MEC - MECHATRONICS

MEC101 Introduction to Mechatronics
Credit 1 Fall

Registration Requirement: RD090 and WR090, or IECC201R and IECC201W; and MTH020; each with a grade of "C" or better, or placement above stated course levels, or instructor approval.
Introduction to Mechatronics introduces students to the field of Mechatronics through seminars, guest lectures, and Amatrol assignments.
Additional Course Fee: $45.00

MEC110 Introduction to Manual Machine Tools
Credits 3 Fall

Registration Requirement: RD090 and WR090, or IECC201R and IECC201W; and MTH020; each with a grade of "C" or better, or placement above stated course levels, or instructor approval.
Introduction to Manual Machine Tools provides an overview of the operation, function, and uses on many common tools used in manufacturing. This course includes instructions on band saw, drill press, manufacturing hand tools, and manual mill.
Additional Course Fee: $80.00

MEC112 Measurement Tools
Credits 3 Fall

Registration Requirement: RD090 and WR090, or IECC201R and IECC201W; and MTH020; each with a grade of "C" or better, or placement above stated course levels, or instructors approval.
Measurement Tools introduces basic measurement, precision measurement tools, and dimensional gauging. Learners will cover concepts such as S.I. Measurement, U.S. Customary Measurements, Tape Measure and Measurement Conversion. Applications taught include using a dial caliper, digital caliper, English micrometer, and metric micrometer.
Additional Course Fee: $80.00

MEC113 Industrial Safety
Credits 2 Winter

Registration Requirement: RD090 and WR090, or IECC201R and IECC201W; and MTH020; each with a grade of "C" or better, or placement above stated course levels, or instructor approval.
Industrial Safety covers the fundamentals of industrial safety. Workplace safety including a review of OSHA regulations, use of Personal Protective Equipment, Lockout/Tagout, and accident response will be covered as well as other safety topics.
Additional Course Fee: $45.00

MEC121 Mechanical Drives I
Credits 4 Fall

Registration Requirement: Reserved for students in the Mechatronics major.
Mechanical drives introduces mechanical systems and develops fundamental knowledge of mechanical systems and practices. Covers basic safety, installation, key fasteners, power transmission systems, v-belt drives, chain drives, spur gear drives, and multiple shaft drives. Topics covered include learning how to select, install, adjust, troubleshoot, and repair a range of mechanical systems which are commonly found in both automated and manual machines used in every industry around the world.
Additional Course Fee: $80.00

MEC122 Mechanical Drives II
Credits 4 Winter

Registration Requirement: MEC121
Mechanical Drives II covers heavy duty V-Belt drives including conventional, multiple, wedge, and variable speed V-Belt drives. This course describes V-Belt selection and maintenance by covering V-Belt size specification, component identification, and troubleshooting. Learners will develop fundamental knowledge of synchronous belt drives, lubrication concepts, precision shaft alignment, and coupling. Also covered is heavy duty chain drives which describes silent chain drives, multiple-strand systems, chain selection, chain lubrication, chain maintenance and troubleshooting.
Additional Course Fee: $80.00

MEC123 Mechanical Drives III
Credits 4 Spring

Registration Requirement: MEC122
Mechanical Drives III includes describing lubrication, selection, maintenance and troubleshooting of plain ball bearings. It introduces anti-friction bearings by describing two types of bearing and teaching the fundamental skills of how to identify, mechanically install, and thermally install, and troubleshooting those bearings. Also covered is gasket and seals; such as o-ring seal, lip seal and mechanical seal, advance gear drives; such as helical gear drives, right angle gear drives, and speed reducers, gear drive selection and maintenance.
Additional Course Fee: $80.00

MEC131 AC/DC Electrical Systems
Credits 3 Fall

Registration Requirement: Reserved for students in the Mechatronics and Engineering Technologies majors.
AC/DC Electrical course teaches fundamentals of AC/DC electrical systems used for power and control in industrial, commercial, agricultural, and residential applications using Amatrols virtual training technology. Students learn industry-relevant skills included in subject areas such as Basic Electrical Circuits, Electrical Measurement, Circuit Analysis, Inductance and Capacitance, Combination Circuits, Transformers and Proximity Sensors.
Additional Course Fee: $80.00

