MIT Professional Education

AI Strategies and Roadmap: Systems Engineering Approach to AI Development and Deployment

March 17 – March 21, 2025 | Live-Online | professional.mit.edu/aisr | Lead Instructor: David Martinez

Monday, March 17

	TOPIC	DESCRIPTION	HIGHLIGHTS
8:45–10:10 am	**D. Martinez - Introduction and Lecture 1:** Course introduction, AI background, and functional building blocks overview	Course kicks-off. Course commences with introduction to AI system architecture	AI building blocks
10:10–10:20 am	**Break**		
10:20–11:30 am	**D. Martinez - Lecture 2:** AI strategic vision and project roadmap	Formulate a strategic development plan that serves as the guiding blueprint for AI designers, developers, testers, and users/customers	Understand AI strategic development model (AISDM) used in course project
11:30 am–12:15 pm	**D. Martinez – Short Primer on Generative AI and LLMs**	High level description on Gen AI focusing on large language models	Introduce participants to LLMs fundamentals
12:15–1:00 pm	**Lunch Break**		
1:00–2:10 pm	**D. Martinez - Lecture 3:** Data conditioning	First stage of the AI pipeline required to transform data into information; classes of data covered are structured and unstructured data	Learn different types of databases and data conditioning approaches
2:10–2:20 pm	**Break**		
2:20–3:40 pm	**D. Martinez - Team Proposals:** Formulate two project proposals per team	Teams discuss and select two proposals as candidates for their project	Teams pick two projects where AI is the technology enabler
3:40–5:00 pm	**Team Presentations:** Present to faculty and course peers	Each team has 10 minutes to present two AI team project proposals	Faculty will select one of two proposals prior to Day 2

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TUESDAY, March 18

	TOPIC	DESCRIPTION	HIGHLIGHTS
8:30–9:00 am	**D. Martinez - Welcome to Day 2:** Day 2 agenda plus feedback on selected team projects	Day 2: What to expect and faculty announces AI team project selection	Discussion on team project guidelines and format
9:00–10:10 am	**D. Martinez - Lecture 4:** Machine learning	Application of machine learning (ML); ML algorithms transform information into knowledge	Foundational concepts in the design of ML models
10:10–10:20 am	**Break**		
10:20–11:30 am	**D. Martinez – Performance Metrics to Assess ML algorithms** Performance evaluation techniques	Review of techniques for assessing machine learning algorithm performance	Provide critical understanding of techniques to perform ML model evaluations
11:30 am–12:15 pm	**D. Martinez - Hands-On Exercise:** Multi-Layer Perceptron (MLP) machine learning model	Design an MLP model to classify MNIST fashion data and assess algorithm performance	Gain practical experience with building an ML model using Jupyter notebook
12:15–1:00 pm	**Lunch Break**		
1:00–2:10 pm	**D. Martinez - Lecture 5:** Modern computing as enabling technology	Understand what makes GPUs and TPUs well-matched to executing machine learning algorithms	Computational engines enabling AI breakthroughs
2:10–2:20 pm	**Break**		
2:20–5:00 pm	**Team Project:** Develop first draft of project strategic roadmap	Teams begin working on their respective AI projects	Complete mission, vision, and envisioned future
			Note: All times are US Eastern Daylight Time. Schedule is subject to change.

