ENTC - ENGINEERING TECHNOLOGY

ENTC 600 Mechatronics II

Credits 3. 2 Lecture Hours. 3 Lab Hours. Focus on up-to-date knowledge and theories on robotic manipulation and industrial robots; exploration of rigidbody motions, forward and inverse kinematics, differential kinematics, forward and inverse dynamics of robotic manipulator, motion planning and control theories. **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 for students enrolled in MXET 400.

ENTC 610 Cyber-Enabled Manufacturing

Credits 3. 3 Lecture Hours. Theory and technologies related to integrating humans, smart-machines and information within a connected networked manufacturing environment; technologies including sensors and sensor networks; Internet of Things and Industry 4.0 concepts; topics include total quality control, sensor fusion, analytic modeling and adaptive control algorithms. **Prerequisites:** Graduate classification or approval of instructor.

ENTC 611 Industrial Internet of Things

Credits 3. 3 Lecture Hours. Comprehensive coverage on, among others, the role of data, manufacturing systems, various Industry 4.0 technologies, applications and case studies; draw input from researchers and practitioners on what are the opportunities and challenges brought about by Industry 4.0, and how organizations and knowledge workers can be better prepared to reap the benefits of this latest revolution **Prerequisite:** Graduate classification; approval of instructor.

ENTC 612 Manufacturing Supply-Chain Capability Management

Credits 3. 3 Lecture Hours. Supply chain operations, associated business processes and their relation to the financial performance of a manufacturing company; methodologies for the optimal use of company assets and resources to achieve coordinated of material flows between and within suppliers, manufacturers and distributors. **Prerequisites:** Graduate classification or approval of instructor.

ENTC 615 Advanced Network Systems & Security

Credits 3. 2 Lecture Hours. 3 Lab Hours. Advanced Network Systems & Security. Advanced topics of the network systems and security including network design and protocol including Border Gateway Protocol (BGP), Internet Protocol (IP) Routing, Internet Protocol Version 6 (IPv6), Network Address Translation (NAT) and Domain Name System (DNS); network security including Access Control Lists (ACLs), Transmission Control Protocols (TCP) and IP security and Virtual Private Networks (VPN); socket programming and cryptographic protocols. **Prerequisites:** Graduate classification.

ENTC 629 Leadership and People Management in Technology Enterprises

Credits 3. 3 Lecture Hours. Technology operations and organizational structures; techniques and methods for effective project and personnel management; globalization and impact on project management; financial justification and cost accounting of project budgets; leadership and management skills; engineering and technology supervision. **Prerequisite:** Graduate classification or approval of instructor.

ENTC 633 Advanced Wireless Instrumentation and Control

Credits 3. 3 Lecture Hours. Short range wireless communication, instrumentation and control for industrial Internet of Things (IoT); wireless sensor networks, information processing and transmission; analysis of requirements on reliability, latency, security, power, signal conditioning and processing, and control; system and subsystem performance evaluation; cloud computing, data analytics for system optimization and prognosis. **Prerequisites:** Graduate classification or approval of instructor.

ENTC 635 Advanced Applied Dynamics for Mechatronic Systems

Credits 3. 3 Lecture Hours. Translational mechanical system dynamics, rotational mechanical system dynamics, electrical system dynamics modeling, mechatronics system dynamics, fluid power dynamics, rigid body dynamics and applied dynamics modeling using finite element method; automotive, oil and gas drilling and robotic applications. **Prerequisites:** Graduate classification or approval of instructor.

ENTC 641 Data Analysis, Simulation and Experimental Methods for Industry

Credits 3. 3 Lecture Hours. Parametrize and simulate physical systems; use of successive substitution technique for system modeling and optimization purposes; optimization techniques including calculus-based search methods; experimental methods for industry applications will include two-level factorial experimental design; multivariable data fitting and error propagation analysis. **Prerequisites:** STAT 601; graduate classification or approval of instructor.