MEC132 Electric Motors
Credits 4 Winter

Registration Requirement: MEC131
Electric Motors introduces electrical circuits and works through many industry tasks in Electrical Systems including DC Series Motors, DC Shunt and Compound Motors, Motor Speed and Torque, Motor Performance, Split-Phase AC Motors, Capacitor-Start AC Motors, Permanent-Capacitor and Two-Capacitor Motors, and Three-Phase AC Induction Motors. Additional topics include AC and DC motor failures, common methods of diagnosing these failures by using a multimeter and megger meter, and troubleshooting these failures. Specific objectives include listing common failures of a three-phase AC motors stator windings, understanding common methods used to diagnose DC motor failures, and using a megger meter to test a DC electric motor armature.
Additional Course Fee: $80.00

MEC133 Motor Controls
Credits 5 Fall

Registration Requirement: MEC132
Motor Controls teaches electric relay control of AC electric motors found in industrial, commercial, and residential applications. Learners gain understanding of the operation, installation, design, and troubleshooting of AC electric motor control circuits for many common applications. Learners also develop skills in interpreting schematics, system design, motor start/stop circuits, motor sequence control, reversing motor control, and motor jogging. Safety is emphasized throughout, highlighting motor safety, lockout/ tagout and safety interlocks. Topics include voltage testing equipment as well as troubleshooting of control component, motor starter, power component, and motor control circuits.
Additional Course Fee: $80.00

MEC134 Electrical Fabrication
Credits 2 Winter

Registration Requirement: MEC131
Electrical fabrication introduces electrical system wiring and develops fundamental knowledge of electrical wiring and components. Covers basic electrical system wiring, interpreting wire installation plans, handling non-metallic cable, understanding application of basic components such as switches, outlets, and lighting, and connecting electrical services. This course will cover major topics like soldering basics, soldering and desoldering techniques, and electrical panel soldering applications.
Additional Course Fee: $45.00

MEC141 Pneumatics I
Credits 3 Winter

Registration Requirement: RD090 and WR090, or IECC201R and IECC201W; and MTH020; each with a grade of "C" or better, or placement above stated course levels, or instructor approval.
Pneumatics I prepares learners to work intelligently in industry with pneumatic applications. It introduces pneumatic power and takes learners through key topics and skills in pneumatic power & safety, pneumatic circuits, pneumatic schematics, the principles of pneumatic pressure and flow, and pneumatic speed control circuits. It covers pressure regulation, air filtration, how to connect pneumatic circuits, pneumatic cylinders, valves, and actuators, a wide array of pneumatic applications, pressure and cylinder force, pneumatic leverage, pressure and volume, and air flow resistance.
Additional Course Fee: $80.00

MEC142 Pneumatics II
Credits 2 Spring

Registration Requirement: MEC141 or instructor approval.
Pneumatics II teaches intermediate pneumatic components, system applications & industry-relevant skills in operation, installation, performance analysis, maintenance & design. Topics include cam-operated valves; cylinder sequencing with cam valves; cylinder deceleration circuits; pilot operated directional control valves (DCV); shuttle valves; air logic components, design, filters, lubricators; filter selection & maintenance; water traps/removal techniques; air dryers; after-coolers; component maintenance. Additional topics include advanced pneumatic principles/components, cylinder loads/applications, quick exhaust valves, motor loads, air bearings, component sizing, air compressor types/operation, flow measurement, compressor performance.
Additional Course Fee: $80.00

MEC160 Introduction to Maintenance Welding
Credits 2 Fall

Registration Requirement: Reserved for students in the Mechatronics major.
In this course students will learn basic welding techniques and industry standards for maintenance welding through lectures and labs. Welding plays a critical role throughout our economy. It is central to many industries including manufacturing, construction, and aerospace to name only a few. Welding is a blend of both art and science, joined together to create enduring bonds that allow us to create structures and machines on a scale impossible to achieve without it. This course teaches how to safely create an array of high quality weld types.
Additional Course Fee: $80.00

MEC231 Introduction to Programmable Logic Controllers
Credits 4 Spring

Registration Requirement: MEC131 and MEC134 or consent of instructor based on industry experience.
This course introduces students to the fundamentals of working with Programmable Logic Controllers. Students will develop competence in connecting to, programming, and operating microPLC's. The course will cover basic datatypes and introduce boolean, counter, timer and basic math instructions. Locating and utilizing appropriate documentation to verify and connect hardware will also be covered.
Additional Course Fee: $150.00

MEC232 Intermediate Programmable Logic Controllers
Credits 5 Fall

Registration Requirement: MEC231 and MEC134; or consent of instructor based on industry experience.
This course expands on the fundamentals of working with Programmable Logic Controllers and focuses on standalone PLC's. Students are introduced to intermediate topics such as analog I/O, ethernet communications, motion control applications and programming languages other than ladder logic. Students gain experience specifying, connecting and troubleshooting digital and analog I/O for discrete control as well as connecting with other automation components such as servo or stepper drives.
Additional Course Fee: $150.00

