

To the ETID Department of Texas A&M

July 1, 2025

Attn: Dr. Bimal Nepal

This memo serves to detail an outstanding concern with our MXET curriculum and direction. I am the author of the original laboratory lessons for the course of MXET400, Industrial robotics. In 2018, under the oversight of Dr. Joe Morgan the first Program Coordinator for MXET, I formed curriculum from concepts to instructions to equipment to support it. I met with the external advisory committee together with faculty and made multiple trips to stakeholders such as our National Instruments, Texas Instruments, NASA, and teams who frequently hire our department's graduates. My involvement in curriculum formation was purposeful, due to my extensive industry experience. My past work in manufacturing spans Goodyear, Toyota Kentucky, Toyota Japan, and onsite work in over a dozen automotive suppliers across the Midwest, which feed into Toyota Manufacturing North America. All these manufacturers rely on industrial automation in the form of PLCs, programmable logic controllers.

Without covering industrial electronics, the MXET curriculum has severe shortcomings, and our students are aware. The student I interviewed says ***"I want to learn PLCs... It's something I've seen as a requirement for a lot of automation jobs, which is supposedly the job that we are supposed to get into as MXET majors."*** This student has graduated two months ago, he is highly competent with electronics, and is actively searching for a job. Our track record at ETID is to have students gain work contracts many weeks before graduation, and instead they are finding unemployment. MXET is supposed to be our shining star of the department – the newest and most relevant degree and our numbers show following 2017 it was the fastest growing major for multiple years (see figure below).

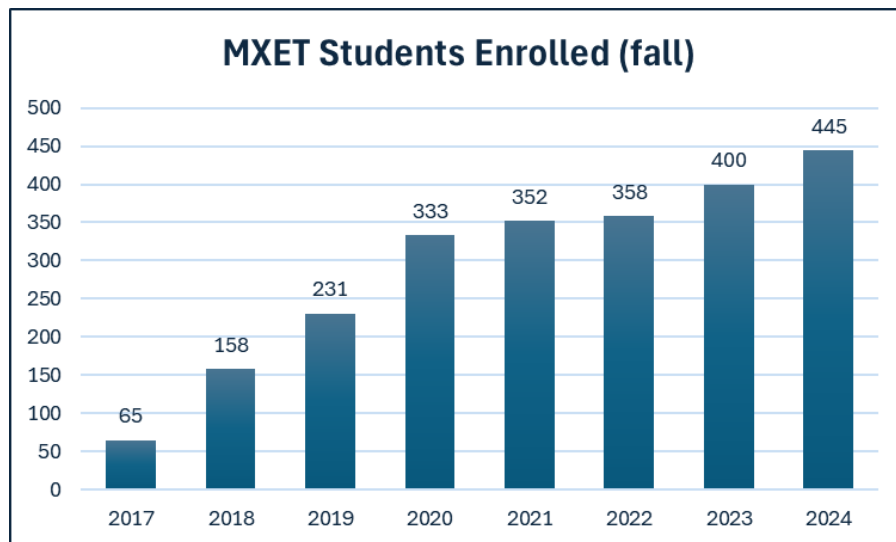
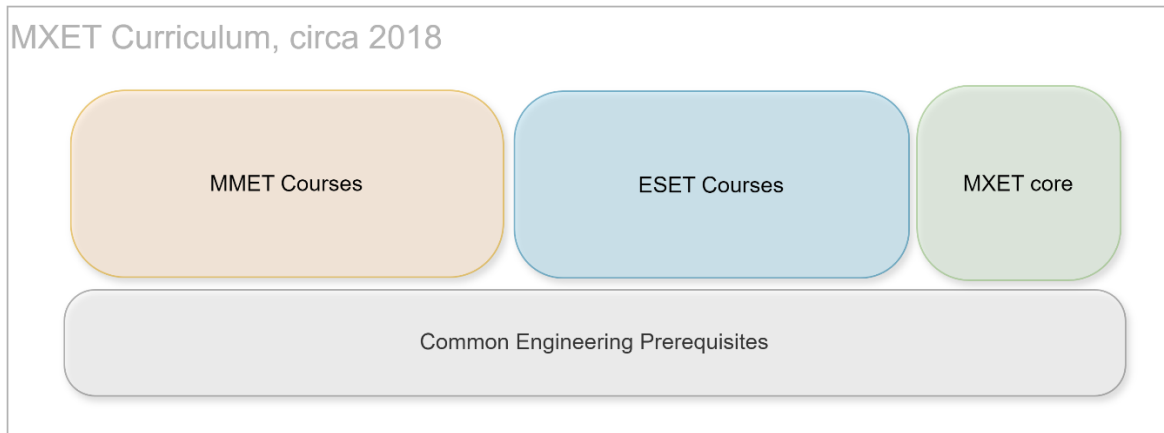


