. 24-hour emergency help is also available through the 988 Suicide & Crisis Lifeline (988) or at 988lifeline.org.
Texas A&M at Qatar: Texas A&M University at Qatar students wishing to discuss concerns in a confidential setting are encouraged to visit the Health and Wellness website for more information.

Statement on the Family Educational Rights and Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. Currently enrolled students wishing to withhold any or all directory information items can do so within howdy.tamu.edu using the Directory Information Withholding Form. The complete FERPA Notice to Students and the student records policy is available on the Office of the Registrar webpage.
Items that can never be identified as public information are a student's social security number,

citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.
Directory items include name, UIN, local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study (college, major, campus), classification, previous institutions attended, degrees honors and awards received, participation in officially recognized activities and sports, medical residence location and medical residence specialization.

Course Policies and Procedures

The following policies reflect the expectations for professional conduct in this course. Students are responsible for reviewing these policies carefully and adhering to them throughout the semester. Questions or uncertainties should always be directed to the instructor for clarification.

Late Work Policy

- Late work incurs a deduction of 10 points (out of 100) per calendar day.
- Work more than three days late will not be accepted unless covered under an excused absence (Student Rule 7).
- Work submitted as make-up for an excused absence is not considered late.

Free Speech and Civil Discourse

Texas A&M recognizes that the pursuit of truth through open and robust discourse is critical to academic inquiry. However, as a community of scholars, the university has an aspirational expectation that such discourse will be conducted in accordance with Aggie Core Values. In this "marketplace of ideas," we encourage civil dialogue creating an environment that allows individuals to express their ideas and to have their ideas challenged in respectful and responsible ways. Students can learn more about Freedom of Expression and Free Speech on the University's website about the First Amendment.

Artificial Intelligence Use

Artificial intelligence is transforming how materials scientists work, and developing fluency with AI tools is an essential professional skill. In this course, **supervised and thoughtful use of AI tools** (e.g., ChatGPT, Claude, Copilot, Gemini) **is encouraged** for tasks such as:

- Brainstorming and refining ideas
- Debugging and improving code
- Explaining concepts and exploring alternatives
- Drafting and editing technical writing
- Literature search and synthesis

Documentation requirement. Each assignment submission must include an **Appendix** describing in detail how AI tools were used. This should explain which tools were used, for what tasks, how you verified the outputs, and what modifications you made. If no AI tools were used, state this explicitly. The goal is not to limit AI use, but to help you develop the critical judgment to use these tools effectively and recognize their limitations.

Verify AI outputs. AI tools can produce incorrect results, hallucinate citations, generate buggy code, and confidently state falsehoods. You are responsible for verifying all AI-generated content before incorporating it into your work. Citing a non-existent paper or submitting code you do not understand are serious errors regardless of their source.

AI does not reduce expectations. The availability of AI assistance does not lower the standards for quality, depth, or originality. Work that meets minimum requirements through AI automation without demonstrating genuine understanding or intellectual engagement will not receive high marks. Your submissions should reflect mastery of the material, not just AI proficiency.

The instructor will also use AI tools to assist in evaluating projects, verifying code correctness, and providing feedback. This reflects the reality of modern scientific practice and models the responsible use we expect from students.

What constitutes misuse? Submitting AI-generated work without meaningful human engagement, critical evaluation, or proper attribution. You are responsible for understanding and being able to explain everything you submit.

For university guidance on responsible AI use, visit https://ai.tamu.edu.

Course Evaluations

Texas A&M University uses an online course evaluation system (AEFIS: Assessment, Evaluation, Feedback & Intervention System). Students will receive email notifications with links to complete evaluations for each enrolled course. Constructive feedback is vital for improving teaching and curriculum design, and your participation is strongly encouraged.

Copyright

Version History

Version	Date	Changes
2.1	January 8, 2026	Consolidated L13a/L13b back to single L13; L14 moved to week 8; schedule shifted
2.0	January 8, 2026	Split L13 into L13a (Hyperparameters) and L13b (Implementation); adjusted sched
1.9	January 6, 2026	Enhanced AI policy: Appendix requirement, verification, expectations
1.8	January 6, 2026	Restructured policies: University Policies (verbatim TAMU) + Course Policies
1.7	January 5, 2026	Revised to 6 homework assignments with updated schedule
1.6	January 5, 2026	Added Slack workspace link
1.5	January 5, 2026	Minor updates
1.4	January 5, 2026	Revised AI policy to encourage supervised use
1.3	January 5, 2026	Added L00: Course Overview & Policies; updated schedule
1.2	January 5, 2026	Revised learning outcomes to align with course modules
1.1	January 5, 2026	Aligned lecture titles with Beamer slide files
1.0	January 5, 2026	Initial release with 27-lecture modular structure