



AI/ML Lab for Engineering & Science

Certificate Program

Enroll Now:

- **Live-Online Format** (Saturdays, 8am–5pm PT)
- **Upcoming Session** (Jan 20–Feb 17, 2024)
- **Course Credit** (4.0 CEUs)

ctme.caltech.edu/ailabensc-open

Program Objectives

Welcome to Caltech's AI/ML Lab for Engineering and Science, where we propel your machine learning skills to new heights for industry-grade applications in both research and real-world product environments. Our intensive, hands-on five-day certificate program is designed to hone your expertise based on the Institute's proven methodology for nurturing researchers' skills.

In this live online program, you will delve into the foundations of machine learning algorithms, gaining a deep understanding of data preprocessing, model selection, and evaluation criteria. Through diverse use cases, we will guide you along the entire AI/ML lifecycle, arming you with a potent toolkit to conquer industry challenges with confidence.

Learning Objectives

Our aim is to provide you with practical, applied machine learning techniques that you can implement immediately. While we will touch upon the statistical foundations of modern ML, our primary focus will be on equipping you as a real-life industry practitioner in engineering and research domains.

This course is designed for technically adept learners who wish to gain a comprehensive understanding of the entire AI/ML lifecycle, exploring the intricate trade-offs between commercial demands and academic pursuit of algorithm development. Enroll now to unlock your full potential in the realm of AI.

You will learn how to:

- Understand industry applications of the end-to-end AI/ML lifecycle
- Complete the foundations of ML with analytical methods and statistical deep dives
- Preprocess data to fit the needs of modern ML algorithms
- Understand the entire AI/ML lifecycle and its applications
- Create robust modeling of supervised and unsupervised algorithms
- Know which algorithm to select for various real-world scenarios in engineering and science
- Approach deep learning with applied knowledge of neural networks
- Leverage deep learning methods using modern tools like PyTorch
- Know the differences in compute when using deep learning
- Apply foundational large language models (LLMs) to current use cases in engineering and science



Participants

This program is designed for experienced professionals with a background in engineering, science, or related fields such as aerospace, chemistry, biology, electronics, finance, communications, or technology. It is ideal for those who want to integrate data science and machine learning into their work. Learners are expected to have a solid understanding of calculus, linear algebra, probability, and statistics, as well as basic programming skills, including Python/R. The course provides a balanced combination of theoretical concepts and practical applications.

Why CTME?

Leaders who aspire to innovate and execute come to Caltech's Center for Technology and Management Education (CTME). Here, you will do more than attend a class. You will develop new mindsets, technology skills, and leadership capacity to master the complex issues that challenge your organization today.

Instructors with real industry insight—Our instructors bring decades of real-world expertise and leadership in engineering, commercialization, manufacturing, operations, innovation management and executive accountability within technology-driven organizations and government agencies.

Achieve real impact in our on-demand classes with Caltech's action learning approach. Our module exercises, relevant cases, and structured reinforcement learning empowers you to apply new knowledge and thrive in the face of new challenges.

Discover the freedom to learn your way with our flexible programs. Whether you prefer online classes, on-campus or international experiences, or self-paced learning, we have options for you. With frequent course offerings, you can easily fit your education into your busy schedule.

Take on the challenge with Caltech. Earn a distinguished certificate by completing full programs (40+ hours) or choose targeted learning for your objectives and career. Gain credit for continuing education and professional development.

About Caltech

Caltech is a world-renowned science and engineering institute that marshals some of the world's brightest minds and most innovative tools to address fundamental scientific questions and pressing societal challenges. Caltech prizes excellence and ambition. The contributions of Caltech's faculty and alumni have earned national and international recognition, including over 45 Nobel Prizes. The Institute manages the Jet Propulsion Laboratory (JPL) for NASA.

In accordance with Caltech policy, CTME does not discriminate against any person on the basis of race, color, sex or sexual orientation, gender identity, religion, age, national or ethnic origin, political beliefs, veteran status, or disability in admission to, access to, treatment in, or employment in its programs and activities.

Instructor

Nicholas Beaudoin works at the intersection of machine learning and strategic decision-making in public and commercial organizations. As a data science manager with large and small consulting firms, including Deloitte, Capgemini, Eviden, and Washington, DC, analytic/policy think tanks, he developed AI/ML solutions, methods, data pipelines, and data visualization. His experience comes from helping companies ideate, build, and deploy machine learning solutions, including the infrastructure to support them. He has helped numerous Fortune 500 companies such as Mercedes-Benz, Honda, Warner Bros., Disney, Estée Lauder, national insurance providers, and various federal government departments ranging from the Department of Defense to the Department of State and Department of Agriculture.

Mr. Beaudoin holds extensive knowledge spanning AI/ML production, including end-to-end machine learning lifecycles, deployment strategies, and cloud-based integrations on AWS, GCP, and Azure. He is experienced in DevOps best practices for machine learning and proficient in MLOps orchestration and management. Additionally, he has expertise in applied generative AI, specifically large language models (LLMs), and is familiar with machine learning open-source toolkits.

Mr. Beaudoin is an instructor for Caltech CTME's programs, where he teaches machine learning, machine learning operations (MLOps), generative AI, and cloud-based machine learning. Mr. Beaudoin holds a Master's degree in International Affairs, with a focus on International Economics and Econometric Modelling, from UC San Diego and a Bachelor's degree in Political Science from Lewis & Clark College. In addition, he holds numerous advanced certifications in AWS and Google Cloud services.

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