Figure 1- Multidisciplinary Engineering Enrollment [4]

In the formation of the MXET program, only two courses were formed from scratch, and the remaining courses were borrowed from the sister programs MMET and ESET. It was intensively deliberate to select Industrial Robotics as a course to

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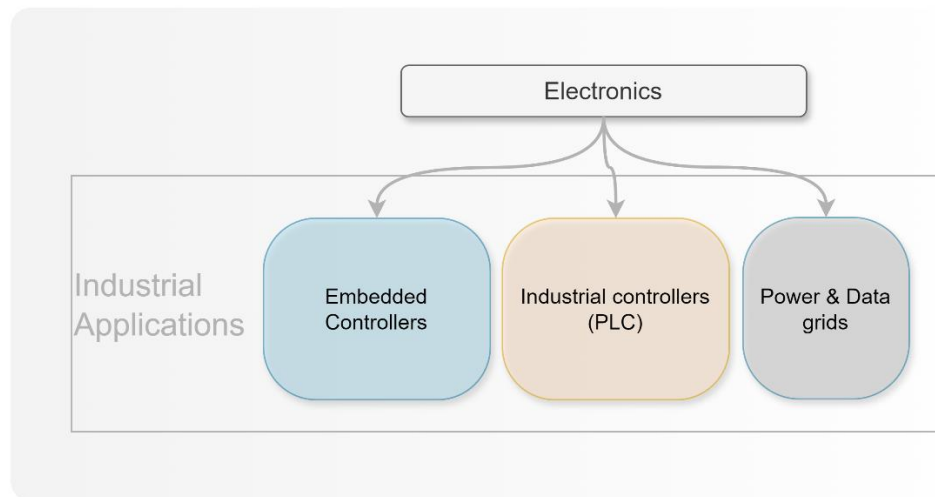
build from ground zero. The robots used in industry are comprised of only two categories: embedded controllers and industrial controllers. Our department specializes in Embedded electronics, so industrial control resides in the gap between our current offerings and a successful MXET curriculum. The figure below illustrates parts of the program curriculum with the small box for “MXET Core” representing only two courses that would define the program.



*Figure 2 - The MXET curriculum makeup, featuring just 2 courses in the green box above*

In the industrial world, electronics are implemented in just two categories: embedded and PLCs. PLC systems (programmable logic controllers) are crucial to such a degree that Manufacturing engineers, Mechanical engineers, and Electrical engineers are all expected to be familiar. I first worked with PLC's in my very first internship in Toyota Manufacturing, Kentucky (2009). I personally discussed with senior-level students in ESET throughout several years and MXET during it's first year, when Industrial robotics was not yet ready as a course. These students admitted that they lack exposure to PLCs and wish that they had a chance to learn something about them. From the industry side and from the student side we have a clear need to include PLC devices in the curriculum for MXET.

Our ESET department has a refined strength in embedded electronics but no history with industrial electronics. Therefore, I was tasked with selecting appropriate PLC units and accessories to include in our MXET400 lab and programming a demonstrative set of functions for the students to build from. I spent the entire summer in 2021 building the software, wiring physical devices, and extensive but simple slides to guide the users to begin implementing the PLC units. Since these devices have countless functions, I also had to select the most appropriate functions to demonstrate the *essence of the PLC's purpose* in a factory automation scenario. I put painstaking care into each decision, the names of the files, the online storage of the files, and easy accessibility for students. As an insurance policy against losing this progress, I made it so that even without ever having a conversation with myself, the teaching staff would have a high chance of understanding and teaching the content. I recorded videos explaining the system operation, so if misconfiguration occurred, recovery would be easy.



