DEVELOPING EMBEDDED AI SYSTEMS
SPECIALIZED STUDIES PROGRAM • ONLINE

Embedded artificial intelligence (AI) will enable new, inexpensive, and low power AI solutions that are not possible using cloud-based AI technologies alone. The edge AI chip market is growing much faster than the overall chip market, with the number of edge AI chips to be sold in 2024 estimated to be1.5 billion. Embedded AI requires knowledge and skills beyond traditional embedded systems, data science, and machine learning (ML). It requires knowledge of devices, sensors, and advanced, near real-time signal processing methods for video, audio, motion, or other signals. Specialized software tools and frameworks are required to develop embedded AI applications.

This program provides the knowledge and skills required to take advantage of this next major shift in technologies and the related growth in job demand. The program explores the specialized tools, frameworks, technologies, platforms, and methods used to create exciting new embedded AI devices. Study TinyML – the field of applying ML technologies to embed AI in resource-constrained devices. Discover how complex embedded AI applications work on smartphones, drones, and other embedded devices that have constrained processing, memory, power, and other resources. Investigate the signal processing methods and ML models behind important applications that process video, audio, motion, and other signals. Explore how ML frameworks are used to create these applications and use these with embedded AI hardware in hands-on projects. Learn how to choose the right hardware, development tools, and software components for an application. Examine the tradeoffs needed to make decisions about the mix of AI processing that needs to be done on the device and in the cloud. Apply what you have learned and use cutting-edge devices, sensors, signal processing, TinyML methods, and embedded ML frameworks to create an embedded AI device.

University of California, Irvine

ce.uci.edu/embeddedAI

WHO SHOULD ENROLL

This program is ideal for those who wish to learn about the field of embedded AI, acquire the specialized skills needed to create embedded AI solutions, explore new uses, solve problems using constrained edge devices, gain competitive business advantage, and expand career options. The curriculum is designed for embedded systems professionals, software engineers, electrical engineers, computer engineers, computer scientists, data scientists, data engineers, and machine learning scientists.

PROGRAM BENEFITS

- Use hands-on examples and activities to explore embedded AI applications, technologies, and highly specialized embedded ML software frameworks.
- Explore the details of embedded ML models (including deep learning neural networks) behind some important applications such as object recognition, wake word processing, and gesture detection.
- Review the steps required to develop and deploy embedded ML models.
- Understand the unique challenges posed by the deployment of ML models on resource constrained devices in TinyML applications.
- Use cutting-edge sensors, devices, signal processing, TinyML methods, and embedded ML frameworks to create an embedded AI device.
- Collect real-world sensor data, train, and validate ML models, optimize the model for deployment on a resource-constrained device, and deploy the model to your hardware.
- Explore features of devices that may be used for unembedded AI, including new low power microcontrollers which incorporate neural network accelerators that will enable new battery powered applications to execute complex ML models.
- Explore current trends and what may be on the horizon for embedded AI.

EARN A CERTIFICATE

Apply to become a candidate for the program: A Declaration of Candidacy is required to establish candidacy in this program. Complete the application and pay the application and candidacy fee of $125 (non-refundable). Learn more about the benefits of becoming a candidate. Candidacy is not required to enroll into individual course in a program.

A candidate in the program is awarded a specialized studies certificate upon the successful completion of three (3) required courses totaling 9 units, each with a letter grade of "C" or better. All requirements must be completed within five (5) years after the student enrolls in their first course. To receive the Certified Digital Certificate after the completing all the program requirements, students must submit the Request for Certificate to initiate the certificate audit process. Students not pursuing the certificate are welcome to take as many individual courses as they wish.

PROGRAM FEES

The total cost of the program varies depending on prerequisite and elective courses chosen. Actual fees may differ from the estimate below. Fees are subject to change without prior notice.

Course Fees (9 required units)	$2,235
Candidacy Fee	$125
Total Estimated Cost	**$2,360**

FOR MORE INFORMATION

EngineeringSciences@ce.uci.edu

DEVELOPING EMBEDDED AI SYSTEMS SPECIALIZED STUDIES		
COURSE#	**REQUIRED COURSES (9 units)**	**UNITS**
EECS X480.1	Introduction to Embedded AI	3
EECS X480.2	Embedded AI Applications and Technologies	3
EECS X480.3	Embedded AI Programming	3
Course schedules are subject to change. Individual courses may be taken without enrolling in the full program.		

EARN AN ALTERNATIVE DIGITAL CREDENTIAL

Successful completion of a qualifying assignment within the Introduction to Embedded AI course offers you the opportunity to earn an Alternative Digital Credential (ADC). Also referred to as a digital badge, an ADC is a virtual record of specific skills and competencies you have acquired and provides a verifiable way for you to share your educational achievements with employers, colleagues and others via social platforms like LinkedIn, Facebook and Twitter.

University of California Irvine
Embedded Artificial Intelligence: Basics
UCI
Division of Continuing Education

ce.uci.edu/embeddedAI   # University of California, Irvine