

New Curriculum or Curricular Change EFD Template



College of Engineering

Engineering Faculty Document No.:

97-26

November 21, 2025

TO: The Engineering Faculty

FROM: The Faculty of the Elmore Family School of Electrical and Computer Engineering

RE: New Engineering Major

The Faculty of the Elmore Family School of Electrical and Computer Engineering has approved the following new Major from the College of Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

TITLE:

Executive Master of Science in AI Engineering Leadership

DESCRIPTION:

The Executive Master of Science in AI Engineering Leadership will be a new major in the MSECE degree offered by the Elmore Family School of Electrical and Computer Engineering. The detailed curriculum requirements are provided on the following pages. In summary, this program will require 36 credits. Of these, 24 credits will be technical requirements (including 3 credits of math coursework and the remaining credits from courses related to Artificial Intelligence). The remaining 12 credits will be professional development courses offered in-house by ECE faculty.

This degree is developed as a strategy for enhancing Purdue presence in urban areas such as Indianapolis or the Bay Area in California. The technical courses will be offered in West Lafayette and Indianapolis and available online to the students. The faculty will travel to the on-site location twice each semester for in-person instruction. The professional development courses will be offered in person and on-site. Students will be collected into cohorts, taking 2-3 courses per semester together.

The closest similar degrees are MS in Management and Leadership (through Purdue Global) and [Master of Engineering Management](#) (through the College of Engineering).

RATIONALE:

The existing Master of Science in Electrical and Computer Engineering (MSECE) offered by the Elmore Family School of Electrical and Computer Engineering has three main flavors: (i) Professional Master's Program, which is a residential program primarily focused on students right after their BS program; (ii) Online MS, which is a purely online program focused on working professionals, taking 1–2 classes per semester on a part-time basis; and (iii) MS thesis, which is focused on students who want to get involved in the research mission. The proposed MS program is targeted towards students who want an in-person experience but are working professionals. More

specifically, it is meant for mid-level technical managers that need both deep technical expertise and leadership/management skills to enhance their **technical** career (not switching to a management track as done through an executive MBA program).

Existing Infrastructure: ECE currently has more than 1500 active students in the two MS programs (MSECE and MSSWE) and has built the needed infrastructure to administer this program successfully and efficiently. In particular, the online MS program is ranked No. 1 in the nation, reflecting (among other things) that almost the entirety of the course catalog is available online and the faculty spend a large amount of time to be available to the online students. The proposed program builds on some of that infrastructure. However, that will be enhanced through practices such as faculty traveling to the on-site location for in-person experiences and offerings of professional development courses and workshops targeted for enhancing technical careers.

Need for the degree: There are two typical pathways for students in technical roles when they hit mid-management roles and do not have the capacity or desire to participate in a residential program. The first is an executive MBA, which is utilized to shift to a management track. “Lighter” versions, such as the MS in Engineering Management are also available. The second is an online MS, which provides an additional credential to take the next step in their career, while staying on their career path. However, there is no current opportunity for students to attain deep technical expertise as well as leadership and management skills to run their group. The proposed major has been envisaged to meet this need.

The cohort structure, in-person experience complementing the online courses, and provision of networking opportunities through professional development workshops are designed to be of special interest to this group. The technical focus on AI Tech Stack and Physical AI drive the selection of the technical courses, given that the AI revolution continues to increase the divergence of skills and potential of students who graduated their bachelors as little as 5 years ago vs today.

As such, we believe this major will be of great interest to the marketplace. The model is modular and scalable – meaning that new cohorts can be started at the onsite location and the model can be utilized by other disciplines (for example with a different focus such as Healthcare) in urban areas such as Indianapolis or the Bay Area in California.