MEC241 Introduction to Hydraulics
Credits 3 Spring

Registration Requirement: Acceptance into the Mechatronics program or instructor consent.
Introduction to Hydraulics introduces hydraulic power use and application, allowing learners to develop skills and knowledge needed to apply hydraulics in modern industry. It takes learners through key topics and skills in hydraulic power & safety, hydraulic circuits, hydraulic schematics, the principles of hydraulic pressure and flow, and hydraulic speed control circuits. It covers pumps, fluid friction, how to connect hydraulic circuits, hydraulic cylinders and valves (including needle valves), and a wide array of hydraulic applications. Additionally topics in hydraulic maintenance will be covered.
Additional Course Fee: $80.00

MEC242 Advanced Hydraulics
Credits 4 Fall

Registration Requirement: MEC241
Advanced Hydraulics teaches hydraulic components, system applications & industry-relevant skills in operation, installation, performance analysis, and design. Topics include accumulator sizing, system design, circuit applications, component operation/installation, rapid traverse slow feed & pump unloading circuits, cylinder sequencing/types/mountings, DCV spool center types/applications, remote pressure control, heat exchangers, reservoirs, fluid conductors/conditioning, filtration, motor & pump performance, system design, maintenance, and valves: pilot-operated DCVs, 2-stage DCVs, cam-operated DCVs, pressure-compensated flow control, pilot-operated check, direct-operated relief, non-compensated flow control, p-port check.
Additional Course Fee: $25.00

MEC243 Fluid Power Controls
Credits 4 Winter

Registration Requirement: Co-requisite: MEC242
Fluid Power Controls introduces electrical control systems and discusses basic control devices, power devices, control relays, sequencing control, timer control, pressure control applications, and circuit applications. Also discussed in depth to provide further skills is automatic and electrical control concepts and devices, logic elements, hydraulic and pneumatics solenoid-operated valves, relay and motor control applications, safety circuits and modes of operation.
Additional Course Fee: $15.00

MEC250 Manufacturing Operations
Credit 1 Spring

Registration Requirement: Reserved for students in the Mechatronics major.
Manufacturing Operations introduces the concepts, terms, and application of lean manufacturing principles and practices in the manufacturing process. Provides an overview of the history and evolution of lean, the benefits of lean process, and the role of management in the lean process. Reviews the 5S tool for organizing and maintaining the workplace: Sort, Straighten, Shine, Standardize, and Sustain. Total Productive Maintenance concepts are also covered in this course including the importance of total productive maintenance and describing three principles of preventative maintenance, overall equipment effectiveness, implementing the elements of an autonomous maintenance program, and maintaining equipment.
Additional Course Fee: $15.00

MEC251 Robotics I
Credits 3 Winter

Registration Requirement: Reserved for students in the Mechatronics major.
This course will introduce systems to the basics of industrial robot programming. Students will be introduced to coordinate systems, homing, and basic teach commands on FANUC robots.
Additional Course Fee: $85.00

MEC252 Robotics II - Vision Systems
Credits 3 Spring

Registration Requirement: Corequisite: MEC251
This course will continue from Robotics I to include vision systems on robots. Students will be trained to setup, calibrate and program a robot using an industrial vision system.
Additional Course Fee: $85.00

MEC270 Process Control
Credits 4 Winter

Registration Requirement: Reserved for students in the Mechatronics major.
Process Control teaches two of the most common types of process control systems, flow and liquid level. This course covers process control safety, instrument tags, piping and instrumentation diagrams, and level measurement, then moves into system control functions such as liquid level control, automatic control methods, basic flow measurement and control, and control loop performance.
Additional Course Fee: $80.00

MEC290 Mechatronics Capstone I
Credits 3 Spring

Registration Requirement: MEC123, MEC133, MEC243, MEC232, MEC270.
In this course, students will complete a team or individual project that demonstrates their mastery of Mechatronics concepts. Teams will utilize skills learned from the Mechatronics program to organize, assemble and program an automated system. Teamwork, project planning and scheduling will be covered.
Additional Course Fee: $105.00

MEC291 Mechatronics Capstone II
Credits 3 Spring

Registration Requirement: Co-requisite: MEC290
In second part of the Mechatronics Capstone, students will focus on project documentation and career readiness. Students will work on project communication, project risk mitigation, and supporting technical schematics and documentation. Students will also practice skills used for networking and job interviews.
Additional Course Fee: $105.00

Course fees are subject to change. Additional section fees (web, hybrid, etc.) may apply.