

AUTOMATION ENGINEERING TECHNOLOGY (AETC)

AETC 111, ROBOTICS/AUTOMATED MANUFACTURING 3 (5)

Study of automated manufacturing and the computer-based technologies that are available for this task. Topics covered will include computer aided design (CAD), computer numerical control (CNC), programmable logic controllers (PLC), and computer integrated manufacturing (CIM). Emphasis will be placed on programming of industrial robots for the purpose of automated manufacturing. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Typically Offered: Fall Semester

AETC 115, INDUSTRIAL ROBOTICS I 3 (5)

Operation, programming, and application of non-collaborative and collaborative industrial robotics used in automated manufacturing. Topics covered will also include introduction to industrial automation technologies available for this task. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Typically Offered: Fall Semester

AETC 121, PROGRAMMABLE LOGIC CONTROLLERS 3 (5)

Study of programming and application of programmable logic controllers (PLC). Theory and practice of hardware selection, setup, configuration, and troubleshooting. Students will apply their skills towards the programming of PLC hardware for industry related situations. Laboratory required. (A special fee will be assessed.) (TAG, CTAG, MTAG)

General Education: IN1

Typically Offered: Fall and Spring Semesters

AETC 131, PIPING SYSTEMS AND CODES 3 (4)

This course is an introduction to specifications, selections, applications, and maintenance of pipes, fittings, and valves. Simple pipe calculations, selection of appropriate tools, types, and purposes of valves, and piping codes will be discussed. Also covered are unique pipe installation and maintenance procedures related to steam heating systems, hydraulic systems, fire protection systems, refrigeration, and air conditioning systems. Laboratory required. (A special fee will be assessed.)

General Education: IN1

AETC 132, PNEUMATIC COMPONENTS AND SYSTEMS 2 (3)

This course covers the principles of pneumatics, types of components, and design of typical pneumatic circuits. The history and applications of pneumatics are reviewed. Emphasis is placed on the compression, distribution and use of pneumatics in industry today. Use of various forms of documentation of pneumatic logic circuits is discussed. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: TECN 121

AETC 211, WORKCELL INTERFACING 3 (5)

This course concentrates on the development of digital communications needed to interface various forms of industrial equipment. Students will use laboratory time to apply the concepts of voltage conversions, isolation techniques, and signal conditioning. Selection and application of available sensor technologies will also be covered. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: AETC 111, 121 and ELCT 111 or division approval.

Typically Offered: Fall Semester

AETC 215, INDUSTRIAL ROBOTICS II 3 (5)

Building upon the prerequisite courses, this course covers more advanced robotic programming applications, integration techniques, and maintenance. This course also focuses on setup, operation, and programming of vision systems for vision guided industrial robot applications. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: AETC 115 and AETC 121

Typically Offered: Spring Semester

AETC 221, AUTOMATED SYSTEMS TROUBLESHOOTING 2 (3)

This course covers the concepts and procedures that are necessary to identify problems, troubleshoot, and repair different configurations of automated work cells. Topics discussed and demonstrated include operation of work cell through the software applications, schematics, control circuits, and problem solving techniques. Laboratory is required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: TECN 121 and ELCT 111.

AETC 222, HYDRAULIC COMPONENTS AND CIRCUITS 2 (3)

This course covers the principles of operation, construction, and functions of hydraulic components in a closed circuit. Emphasis is placed on skill development in selection of hydraulic components, fluid media and development of hydraulic circuits. Set-up and operation, test and troubleshooting maintenance and repair of hydraulic circuits will be studied. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: TECN 121

AETC 223, PROGRAMMABLE LOGIC CONTROLLERS II 3 (5)

This course covers advanced programmable logic controller (PLC) concepts. Topics include motion control, PLC related networking, and human machine interfaces (HMI). Laboratory exercises will involve developing systems based upon these topics. Automatic identification, positional sensors, and automation related mechanisms will also be discussed. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Typically Offered: Fall Semester

AETC 231, FLEXIBLE MANUFACTURING SYSTEMS 3 (6)

Study of applications of flexible manufacturing. Designed to take the students through the entire process of developing, designing, programming, and documenting a flexible manufacturing system. Project management and team based skills will be emphasized. Laboratory required. (A special fee will be assessed.)

General Education: IN1, IN2

Course Entry Requirement(s): Prerequisite: AETC 211 or division approval

Typically Offered: Spring Semester

AETC 241, INSTRUMENTATION AND CONTROL 3 (5)

An application oriented course to include the terminology, symbols, process variables and typical control methods used in process control, measuring techniques of variables, and the methods employed to control these variables. Feedback control methods covered include proportional, integral, derivative, PID, tuning methods, as well as cascade and ratio control. Students install, calibrate, tune, and operate feedback control systems in the laboratory, including flow, temperature, level, and cascade control systems. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: ELCT 111 or division approval.

Typically Offered: Spring Semester

AETC 287, WORK-BASED LEARNING I - AETC 1-3 (1)

This course provides supervised, paid work experience with approved employer(s) in an area related to the student's program. Emphasis is placed on integrating prior or concurrent classroom learning with work experience through career readiness competencies. Students will be able to evaluate career selection and satisfactorily demonstrate work-related competencies.