Competition: While many institutions throughout the US offer online MS degrees, MS in areas such as engineering management, and MBA programs, there is almost no degree available that has a similar dual focus on technical skills of AI and management / leadership skills, especially with a commitment of a significant in-person experience as well as that of a cohort experience. Two example executive MS programs are: (i) Executive MS program by UT Dallas which requires classes in person Friday evenings and Saturday mornings. There is no industry focus and hence the classes among the students can be quite different. In person component limits students to be from the surrounding area, and (ii) Executive MS program by UT Austin Online which requires classes one weekend per month. This is a 2 year program (10

courses, with 2 project courses). This is similar to the online MS program at Purdue ECE with no residential or in-person component. Also they provide graduate certificates and not a degree. Another related program is the Dual MBA-MS by Columbia. This program is over two years for 2 degrees and is fully in person. There are some satellite campuses (CMU) or residential programs (Berkeley / Stanford) targeted at industry for executive MS type programs. They are more costly and fully residential (although part time). For CMU program, there is no guarantee to be taught by the regular tenure track faculty and the technical degree thus is not equivalent to a regular residential degree.

Milind Kulkarni

Head/Director of the Elmore Family School of Electrical and Computer Engineering

Link to Curriculog entry:
[Paste link to Curriculog entry.]

ATTACHMENTS of the Curricular components and degree requirement are needed:

Executive MS in AI Engineering Curricular Components

Curricular Components:

Core Technical Courses (24 credit hours): These courses are intended to set up students for success for the duration of their program.

Math (3 credits)

Technical Electives in Artificial Intelligence (21 credits)

Professional Development Courses (12 credits): These courses provide additional training, expertise and practice in areas that are important to student's professional development, but that are not considered technical in nature. Examples will include project management, product development, leadership development, time management, and technical report writing.

Degree Requirements

Math (3 credits)	24 credits
AI Technical Electives (21 credits)	
Specialization courses (i.e. business, leadership, Project management, Time management etc.)	12 credits
	36

Learning Outcomes and Assessment

Learning Outcomes

Upon completion of students will be able to:

1. Employ quantitative, qualitative, analytic and statistical techniques to AI engineering problems
2. Communicate effectively and employ constructive professional and interpersonal skills
3. Apply advanced leadership practices to organizational challenges
4. Identify and execute ethical and responsible professional practices

Assessment of Outcomes

Progress towards achievement of the competencies required for Executive MS graduates will be assessed throughout the student's participation in the Major:

- Competency in technical foundations and ethical and responsible professional practices will be assessed through coursework via exams, oral presentations, written reports and other artefacts demonstrating individual and team capability.
- Communications competencies and professional and interpersonal skills will be assessed through coursework, team projects, written reports and oral communications.
- Advanced leadership practices will be assessed through analysis and application of engineering leadership and organizational case studies as appropriate in the context of the courses

Appendix 1: List of Technical Courses

Cohort topic: **AI** tech stack

<i>Theme</i>	<i>Courses</i>
Math (3 credits)	
	e ECE595 (New Course Specific for this Degree)
Infrastructure: (9 credits)	
	ECE69500 (Hardware for Machine Learning)
	ECE60850 (Datacenter and Cloud Networks)
	ECE60827 (Programmable Accelerator Architectures)
Data: (3 credits)	
	ECE 50836 (Intro to Data Mining)
Model development and operations: (3 credits)	
	ECE 57000 or ECE 50024
Application: (3 credits)	
	ECE60864 (Advanced IoT Design and Applications)
Governance: (3 credits)	
	ECE60872 (Reliable and Secure Computer Systems)

Cohort topic: Physical AI

<i>Theme</i>	<i>Courses</i>
Math (3 credits)	
	New course ECE595 (New Course Specific for this Degree)
Intro ML / AI (6 credits)	
	ECE 57000 / 50024
	ECE69500 (Foundation Models) / ECE 60131 - Inference and Learning in Generative Models

Autonomous robots (6 credits)	
	ECE 59500 (Reinforcement learning)
	ECE56900 (Intro to Robotic Systems)
Sensing and Systems (6 credits)	
	ECE59500 (Computer Vision for Embedded Systems) / (Deep Learning for Computer Vision)
	ECE60864 (Advanced IoT Design and Applications) ECE56800 (Embedded Systems)
Reliability (3 credits)	
	ECE 69500 (Hardware-Software Security) / Robustness in AI

Professional Development Courses (common to both cohorts)

ECE69500 (Communication for Engineering Leaders)

ECE50005 (IP Generation and Management) — 3 credits
Santokh

Three new courses to be developed

