ELECTRONIC TECHNOLOGY (605)

605-102. Introduction to Electronics. (3 Credits)
Explore basic concepts and theories of direct and alternating current circuits, including the application of Ohms, Watts and Kirchoffs laws, to series, parallel and series-parallel circuits. Apply concepts to power supply circuits and learn proper use of voltmeters, ohmmeters and oscilloscopes.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=605&num=102)

605-113. DC Electronics. (3 Credits)
Study the principles and applications of Ohm's and Kirchoff's laws, series and parallel circuits, voltage and current dividers and magnetism while building a foundation in electronics technology. Develop troubleshooting skills, and use computer simulation software to reinforce theory.
Prerequisites: 804-115 (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=605&num=113)

605-118. Digital Electronics I. (2 Credits)
Study practical digital electronics including binary number systems, basic logic components and the more complex logic devices such as multiplexers, de-multiplexers, and analog/digital and digital/analog converters. An introduction to Boolean algebra will be made.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=605&num=118)

605-119. Digital Electronics II. (2 Credits)
A deeper understanding of digital electronics including Boolean expression and implementation techniques will be gained. A high-level design language (Quartus II) a VHDL language will be used to implement circuits in programmable logic devices (PLD). Arithmetic operations, noise margin, practical implementation techniques, counter circuits and state machines will be presented.
Prerequisites: (605-118 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=605&num=119)

605-126. Industrial Systems. (3 Credits)
Gain hands-on experience using automated control devices and systems, including thyristor characteristics and applications in phase control, concluding with DC motor control. Learn to use a commercial DC drive, programmable controller operation and programming; interface programmable logic controllers (PLC) with material handling equipment; develop a controlling program based on written specifications; and program and document PLC programs using computers and various software packages.
Prerequisites: (605-176 with a minimum grade of C or 662-190 with a minimum grade of C or 605-114 with a minimum grade of C or 662-104 with a minimum grade of C or 462-120 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=605&num=126)

605-127. Elect Fabrication Techniques. (2 Credits)
Train in the areas of wire preparation and termination, soldering and desoldering of through-hole and SMT circuit boards, and wire bundling and routing. Learn printed circuit board inspection, cleaning and repair techniques. Develop skills and knowledge to work as a technician.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=605&num=127)

605-129. Elect Pwr Ctrl & Motors. (3 Credits)
Study power distribution circuits including transmission substation (high voltage), distribution substation (medium voltage), and in-plant distribution. Explore the construction and operation of DC motors and single-phase and three-phase AC motors. Become familiar with elementary industrial control circuits. Construct, wire, test, and operate a typical industrial control panel.
Prerequisites: 663-103 with a minimum grade of C or 605-102 with a minimum grade of C or 414-386 with a minimum grade of C or 414-186 (may be taken concurrently) with a minimum grade of C or 413-313 (may be taken concurrently) with a minimum grade of C or 413-333 (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=605&num=129)

605-138. SS Devices for Automation. (2 Credits)
Become familiar with semiconductor materials and the operation of components such as diodes, transistors, and IGBTs in industrial control circuits.
Prerequisites: (414-186 with a minimum grade of C or 414-386 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=605&num=138)

605-139. Human Machine Interfaces. (3 Credits)
Examine industrial touch panels used in modern automation systems by programming a machine control interface using FactoryTalk View Studio Machine Edition software with an Allen-Bradley PanelView HMI. Students will also explore basic ethernet networking concepts as they establish local network communications between the host PC, HMI, and an Allen-Bradley CompactLogix PLC controller.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=605&num=139)

605-148. Data Acquisition. (3 Credits)
This course will explore a broad family of measurement applications used to verify design work, analyze trends or characterize a process or a product. The course also provides an introduction to the National Instruments (NI) LabVIEW software, a global standard graphical programming environment. The student will learn how to control systems and plot, chart, display and report measurements using LabVIEW software. The National Instruments Educational Laboratory Virtual Instrumentation Suite II (NIELVISII) will be used to interface “real-world” inputs from transducers (thermocouples, RTDs, thermistors, temperature sensors, photo sensors, load cells, strain gauges, etc.) that respond to a physical phenomenon by producing a proportional electrical signal to the PC via a USB interconnection. Additional industrial hardware such as CompactDAQ and the NI USB-6008 USB interface will also be used.
Prerequisites: (663-104 (may be taken concurrently) with a minimum grade of C) and (662-190 with a minimum grade of C or 663-103 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=605&num=148)

