

# MULTIDISCIPLINARY ENGINEERING TECHNOLOGY - BS, MECHATRONICS TRACK

Multidisciplinary Engineering Technology (MXET) prepares students for careers requiring an understanding of technical problems and systems that combine principles from two or more engineering technology disciplines. The degree is designed to be flexible, giving the student a strong background in electronic and mechanical systems, which is then augmented with a focus area. Graduates of the program receive a rigorous technical education and typically take engineering and technology positions appropriate to their focus area of study. The MXET curriculum is based on a strong underpinning of engineering math and science courses followed by a core technical sequence. This core includes mechanical, electronic and embedded systems/software fundamentals, principles and design concepts. Throughout their curriculum, students work on multiple open-ended projects to design, implement, test, and evaluate mechanical and electronic hardware and software systems. One of the most unique aspects of the Multidisciplinary Engineering Technology program is that most technical courses provide a hands-on laboratory experience using state-of-the-art equipment and industry-standard design and analysis software. The technical curriculum is augmented with courses in written/oral communications and technical project management. A team-based industry-sponsored capstone design sequence provides a challenging opportunity to apply technical, managerial, and communications skills to solve a real-world problem.

## MXET Program Mission

The Multidisciplinary Engineering Technology Program at Texas A&M University prepares graduates for immediate impact and long-term career success by providing a real-world experiential education coupled with personalized undergraduate experiences in mechanical, electronic, control, computer and communication systems, as well as engineering design and development.

## MXET Program Educational Objectives

The program educational objectives of the BS MXET degree program are to produce graduates who, within two to five years after graduation, will:

- Possess and demonstrate technical knowledge of the design, manufacture, sales, and service of complex systems that span multiple engineering technology disciplines.
- Demonstrate an increasing level of leadership and responsibility.
- Exhibit productivity in a dynamic work environment through a commitment to lifelong learning.
- Exhibit a commitment to professional ethics in their professional careers.

A continuous cycle of assessment and program improvement is used to ensure that these objectives are being met. Through interactions with industry and academic partners, the Multidisciplinary Engineering Technology program offers a state-of-the-art curriculum that produces successful graduates.

## MXET Tracks

The MXET program has a common core of courses and 29 additional credit hours that allow students to gain further experience with the focus area of choice. Currently, there are three focus areas, each represents a track of the MXET program. These tracks are mechatronics, STEM education, and electro marine engineering technology. The MXET program is offered at three distinct locations: College Station, Galveston, and McAllen.

## Mechatronics Track

The Mechatronics track prepares students to design, develop and support products and systems that combine mechanical, electronic, robotics, automation, communication, control, and embedded computing principles.

This program is approved to be offered at the Texas A&M Higher Education Center in McAllen, Texas.

## Program Requirements

The freshman year is identical for degrees in aerospace engineering, architectural engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, environmental engineering, industrial distribution, industrial engineering, interdisciplinary engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering (Note: not all programs listed are offered in Qatar). The freshman year is slightly different for chemical engineering, biomedical engineering and materials science and engineering degrees in that students take CHEM 119 or CHEM 107/CHEM 117 and CHEM 120.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

### First Year

Fall		Semester Credit Hours
CHEM 107	General Chemistry for Engineering Students <sup>1,4</sup>	3
CHEM 117	General Chemistry for Engineering Students Laboratory <sup>1,4</sup>	1
ENGL 103 or ENGL 104	Introduction to Rhetoric and Composition <sup>1</sup> or Composition and Rhetoric	3
ENGR 102	Engineering Lab I - Computation <sup>1</sup>	2
MATH 151	Engineering Mathematics I <sup>1,2</sup>	4
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
<b>Semester Credit Hours</b>		<b>16</b>
Spring		
ENGR 216/ PHYS 216	Experimental Physics and Engineering Lab II - Mechanics <sup>1</sup>	2
MATH 152	Engineering Mathematics II <sup>1</sup>	4

PHYS 206	Newtonian Mechanics for Engineering and Science <sup>1</sup>	3
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
Select one of the following:		3-4
CHEM 120	Fundamentals of Chemistry II <sup>1,4</sup>	
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3,5</sup>		
<b>Semester Credit Hours</b>		<b>15-16</b>
<b>Total Semester Credit Hours</b>		<b>31-32</b>

<sup>1</sup> A grade of C or better is required.

