Time	Monday	Tuesday	Wednesday	Thursday
7-7:45 am	**REGISTRATION**			
8-9:30 am	Introduction: Materials by Design, from Atoms to Structures, Advanced Computing to Manufacturing **L1**	Materiomics: Fundamentals and Applications of Bioinspired Design by Categorization Case study: Molecular mechanics of viral proteins In-class 3D printing – setting up (various additive methods and integration with computing and computer vision) **L5**	Advanced Simulation Methods: Reactive Force Fields, Chemical Modeling, Quantum Training and Machine Learning, High-throughput material screening (materials genome), agentic self-driving laboratories **L7**	Performance of Materials in Extreme Conditions: Resilience, Stability, Catastrophic Failure: Connecting Experiment, Modeling and Theory Case study: Molecular mechanics and earthquakes **L9**
9:30-9:45 am	**COFFEE BREAK**	**COFFEE BREAK**	**COFFEE BREAK**	**COFFEE BREAK**
9:45-12:30:	Physics-driven Artificial Intelligence (AI): Nanoengineering hierarchical materials to meet industrial needs **L2**	Predictive Design: Multiscale Self-assembly & Additive Manufacturing; Fundamentals, Implementation, and Examples Agentic AI and decentralized swarms In-class design studio and 3D printing of optimized materials (continuum optimization and microstructural modeling) **L6**	Materiomics Case Study II: Modeling, Design, Manufacturing and Characterization of *De Novo* Hierarchical Composite Materials – turning weakness to strength In-class coding exercise – machine learning convolutional classifier development, cloud computing demonstration **L8**	Survey of Quantitative Multiscale Experimental Tools; Translational paradigms; Modeling in Science, Art and Music and Cross-disciplinary Synthesis, category theory Multi-agent material model live demonstration, swarm AI, vibe coding **L10**
12:30-1:00 pm	**LUNCH (on your own)**	**LUNCH (on your own)**	**LUNCH (on your own)**	**LUNCH (on your own)**
1:00-2:30 pm	Fundamentals of Computational Materials Science: Concepts, Implementation and Examples, Physics and Data-driven Methods **L3**	**LAB 1**: Hands-on Molecular Modeling – From the Bottom Up (includes simulation case studies, data analysis, visualization) Machine Learning Interatomic Potentials (MLIP), GPU acceleration	**LAB 2** INTRO LECTURE: Bioinspired Materials & Additive Manufacturing; Hands-on Application of Machine Learning and AI in Materials Design, Virtual and Augmented Reality (AR/VR)	**MATERIALS DESIGN CLINIC 1**: **MIT.Nano Lab tour 1-1:30pm** Machine learning, data collection, feasibility. Working with problems shared by participants for real-world solutions.
2:30-2:45 pm	**COFFEE BREAK**	**COFFEE BREAK**	**COFFEE BREAK**	**COFFEE BREAK**
2:45-4:30 pm	Introduction to machine learning clinic Materiomics Case Study I: Bio-inspired Surface Engineering (Gecko Nanotechnology & Adhesion), industrial applications of multiscale modeling and AI in materials engineering **L4**	**LAB 1 (cont'd)**: Interactive Case Studies (participants give short presentations, interactive discussion)	**LAB 2 (cont'd), 2-4pm:** Bioinspired Materials & Additive Manufacturing, Materials Processing Laboratory (virtual interactive lab tour, videos, and live demo by the instructor)	**LAB 3:** Presentations and Discussions, time for open Q&A (interactive group activity) Group Discussion; Certificates
4-5:30 pm	**RECEPTION** (includes participant introductions) **1-236 (Spofford Room)**	Optional: Time for Group Work and Assignments (can be arranged within groups at other times), Instructor is available for personal meetings	Optional: Time for Group Work and Assignments (can be arranged within groups at other times); Instructor is available for personal meetings	

Color code: Black font – lecture activity, blue font – interactive work, lab tour/activity
dark blue = reception/networking

In-class interactive simulations performed via in-browser cloud computing (access to internet via browser required)