ENTC 644 Embedded Intelligent System Design

Credits 3. 3 Lecture Hours. Embedded intelligent system design; investigate artificial intelligent systems; advanced embedded system designs; use of high performance microcontroller and processor. **Prerequisites:** Graduate classification or approval instructor.

ENTC 651 Advanced Materials Technology

Credits 3. 3 Lecture Hours. Concepts, properties and behavior of common traditional and non-traditional materials; mechanical behavior including fracture, fatigue and creep; electrical, thermal, magnetic, optical properties; degradation of material systems; material testing and characterization using commonly established tools and procedures; material selection for specific applications. **Prerequisites:** Graduate classification or approval of instructor.

ENTC 652 Advanced Manufacturing Technology

Credits 3. 3 Lecture Hours. Advanced manufacturing practice in industry; principles and applications of 3D printing, particulate materials processing, microfabrication and high energy beam materials processing. **Prerequisites:** MMET 181; MMET 206; MMET 207, or approval of instructor; graduate classification.

ENTC 653 Semiconductor Validation and Verification

Credits 3. 2 Lecture Hours. 3 Lab Hours. Validation of semiconductor devices; focus on the difference between validation and production testing; hands on experience with automation of benchtop instruments with LabView and TestStand; overview of Spotfire to analyze data acquired during laboratory exercises; focus on the acquisition of valid data and the clear and concise presentation of data to stakeholders. **Prerequisite:** Background in mixed signal test theory similar to ESET 352 or approval of instructor.

ENTC 661 Product and System Lifecycle Management

Credits 3. 3 Lecture Hours. Aspects of product and system design presented in a lifecycle context; emphasis on systems engineering, product development and lifecycle management concepts; decision making tools, economic and environmental assessment methods presented and used to evaluate engineered products and systems. **Prerequisites:** Graduate classification or approval of instructor.

ENTC 662 Advanced Control Systems

Credits 3. 3 Lecture Hours. Components, principles, and techniques fundamental to automated control systems; study of transfer functions, network analysis using Laplace transforms, Z transforms, feedback control systems theory, digital computer simulation and computer-based controls systems. **Prerequisite:** Graduate classification or approval of instructor.

ENTC 663 Machine Elements in Mechanical Design Applications II

Credits 3. 3 Lecture Hours. Applications of principles of analysis and design of machines and machine elements including linkages, robots, cam and follower systems, shafts, gears, clutches, belt and chain drives; introduction to the mathematical tools for the analysis and design of these machines and machine elements. **Prerequisite:** MMET 363 or equivalent.

ENTC 681 Seminar

Credit 1. 1 Other Hour. Selected topics presented by the faculty, students and outside speakers. **Prerequisites:** Graduate classification or approval of instructor.

ENTC 684 Professional Internship

Credits 1 to 6. 1 to 6 Other Hours. Directed internship in an organization to provide students with on-the-job training with professionals in settings appropriate to the students' professional objectives. May be taken for credit up to six hours. Must be taken on a satisfactory/unsatisfactory basis. **Prerequisite:** Graduate classification in Master of Science in Engineering Technology.

ENTC 685 Directed Studies

Credits 1 to 12. 1 to 12 Other Hours. Directed study of topics not within scope of thesis research and not covered by other formal courses. May be repeated for credit. **Prerequisites:** Graduate classification or approval of instructor.

ENTC 689 Special Topics in…

Credits 1 to 4. 1 to 4 Lecture Hours. Selected topics in an identified area of engineering technology. May be repeated for credit.

ENTC 691 Research

Credits 1 to 23. 1 to 23 Other Hours. Research for thesis or dissertation. May be repeated for credit. **Prerequisite:** Graduate classification or approval of instructor.

ENTC 692 Professional Study

Credits 1 to 23. 1 to 23 Other Hours. Approved professional study of project. **Prerequisites:** Approval of instructor.