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WEDNESDAY, March 19

	TOPIC	DESCRIPTION	HIGHLIGHTS
8:30–9:00 am	**D. Martinez - Welcome to Day 3:** Day 3 agenda and faculty Q&A	Day 3: What to expect	Address any clarification on prior lectures or course project
9:00–10:10 am	**D. Martinez - Lecture 6:** Human-machine teaming	This building block of the system architecture transforms the output of the machine learning algorithms from knowledge into insight	Learn about trade-offs between roles best suited to a human vs. machines
10:10–10:20 am	**Break**		
10:20–11:30 am	**D. Martinez - Lecture 7:** Responsible AI	Incorporate Responsible AI (RAI) from the start of the development cycle, adhering to a set of AI trustworthy principles	Perspectives and challenges with RAI
11:30 am–12:15 pm	**Invited AI Practitioners – Panel on Generative AI** Opportunities and concerns (e.g., GPT-4, LLaMA, DALL-E 2, etc.)	Panel: Invited AI leaders speak on challenges and opportunities in the development and deployment of Generative AI	Panel discussion on the state of Generative AI: capabilities, Issues, and looking ahead
12:15–1:00 pm	**Lunch Break**		
1:00–2:10 pm	**D. Martinez - Lecture 8:** Guidelines for deploying AI capabilities	Leverage 10 guidelines that incorporate people, processes, and technologies in the successful deployment of AI products and/or services	AI ecosystem environment from business needs to deployment
2:10–2:20 pm	**Break**		
2:20–5:00 pm	**Team Project:** Develop second draft of project strategic roadmap	Teams continue working on their respective AI projects	Complete strategic direction and AI value proposition and business needs (stakeholder requirements)

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THURSDAY, March 20

	TOPIC	DESCRIPTION	HIGHLIGHTS
8:30–9:00 am	**D. Martinez - Welcome to Day 4:** Day 4 agenda and faculty Q&A	Day 4: What to expect	Address any clarification on prior lectures or course project
9:00–10:10 am	**D. Martinez - Lecture 9:** MLOps: transitioning from development into deployment	The foundational elements of MLOps, techniques, and contemporary tools	Tips and techniques in transitioning from development into operations
10:10–10:20 am	**Break**		
10:20–11:30 am	**D. Martinez - Lecture 10 (Part I):** Fostering an innovative team environment	Identify a set of practical performance metrics for assessing the effectiveness and productivity of AI teams	Measuring what matters in AI technology-based organizations
11:30 am–12:15 pm	**D. Martinez - Lecture 10 (Part II):** AI leadership and resilience	The future of work and high-performance leaders	Tools and techniques to lead AI teams
12:15–1:00 pm	**Lunch Break**		
1:00–2:10 pm	**D. Martinez - Lecture 11:** Communicating effectively	Best approaches to communicate the AI strategic roadmap to stakeholders, upper management, peers, and AI team members	Tools and techniques to clearly articulate the benefits, value, and desired outcomes from a proposed AI product or service
2:10–2:20 pm	**Break**		
2:20–5:00 pm	**Team Project:** Develop final presentation of project strategic roadmap	Teams finalize their respective AI projects; review pre-recorded video on communicating effectively	Finalize AI team project presentations
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FRIDAY, March 21			
	TOPIC	DESCRIPTION	HIGHLIGHTS
8:30–9:00 am	**D. Martinez - Welcome to Day 5:** Day 5 agenda and faculty Q&A	Day 5: What to expect	Address any clarification on prior lectures or course project
9:00–10:10 am	**D. Martinez - Lecture 12:** Putting it all together	Summary of all the topics covered in previous lectures serving as a quick reference guide for each of the participants	Lectures main takeaways
10:10–10:20 am	**Break**		
10:20 am–12:00 pm	**Team Presentations:** Course projects	Teams present their course projects on mission/vision, envisioned future, strategic direction, AI value proposition, and business needs/SWOT analysis for a product or service	Duration: 15 minutes per team plus 5 minutes Q&A and feedback
12:00–12:45 pm	**Lunch Break**		
12:45–1:45 pm	**Team Presentations (continuation):** Course projects	Teams present their course projects on mission/vision, envisioned future, strategic direction, AI value proposition, and business needs/SWOT analysis for a product or service	Duration: 15 minutes per team plus 5 minutes Q&A and feedback
1:45–2:00 pm	**Break**		
2:00–3:00 pm	**D. Martinez - Course Wrap-Up**	Course completion is based on attending all 12 lectures and completing a presentation on team project	MIT Professional Education issues a certificate of completion to participants within 2 weeks
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