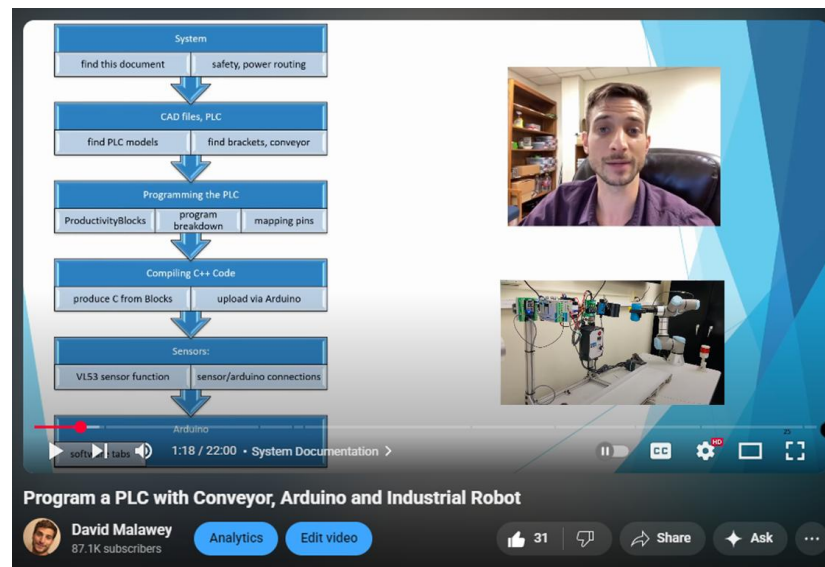
*Figure 3 Applications of Electronics Engineering in modern industry*

Our MXET students are aware that they lack knowledge in industrial controllers, and they are aware it is crucial. Even in our MMET department we have a laboratory for PLC controllers. From 2018-2021 I took several visits to see Dr. Hsieh's laboratory and understand his equipment, experience, and his advising for the topics of PLC's. His laboratory features miniaturized conveyance systems that MMET students learn on. Dr. Lee onboarded as I was finishing my preparation work for the MXET400 lab, and she was designated as the administrating faculty for this MXET400 course. Essentially, she took ownership of the course from that point forward.

In the first semester that Dr. Lee onboarded, I repeatedly asked to meet with her so I could explain and handoff the PLC—based system that would operate in her lab. Her availability was scarce. The best that I could get was a meeting with her TA, who remained only for about two semesters before he moved on and was replaced. I sent files about the background and the purpose, and I strongly wished to have Dr. Lee's inputs as I was making the lessons and slides that would need to be learned directly in her class. In the following few years until now, she never made time to meet with me for actual planning and discussion on this topic. As of the last semester (spring 2025) I visited the students in the MXET400 lab and interviewed them a little bit about what they learned. They were not given any opportunities to perform even the most basic configuration changes to the PLC - instead, the class is using the PLC as an automatic switch. It is treated opposite of a programmable machine and instead, the same as a fixed piece of hardware that never changes. They are completely missing ALL of the essence of a PLC, while the inclusion of PLC systems in the ESET curriculum was a milestone - a first—ever accomplishment, which we included in the documentation that we sent to ABET for our accreditation!

During 2024 and 2025, I periodically visited the MXET400 lab space, and asked a students (after class) if they know the purpose of a PLC - they could not give a certain answer, even at semester-end after the semester had concluded! I asked further if they had been taught with the slides that I created, or if their project followed the set of tasks that I had included in the project "recommended scope" that I had provided to Dr. Lee, or learn if they had reviewed my video about how the whole conveyor/plc/sensors system works — they were not even aware my documentation existed! I supposed then the

curriculum had been updated, and the professor had made new decisions for this topic and how it would be taught. NO! The students informed me they basically just had one week (equal to one lab session) of instruction that even touched on the PLC system.



*Figure 4 - Video for Industrial Robotics Lab System*

Later this year, in May 2025, I encountered one of our MXET recent graduates who had taken both MXET core courses. He complained to me that the curriculum had not seemed highly relevant to him. He expressed that he spent, instead of time with a PLC system, about the last quarter of the semester doing highly complex mathematics for the kinematics of a robot arm. Not implementation, not working with lab equipment, simply a very heavy set of lessons on 3D kinematics with matrix algebra. I saw the topics that he referred to - this was the type of coursework I had encountered two stages beyond his level of studying - in graduate level mechanical engineering. MXET students are not mechanical engineers and they are not in grad school. He said that the entire class very much struggled with that section of the course and they were not sure why kinematics was important to learn.

What seems to have happened is that our professor chose to include her specialty as a PhD mechanical engineer in the curriculum of a fourth-year engineering technology class, where the students have zero prerequisite curriculum supporting this set of challenging mathematics. It is completely unreasonable to expect junior-level ETID students to succeed in this territory and it is completely outside of the expectations of these students' future employers. Why does the curriculum focus on robot arm kinematics? Coincidentally, this professor has a body of research relating to kinematics of robotic arms and regularly is seeking to add students to her lab to support her research. One of her past researchers was a close friend of mine and I saw routinely how his strong work ethic was overpowering his awareness that his work was excessively niche for a masters' student and highly unlikely to vector him to desirable job placement. I saw him adapted from masters student to be essentially a support feature for PhD research, and he would likely still miss the benefits that befall PhD students since he was not intending on an academic career. So we **wasted** the equipment that was budgeted specifically to lift the MXET program off the ground - special **one-time funds** allocated for the kickoff of the major.