<sup>2</sup> Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.

<sup>3</sup> Of the 21 hours shown as University Core Curriculum electives, 3 must be from creative arts (see AREN curriculum for more information), 3 from social and behavioral sciences (see IDIS curriculum for more information), 3 from language, philosophy and culture (see CVEN, EVEN and PETE curriculum for more information), 6 from American history and 6 from government/political science. The required 3 hours of international and cultural diversity and 3 hours of cultural discourse may be met by courses satisfying the creative arts, social and behavioral sciences, language, philosophy and culture, and American history requirements if they are also on the approved list of international and cultural diversity (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/>) courses and cultural discourse (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/>) courses.

<sup>4</sup> BMEN, CHEN and MSEN require 8 hours of fundamentals of chemistry which are satisfied with CHEM 119 or CHEM 107/CHEM 117 and CHEM 120; Students with an interest in BMEN, CHEN and MSEN can take CHEM 120 second semester freshman year. CHEM 120 will substitute for CHEM 107/CHEM 117.

<sup>5</sup> For BS-PETE, allocate 3 hours to core communications course (ENGL 210, COMM 203, COMM 205, or COMM 243) and/or 3 hours to UCC elective. For BS-MEEN, allocate 3 hours to core communications course (ENGL 203, ENGL 210, or COMM 205) and/or 3 hours to UCC elective.

## Second Year

Fall		Semester Credit Hours
ENGR 217/	Experimental Physics and Engineering Lab	2
PHYS 217	III - Electricity and Magnetism <sup>1</sup>	
ESET 210	Circuit Analysis <sup>1</sup>	4
ESET 219	Digital Electronics <sup>1</sup>	4
MMET 207	Metallic Materials <sup>1</sup>	3
PHYS 207	Electricity and Magnetism for Engineering and Science <sup>1</sup>	3
<b>Semester Credit Hours</b>		<b>16</b>
Spring		
ESET 269	Embedded Systems Development in C <sup>1</sup>	3
ESET 350	Analog Electronics <sup>1</sup>	4

MMET 275	Mechanics for Technologists <sup>1</sup>	3
MMET 376	Strength of Materials <sup>1,6</sup>	4
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3

### Semester Credit Hours

17

## Third Year

### Fall

ESET 349	Microcontroller Architecture <sup>1,6</sup>	4
MMET 303	Fluid Mechanics and Power <sup>1,6</sup>	4
MMET 361	Product Design and Solid Modeling <sup>1,6</sup>	3
MXET 375	Applied Dynamic Systems <sup>1</sup>	3
Math elective <sup>1,7</sup>		3

### Semester Credit Hours

17

### Spring

ENTC 399	High Impact Experience <sup>8</sup>	0
ESET 359	Electronic Instrumentation <sup>1</sup>	4
ESET 369	Embedded Systems Software <sup>1,6</sup>	4
MMET 363	Mechanical Design Applications I <sup>1</sup>	3
MMET 370	Thermodynamics for Technologists <sup>1</sup>	4
MXET 300	Mechatronics I – Mobile Robotic Systems <sup>1,6</sup>	3

### Semester Credit Hours

18

## Fourth Year

### Fall

ESET 419 or MMET 429	Engineering Technology Capstone I <sup>1</sup> or Managing People and Projects in a Technological Society	3
ESET 462	Control Systems <sup>1,6</sup>	4
MXET 400	Mechatronics II – Industrial Robotic Systems <sup>1,6</sup>	3
Technical elective <sup>1,7</sup>		2
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3

### Semester Credit Hours

15

### Spring

ESET 420 or MMET 422	Engineering Technology Capstone II <sup>1</sup> or Manufacturing Technology Projects	2
Select one of the following:		3
COMM 203	Public Speaking	
COMM 205	Communication for Technical Professions	
ENGL 210	Technical and Professional Writing	
Technical elective <sup>1,7</sup>		2
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3

### Semester Credit Hours

13

### Total Semester Credit Hours

96

<sup>6</sup> Meets the 29 hour Mechatronics focus area requirements.

<sup>7</sup> See a departmental advisor for a list of approved electives.

<sup>8</sup> All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the ETID advising office.

This curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

**Total Program Hours 127**