MXET - MULTIDISCIP ENGR TECH (MXET)

MXET 220 Science, Technology, Engineering and Mathematics (STEM) Education Foundations

Credits 2. 1 Lecture Hour. 2 Lab Hours. Introduction to Science, Technology, Engineering and Mathematics (STEM) education approaches, planning, and analyzing; foundations of K-12 workshops in prototyping, mobile app programming, engineering design, robotics, and Computer-Aided Design (CAD); focus on implementation, testing, documentation, demonstration, and classroom management. **Prerequisites:** Sophomore level classification; MXET major; or approval of instructor.

MXET 250 Robotic Systems Design

Credits 3. 2 Lecture Hours. 3 Lab Hours. Principles of robotic systems design, fabrication, programming, and testing; fundamentals of mechanisms, mechanical power transmission, dynamics of mechanisms, instrumentation, actuation, and computer simulation. **Prerequisites:** Freshman or sophomore classification; MXET major; or approval of instructor.

MXET 300 Mechatronics I – Mobile Robotic Systems

Credits 3. 2 Lecture Hours. 3 Lab Hours. Mechanical, electronic, software, control and communications aspects of embedded intelligence-based electromechanical systems with a focus on mobile robotic platforms. **Prerequisites:** Grade of C or better in MXET 375, PHYS 207, and ENGR 217/PHYS 217 or PHYS 217/ENGR 217; grade of C or better in ESET 359 or concurrent enrollment.

MXET 345 Numerical Methods in Robotics Applications

Credits 3. 2 Lecture Hours. 2 Lab Hours. Vectors and Matrices, Numerical Integration and Differentiation, Linear System of Equations, Root Finding, Curve Fitting, Ordinary Differential Equations, with applications in Manipulator Dynamics, Forward and Inverse Kinematics, Trajectory Generation, and Simulation Dynamics. **Prerequisites:** Grade of C or better in MATH 151, MATH 152; junior or senior classification in multidisciplinary engineering technology; or approval of instructor.

MXET 375 Applied Dynamic Systems

Credits 3. 2 Lecture Hours. 3 Lab Hours. Study of translational mechanical system dynamics, rotational mechanical system dynamics, electrical system dynamics modeling, electro-mechanical/mechatronics system dynamics, fluid power dynamics and 2 dimensional rigid body dynamics. **Prerequisites:** Grade of C or better in MMET 275; junior or senior classification in an engineering technology major.

MXET 400 Mechatronics II – Industrial Robotic Systems

Credits 3. 2 Lecture Hours. 3 Lab Hours. Study and analysis of industrial robotics and automation processes necessary for robot-centric work cell design and operation. **Prerequisites:** Grade of C or better in MXET 300; grade of C or better in ESET 462 or concurrent enrollment, junior or senior classification in multidisciplinary engineering technology.

MXET 450 Artificial Intelligence for Mechatronics

Credits 3. 2 Lecture Hours. 2 Lab Hours. Principles of Artificial Intelligence and Machine Learning; Reinforcement Learning; Path Planning; Decision Making; and Intelligent Control and their applications in designing Intelligent Autonomous Systems. **Prerequisites:** Grade of C or better in MATH 151, MATH 152, and MXET 300; grade of C or better in ESET 462 or concurrent enrollment; junior or senior classification in multidisciplinary engineering technology; or approval of instructor.

MXET 485 Directed Studies

Credits 1 to 6. 1 to 6 Other Hours. Directed study of selected problems in an in an area of multidisciplinary engineering technology not covered in other courses. Maye be repeated for credit. **Prerequisites:** Senior classification and approval of instructor.

MXET 491 Research

Credits 0 to 4. 0 Lecture Hours. 0 Lab Hours. 0 to 4 Other Hours. Research conducted under the direction of faculty member in the college of engineering. May be repeated three times for credit. **Prerequisites:** Junior or senior classification and approval of instructor.