AUTOMATION SYSTEMS TECHNOLOGY (664)

664-130. Introduction to SCADA. (3 Credits)
Develop a foundational understanding of Supervisory Control and Data Acquisition (SCADA) systems, essential for various industries. Explore the components, architecture and applications of SCADA, including data acquisition, control strategies and security considerations. Through lectures, discussions and hands-on exercises, gain practical knowledge and skills in SCADA system design and operation.
Prerequisites: 605-189 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=130)

664-135. PLC - CoDeSys Programming. (2 Credits)
Get a comprehensive introduction to Programmable Logic Controller (PLC) programming using the CoDeSys software platform. Learn the fundamentals of PLC architecture, programming languages (Structured Text, Ladder Diagram, Function Block Diagram) and application development. Through hands-on exercises and simulations, gain practical experience in creating, configuring and troubleshooting PLC programs for various industrial automation tasks.
Prerequisites: 605-188 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=135)

664-140. Machine Safety & Risk Asmt. (2 Credits)
Gain a comprehensive understanding of machine safety principles and risk assessment methodologies. Learn to identify, evaluate and mitigate hazards associated with machinery in industrial settings. Topics include regulatory frameworks, hazard identification, risk assessment techniques, machine safety design and implementation of safety measures.
Prerequisites: 605-189 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=140)

664-150. Industrial Data Acquisition. (3 Credits)
Explore industrial protocols and communication methods used to move data from sensors, instrumentation and other industrial devices to the edge or the cloud. Gain an introduction to Supervisory Control And Data Acquisition (SCADA) systems, and study legacy and current industrial data communication protocols.
Prerequisites: 605-133 with a minimum grade of C and 152-101 with a minimum grade of C and 150-190 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=150)

664-151. AutoCad Electrical. (2 Credits)
Build essential skills to create, edit and manipulate 2D drawings using AutoCAD. Develop your ability to visualize and communicate effectively about technical concepts in automation and controls. Learn basic drawing techniques, editing commands, dimensioning, annotation, layers, blocks and output preparation.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=151)

664-155. Industrial Data Comm. (3 Credits)
Gain a comprehensive introduction to the principles and practices of industrial data communication and networking, essential for manufacturing automation integrators. Explore various industrial communication protocols, off-the-shelf solutions, cybersecurity best practices and emerging technologies vital for modern industrial automation systems.
Prerequisites: 605-189 (may be taken concurrently) with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=155)

664-158. Operational Tech Applications. (2 Credits)
Explore Industrial robots and vision systems as well as the methods to extract data from these systems.
Prerequisites: 605-133 with a minimum grade of C or 605-188 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=158)

664-160. Robotics and Servo Control. (3 Credits)
Explore the topics of safety, robotic terminology, types of robots, a robot¿s parts, axis and rotation, end effectors, and applicable sensors. Practice using robots while studying their operation, basic programming, and applications.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=160)

664-161. Automation Systems. (3 Credits)
Use competencies learned throughout the program to operate and interface mechanical, digital, PLC, fluid power, servomechanism, and robotic systems. Discuss the start up and shut down of automated systems, as well as concepts related to current technology in the field of electro-mechanical systems. Explore the principles of safety, lock-out tag-out, documentation, and communication with systems stakeholders.
Prerequisites: 605-139 (may be taken concurrently) with a minimum grade of C and 605-196 with a minimum grade of C and 605-197 with a minimum grade of C and 664-160 with a minimum grade of C and 605-191 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=161)

664-162. Robotics Applications. (3 Credits)
Explore topics including I/O bus networks (Ethernet I/P) for robotics, vision applications for robotic guidance, advanced programming functions (Collision Guard, Collision Skip, Remote TCP option and others), remote PLC control for robotics and HMI integration into robotic controllers (via PLC). These advanced programming concepts can be applied to Fanuc robots used in the lab, although the processes and techniques may be applied to many different types of six-axis industrial robots. By the end of the course, students should have created a completely integrated robotic vision solution which is driven by the operator through an Allen Bradley PanelView+ HMI and Compact Logix PLC.
Prerequisites: 664-160 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=162)