605-177. Electronic Devices II. (3 Credits)
Study the principles and basic applications of power amplifiers, amplifier frequency response, operational amplifiers, active filters, and oscillators. Become familiar with troubleshooting practices and use computer simulation software.
Prerequisites: (605-176 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=605&num=177)

605-182. Microcontrollers. (3 Credits)
Study the programming and design of microcontroller-based systems. Learn how to program using assembly language programming. Use a computer to develop software that is cross-assembled and downloaded to the target system. Interface the microcontroller to the outside world, and explore topics such as serial/parallel communication and interrupts. Complete a project entailing both hardware and software.
Prerequisites: 605-118 (may be taken concurrently) with a minimum grade of C and 663-104 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=605&num=182)

605-187. Electronic Data Communications. (3 Credits)
The fundamental principles of analog and digital communication will be developed. The concepts of analog communication include modulation (transmission) and demodulation (reception) will be applied to amplitude modulation (AM). This will include Fourier series expansion and the development of the frequency domain, transmission power, and fundamentals of antenna and electromagnetic wave behaviors. The digital communication segment focuses on Internet communications to include; Parallel and Serial communications, Line Coding, Multiplexing and Demultiplexing, and the TCP/IP protocol Suite. Nyquist Sampling and Shannon Noise Theorems will be developed.
Prerequisites: (663-103 with a minimum grade of C or 662-191 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=605&num=187)

605-188. PLC 1. (2 Credits)
Study programmable logic controllers (PLC) using Allen-Bradley PLCs, RSLogix 500 series related to basics and start up, PLC wiring, ladder diagram networks and basic programming.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=605&num=188)

605-189. PLC 2. (2 Credits)
This course covers the basic principles of Allen-Bradley's RSLogix 5000. In addition to controller operation, specific topics include: Introduction to bit logic, timer, counter, math, data move, and program control instructions, event sequencing, application development, the applicable skills, and theory for Ethernet industrial communication networks used on automated systems.
Prerequisites: 605-188 (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=605&num=189)

605-191. PLC 3. (2 Credits)
This course provides advanced PLC programming concepts integrated into performing labs on the Amatrol Mechatronics Modular Manufacturing System. The course utilizes Rockwell Automation's CompactLogix Platform using RSLogix5000 software. PLC programs will be written and tested for each of the several Mechatronics Manufacturing System Stations. The computer software, PLC hardware and I/O devices are typical of those used in industrial applications.
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=605&num=191)

605-193. PLC - Siemens Controllers. (2 Credits)
Students will study Siemens S7-1200 PLC hardware systems and the TIA Portal programming software. Programming languages will include Ladder Logic (LAD), Structured Control Language (SCL), and Function Block Diagram (FBD). The students will learn to program, debug and troubleshoot using the above languages.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=605&num=193)

605-196. Drives and Intro to Servos. (2 Credits)
Explore the basics of DC and AC drives, including operational controls, characteristics, drive functionality, and PC and field bus interfacing. Gain hands-on experience in drive set-up and wiring, and become familiar with servo control during lab work. Learn safe troubleshooting and testing practices.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=605&num=196)

605-197. Sensors and Process Control. (2 Credits)
Build an understanding of industrial sensors including limit, Hall-Effect, photoelectric, and proximity switches that detect the absence, presence, or distance of an object from a reference point. Explore instrumentation, the operational theory and elements of open-loop and closed-loop systems, and the calibration of process control and flow metering devices.
Prerequisites: (414-186 with a minimum grade of C or 414-386 with a minimum grade of C or 605-102 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=605&num=197)

605-198. Power Electronics. (3 Credits)
Power electronics is an enabling technology, providing the needed interface between electrical sources and electrical loads, and facilitating the transfer of the power from the source to the load by converting voltages and currents from one form to another. Gain exposure to the commonly used power electronic devices and converters.
Prerequisites: (662-190 with a minimum grade of C or 663-103 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=605&num=198)

605-414. Electronics. (0.25 Credits)
Gain an introduction to machine controls, programmable logic controllers (PLCs), programming logic, troubleshooting, control types, brand functionalities, basic operations, and inputs/outputs.
See sections of this course (http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=605&num=414)