

# Measurement/Control Engr (MCE)

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## Courses

### **MCE 5599 Experimental Course: 1-6 semester hours.**

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

### **MCE 6640 System Modeling Identification and Simulation: 3 semester hours.**

Model development, off-line and on-line identification methods for engineering systems, diagnostic tests and model validation and analog and digital simulation methods. PREREQ: ME/EE 5573 or equivalent.

### **MCE 6642 Advanced Control Systems: 3 semester hours.**

State space analysis and design to include stability, controllability, observability, realizations, state feedback and estimation. PREREQ: ME 5573/EE 5573 or ME 4473/EE 4473.

### **MCE 6643 Advanced Measurement Methods: 3 semester hours.**

Instrumentation systems used in detection and signal conditioning of thermal-hydraulic process variables, radiation including lasers, and electrical and mechanical properties of materials. PREREQ: ME 5505 or ME 4405.

### **MCE 6644 Measurements and Controls Laboratory: 3 semester hours.**

Work with measuring systems for a variety of process variables. Investigation of characteristics of various process control components and systems. Transient and stationary conditions will be included. PREREQ: MCE 6642 and MCE 6643.

### **MCE 6645 Advanced Control Theory and Applications: 3 semester hours.**

Topics selected from advanced control theory and applications, depending upon the interest of students and faculty. May be repeated for credit when topics vary. PREREQ: MCE 6642 or permission of instructor.

### **MCE 6646 Intelligent Control Systems: 3 semester hours.**

Analysis and design of systems using intelligent techniques such as neural networks, fuzzy logic, genetic algorithms, and artificial intelligence. PREREQ: Permission of instructor.

### **MCE 6647 Nonlinear Control Systems: 3 semester hours.**

Phase plane analysis. Lyapunov stability. Describing functions. Singular perturbation and feedback linearization. PREREQ: MCE 6642 or permission of instructor.

### **MCE 6649 Robotics and Automation: 3 semester hours.**

Robotic manipulator kinematics, dynamics, trajectory planning, sensors, programming and control. The application concepts of robotics in industry will be briefly introduced. PREREQ: MCE 6642.

### **MCE 6650 Thesis: 1-9 semester hours.**

Thesis research must be approved by the student's advisory committee. Six credits may be used to satisfy the research requirements for the degree. Graded S/U.

### **MCE 6652 Special Problems: 1-3 semester hours.**

Special experimental, computational, or theoretical investigation leading to development of proficiency in some area of engineering. Formal report required. PREREQ: PRIO Project Approval Required by an Engineering Faculty. May be graded S/U. May be repeated.

### **MCE 6653 Optimal Control Systems: 3 semester hours.**

Performance index. Calculus of variations, Pontryagin maximum principle. Linear quadratic regulator. Time and fuel optimal control. Linear quadratic Gaussian problem. Kalman Filter. H optimal control. Industrial applications. PREREQ: MCE 6642 or permission of instructor.

### **MCE 6654 Adaptive Control Systems: 3 semester hours.**

Real-time parameter estimation. Deterministic, stochastic, and predictive self-tuning regulators. Model reference adaptive systems. Auto tuning. Stochastic adaptive control. Properties of adaptive systems. PREREQ: MCE 6642 or permission of instructor.

### **MCE 6656 Robust Control Systems: 3 semester hours.**

Analyze and design basic robust controllers using methods for robustness investigation such as nu-analysis and H infinity control algorithms. PREREQ: MCE 6642 or permission of instructor.

### **MCE 6660 Special Project: 1-9 semester hours.**

A significant project, involving engineering applications, toward the completion of M.S. program with non-thesis option. Includes a report and oral examination. Graded S/U. May be repeated.

### **MCE 6699 Experimental Course: 1-6 semester hours.**

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### **MCE 8850 Doctoral Dissertation: 1-24 semester hours.**

Research toward completion of the dissertation of Ph.D. in Engineering and Applied Science. Variable credits. May be repeated. Graded S/U.