664-163. Industrial Internet of Things. (2 Credits)
Learn how connected systems are transforming manufacturing operations, enabling greater productivity, improved responsiveness to customers, and higher quality. Topics covered include operational equipment connectivity, enterprise software, database systems, cloud services, and data analytics.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=163)

664-164. Robotics Systems. (2 Credits)
Explore the topics of safety, robotic terminology, types of robots, a robot's parts, axis and rotation, end effectors and applicable sensors. Practice using robots while studying their operation, basic programming and applications.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=164)

664-165. Fabrication-Automation Systems. (2 Credits)
Students will learn and apply safe applications for soldering, wire preparation/termination, and wire bundling and routing. AUTOCAD software will be used to layout and build an electrical panel.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=165)

664-166. Robotics Operations. (2 Credits)
Explore topics including I/O bus networks (Ethernet I/P) for robotics, vision applications for robotic guidance, advanced programming functions (Collision Guard, Collision Skip, Remote TCP option and others), remote PLC control for robotics and HMI integration into robotic controllers (via PLC). These advanced programming concepts can be applied to Fanuc robots used in the lab, although the processes and techniques may be applied to many different types of six-axis industrial robots. By the end of the course, students should have created a completely integrated robotic vision solution which is driven by the operator through an Allen Bradley PanelView+ HMI and Compact Logix PLC.
Prerequisites: 664-160 with a minimum grade of C or 664-164 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=166)

664-170. Data Comm for Integration. (3 Credits)
Gain a comprehensive overview of industrial data communication protocols, network architectures and emerging technologies. Learn to design and implement industrial communication networks, select appropriate protocols and integrate devices into industrial systems. Topics include Ethernet, fieldbus, wireless communication, I/O Link, smart sensors and Single Pair Ethernet.
Prerequisites: 605-188 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=170)

664-172. Advanced Robotics. (2 Credits)
Develop an in-depth knowledge of advanced robotic systems, programming and integration in manufacturing. Explore topics like collaborative robots, autonomous mobile robots, sensor integration, machine learning and robotic system integration. Build hands-on skills through practical exercises in designing, programming and operating advanced robotic technologies.
Prerequisites: 664-162 with a minimum grade of C and 664-170 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=172)

664-180. Machine Learning & Ind 4.0. (2 Credits)
Explore the principles and applications of machine learning (ML) and artificial intelligence (AI) within the context of Industry 4.0. Explore various ML algorithms and AI techniques, and their integration into manufacturing and industrial processes. Gain hands-on experience with data analysis, model building and ethical considerations.
Prerequisites: 664-162 with a minimum grade of C and 664-170 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=180)

664-185. Adv Machine Learning & Ind 4.0. (2 Credits)
Explore the cutting-edge intersection of machine learning, artificial intelligence and Industry 4.0. Delve into deep learning, reinforcement learning and AI applications in manufacturing. Learn about Industry 4.0 technologies and ethical considerations in AI. Prerequisites include a strong foundation in machine learning and programming.
Prerequisites: 664-180 with a minimum grade of C
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=185)

664-401. Handling Tool App Programming. (3 Credits)
Gain a fundamental understanding of operating an automation robot, including safety, powering up, creating and copying motion programs, branching, and position registers.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=401)

664-518. Automation for Apprentices. (2 Credits)
Examine industrial automation and applications to various trades. Automation terminology, concepts and applications will be examined. Automated systems, components and devices will be reviewed. Robotics used in modern manufacturing plants will be compared and analyzed. Job duties and tasks associated with safety, inspection, testing, maintenance, repair and servicing will be the primary emphasis.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=518)

664-519. Automation Setup Apprentices. (1 Credit)
Examine automation and applications for the injection molding industry. Automation utilized in modern injection molding plants will be compared and analyzed. Job duties and tasks associated with safety, setup and operation will be the primary emphasis.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=519)

664-520. Troubleshooting Drives. (1 Credit)
This course will provide apprentices with an introduction to AC drives. Apprentices will learn AC drive language, programming, and troubleshooting.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=520)

664-521. PLC Troubleshooting. (1 Credit)
This course will provide apprentices with an introduction to PLC's. Apprentices will learn PLC language, programming, and troubleshooting.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=664&num=521)