General Education: IN1, IN2, IN3, IN4

Course Entry Requirement(s): A student must be pursuing a degree seeking program at LCCC; have completed 12 semester hours with a minimum of 6 semester hours in the discipline of placement; have a min GPA of 2.5 in the discipline and a 2.0 overall GPA; and have division approval.

Typically Offered: Offer as required

AETC 288, WORK BASED LEARNING II - AETC 1-3 (1)

Building on prior Work Based Learning experience(s), this course provides supervised, paid work experience with approved employer(s) in an area related to the student's program. Emphasis is placed on integrating prior or concurrent classroom learning with work experience through career readiness competencies. Students will be able to evaluate career selection and satisfactorily demonstrate work-related competencies.

General Education: IN1, IN2, IN3, IN4, IN5

Course Entry Requirement(s): Prerequisite: AETC 287

Typically Offered: Offer as required

AETC 289, WORK BASED LEARNING III - AETC 1-3 (1)

Building on experiences from Work Based Learning II, this course provides supervised, paid work experience with approved employer(s) in an area related to the student's program. Emphasis is placed on integrating prior or concurrent classroom learning with work experience through career readiness competencies. Students will be able to evaluate career selection and satisfactorily demonstrate work-related competencies.

General Education: IN1, IN2, IN3, IN4

Course Entry Requirement(s): Prerequisite: AETC 288

Typically Offered: Offer as required

AETC 299, INDIVIDUALIZED STUDIES IN AUTOMATION TECHNOLOGY 1-3 (1)

An in-depth study of areas in automation technology presented by discussion and/or individual research and reading. Topics will vary. Repeatable up to six (6) times for a total of six (6) credit hours.

Course Entry Requirement(s): Prerequisite: Second-year standing and division approval.

Typically Offered: Offer as required

AETC 321, AUTOMATIC IDENTIFICATION 3 (5)

This course will focus on automatic identification technology used to make industrial automation systems smarter and more capable. Topics covered will include: hardware selection, setup, integration, and programming of vision systems, radio frequency ID (RFID), barcodes, and nearfield communications. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: AETC 211, AETC 215, AETC 223 and admission into the SMART Automation bachelor's degree program, have a 2.0 overall GPA; or division approval

Typically Offered: Not offered this year

AETC 331, AUTOMATION INTEGRATION 4 (8)

This course will focus on additional industrial automation integration techniques. Topics covered include: advanced networking & connectivity of various types of automation equipment, cyber-security, safety, and visual awareness interfaces. Laboratory exercises will involve developing systems based upon these topics. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: AETC 321

Typically Offered: Not offered this year

AETC 341, INDUSTRIAL INSTRUMENTATION AND CONTROL 4 (6)

An application oriented course to include the terminology, symbols, process variables and typical control methods used in process control, measuring techniques of variables, and the methods employed to control these variables. Feedback control methods covered include proportional, integral, derivative, PID, tuning methods, as well as cascade and ratio control. Students install, calibrate, tune, and operate feedback control systems in the laboratory, including flow, temperature, level, and cascade control systems. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: AETC 223, ELCT 111 and admission into the SMART Automation bachelor's degree program or division approval

Typically Offered: Not offered this year

AETC 387, WORK-BASED LEARNING – AETC 1-3 (1)

Building on prior Work Based Learning experience(s), this course provides supervised, paid work experience with approved employer(s) in an area related to the student's program. Emphasis is placed on integrating prior or concurrent classroom learning with work experience through career readiness competencies. Students will be able to evaluate career selection and satisfactorily demonstrate work-related competencies.

General Education: IN1, IN2, IN3, IN4

Course Entry Requirement(s): Prerequisite: AETC 288, a 2.0 overall GPA and admission into a bachelor degree program or division approval

Typically Offered: Offer as required

AETC 430, SMART AUTOMATION SYSTEMS 4 (8)

This course will focus on applications of smart industrial automation technology. Topics covered include introduction to manufacturing execution software (MES), digital twins, and augmented reality/virtual reality for industrial automation applications. Laboratory exercises will involve applying these topics to automation systems and developing systems based upon these topics. Laboratory required. (A special fee will be assessed.)

General Education: IN1

Course Entry Requirement(s): Prerequisite: AETC 331

Typically Offered: Not offered this year

AETC 435, SMART AUTOMATION-SENIOR DESIGN 4 (8)

The course will require a student to work in a team with the purpose of applying skills and knowledge obtained from the Automation Program to plan, develop, design, program, create, and document an integrated system utilizing SMART Automation technologies. Projects will be applicable to real world challenges, ideally in partnership with local industry. Project management and team-based skills will be utilized in the course. Laboratory required. (A special fee will be assessed.)

General Education: IN1, IN2

Course Entry Requirement(s): Prerequisite: AETC 430 and TECN 422

Typically Offered: Not offered this year

AETC 487, WORK-BASED LEARNING – AETC 1-3 (1)

Building on prior Work Based Learning experience(s), this course provides supervised, paid work experience with approved employer(s) in an area related to the student's program. Emphasis is placed on integrating prior or concurrent classroom learning with work experience through career readiness competencies. Students will be able to evaluate career selection and satisfactorily demonstrate work-related competencies.

General Education: IN1, IN2, IN3, IN4

Course Entry Requirement(s): Prerequisite: AETC 387

Typically Offered: Offer as required