The MXET400 course description reads as follows:

MXET 400 MECHATRONICS II – INDUSTRIAL ROBOTIC SYSTEMS. STUDY AND ANALYSIS OF INDUSTRIAL ROBOTICS AND AUTOMATION PROCESSES NECESSARY FOR ROBOT-CENTRIC WORK CELL DESIGN AND OPERATION.

FROM AN INTERVIEW WITH AN MXET STUDENT: “READING THIS COURSE DESCRIPTION AND HAVING TAKEN THE CLASS - THIS DOESN’T FEEL LIKE A DISCUSSION OF THE COURSE I TOOK. MY CLASS WAS BASICALLY JUST KINEMATICS OF ROBOT ARMS.” [1]

Regarding the topic of Fraud, Waste, and Abuse: Our department has advertised to students that we are preparing them for industrial mechatronics, we have evaluated that industrial controllers are required for entry in the industry, and we have internally removed teaching outcomes that equip students for industrial electronics. Our actions and offerings are directly misaligned with our advertised value to the students and this is **fraud**. We have offered no suitable replacement for the lessons that were removed, and we concurrently offer this required MXET learning outcome to the alternative program, rendering our graduates unfit for industry.

We **wasted** the slides, lessons, and videos produced by the staff member to make sure the students were supported. We **abused** the authority of the individual professor in override decisions that were made directly for the process of ABET Accreditation. We failed evaluate our students' level of prerequisite knowledge and deliver instruction at the appropriate level. (I can provide explanation and evidence of this claim in a separate letter) This memo outlines one key mishandling, and there are several others. The time it takes to piece together the situation is intensive, and it does not belong on the shoulders of the staff member.

Our students’ career situations are evidence of the outright mishandling of the very futures of the students that we are trusted to support. The last student that I spoke with had traveled all the way from California for college here at TAMU and had accumulated above \$200,000 US Dollars in student debt to complete his degree in MXET. This individual not receiving what he paid for simply due to the selfish and careless behaviors of individual professors is unacceptable. To see eight semesters pass without correction of our curriculum - it's unconscionable. It is the duty of our leadership to address why this shortcoming is taking place and what steps will be made to correct it. As an educator and staff member, I am directly asking for a resolution and a timeline. Let it be known that my effort will be at all times directed in support of our undergraduate students who are the central constituent of our entire effort in the department of ETID.

Sincerely,

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## Department Mission:

*The mission of the Engineering Technology and Industrial Distribution Department is to:*

- 1. Maintain nationally recognized programs in Engineering Technology and Industrial Distribution;*
- 2. Focus on educating highly-qualified graduates with hands-on skills, providing them with experience in advanced integration of both conventional and emerging technologies, a unique understanding of technical management and business practices, and an entrepreneurial point of view;*
- 3. Provide leadership within the College of Engineering and university in interdisciplinary applied research, to include the development, and deployment of new technology; and*
- 4. Promote and develop long term partnerships with industry and government that foster enhancements and interactions in education, research, and professional development.*

See source [6] for the above mission statement.

## Sources:

- 1) TAMU website for undergraduate catalog, accessed 2025.06.30 [catalog.tamu.edu/undergraduate/course-descriptions/mxet](http://catalog.tamu.edu/undergraduate/course-descriptions/mxet)
- 2) Interviews with an MXET student before and after graduation. Dates range from 2025 February to 2025 June. This student studied MXET400 in Fall 2024, Graduated May 2025
- 3) My YouTube Video Titled "We (USA) need to catch up with the Developing World in Engineering." Located at [youtu.be/KLoevbmQ4mU](https://youtu.be/KLoevbmQ4mU), published May 30, 2025.
- 4) Enrollment numbers for the MXET program from TAMU Demographics [abpa.tamu.edu/accountability-metrics/student-metrics/student-demographics](http://abpa.tamu.edu/accountability-metrics/student-metrics/student-demographics)
- 5) My Video Titled "Program a PLC with Conveyor, Arduino, and Industrial Robot" Located at <https://youtu.be/30GM4m-Lyec>
- 6) Mission of the ETID Department, accessed 2025.06.30, located at [engineering.tamu.edu/etid/about](http://engineering.tamu.edu/etid/about)