ELECTROMECHANICAL TECHNOLOGY (620)

Information provided includes course descriptions by subject only. For complete 2024-2025 programs/academic plans, please refer to Academic Programs (http://catalog.blackhawk.edu/academics/).

620-100 Hydraulics
Credits: 1-3

This is a course in fundamental principles in the operation of fl uid power, as it is used in the transmission of power through various components such as cylinders, motors, pumps, and valves.
Aid Code: 10 - undefined.
Restrictions: Restricted to students admitted to Program.
Pre-requisites: 804 110
Co-requisites: (834-110 or 804-113)

Complete Course Listing

620-101 Fundamentals of DC Circuits 1
Credits: 0.5-1

This course is a study of the basic theories, concepts, elements, and principles of DC circuits. The student investigates voltage, current, resistance and power, and will measure these values. Topics covered include Ohm's Law, meter use and basic series circuits.
Aid Code: 10 - undefined.

Complete Course Listing

620-102 Fundamentals of DC Circuits 2
Credits: 0.5-1

This course is a continuation of DC circuits 1. Students advance their knowledge and skill using series to parallel circuits and complex (series-parallel and parallel-series) circuits.
Aid Code: 10 - undefined.
Co-requisites: (620-101)

Complete Course Listing

620-105 Pneumatics
Credits: 1-2

This course uses fundamental principles of compressed gasses that operate and power industrial equipment. Principles are applied in transmission of power through the various components such as cylinders, motors, compressors, distribution systems and valves. It also includes the analysis of pneumatic circuits.
Aid Code: 10 - undefined.
Co-requisites: 620-100

Complete Course Listing

620-106 Electric Motors 1
Credits: 0.5-1

The students perform the basics of electric motor function examining DC and AC motors. The student will connect and operate DC Series, Shunt and Compound motors and compare with AC single phase motors. Students will also be introduced to polyphase AC motors.
Aid Code: 10 - undefined.

Complete Course Listing

620-107 Variable Speed Drives 1
Credits: 0.5-1

This course introduces students to the application of variable speed drives (VSD's). Students examine traditional and current methods of motor control in DC and AC drive installations. Students engage in power and control circuitry, troubleshooting principles, and programming of Variable Frequency Drives (VFDs) to control AC motors.
Aid Code: 10 - undefined.
Pre-requisites: 620-106 and 620-113

Complete Course Listing

620-108 Motors and Drives 3
Credits: 0.5-1

This course is a continuation of Motors & Drives 2. Students analyze poly-phase motors and troubleshooting control circuits. Students will engage in hands on activities which include Variable Frequency Drives and Shaft Coupling Alignment.
Aid Code: 10 - undefined.
Pre-requisites: (620-123)

Complete Course Listing

620-109 Relay Logic
Credits: 0.5-1

Students analyze relay theory and operation and apply this to hardwired AND & OR circuits, as well as start/stop circuits using relays. Relay ladder diagrams and motor starter circuits are defined.
Aid Code: 10 - undefined.
Co-requisites: (620-101)

Complete Course Listing

620-110 Introduction to Programmable Logic Controllers (PLC)
Credits: 4

The student will study components that make up a programmable or microprocessor system and the various applications and operations used for digital and process controls in industry. The further use of programming is expanded to include ladder logic and diagrams. Diagnostic troubleshooting is applied along with analysis of interfacing microprocessors and programmable controllers to other control systems.
Aid Code: 10 - undefined.
Co-requisites: 605-102

Complete Course Listing

620-111 Programming Fundamentals 1
Credits: 0.5-1

This course introduces students to the basics of programming fundamentals. Students analyze the fundamentals of computer operations, programming and logic principles, and empirical program design. Students will employ programming language to program microprocessors and other devices.
Aid Code: 10 - undefined.
Pre-requisites: (620-101)

Complete Course Listing

620-112 Programming Fundamentals 2
Credits: 0.5-1

This is a continuation of Programming Fundamentals 1. Students advance their knowledge and skill with instructions and data manipulation. In a hands-on laboratory environment, language and instruction sets will be defined and used to control devices with a special emphasis on industrial applications.
Aid Code: 10 - undefined.
Co-requisites: (620-111)

Complete Course Listing

620-113 Fundamentals of AC Circuits 1
Credits: 0.5-1

Students explore the theory of alternating voltage and current, the sine wave and transformers. Students measure these values with meters and oscilloscopes in relation to reactance, impedance and phase differences.
Aid Code: 10 - undefined.
Pre-requisites: (620-101)

Complete Course Listing

620-114 Fundamentals of AC Circuits 2
Credits: 0.5-1

This course is a continuation of AC circuits 1. Students analyze capacitive and inductive reactance, impedance and phase properties of AC waveforms. Students will examine basic RL, RC and RLC circuits, as well as basic 3 phase voltage measurement.
Aid Code: 10 - undefined.
Co-requisites: (620-113)

Complete Course Listing

620-115 Computer and Robotic Programming
Credits: 1-4

This course is primarily for students with little or no programming background. The course includes the fundamentals of computer operations. Students will be exposed to programming and logic principles that apply to industrial programming applications. The programming language will be employed to program microprocessors and robotic controls. The language and instruction sets will be studied and used to control devices with a special emphasis on industrial applications. The course includes hands-on laboratory sessions.
Aid Code: 10 - undefined.
Pre-requisites: 620-110

Complete Course Listing

620-116 Fluid Power 1: Basic Pneumatics
Credits: 0.5-1

This course will introduce the student to pneumatics. Students will define the differences between hydraulics and pneumatics through observation of various circuit behavior. Hands-on learning will emphasize control theory of linear and rotary actuators and Vacuum technology will be examined.
Aid Code: 10 - undefined.

Complete Course Listing

620-117 Fluid Power 2: Basic Hydraulics
Credits: 0.5-1

This course is an introduction to Hydraulics. Students will examine the physical principles of confined fluids under pressure in both static and dynamic states. Hands-on learning will allow the student an opportunity to put together all of the components that comprise a hydraulic system.
Aid Code: 10 - undefined.

Complete Course Listing

620-118 Fluid Power Applications
Credits: 0.5-1

This course continues the study of pneumatics. Emphasis is placed on the electrical controls of pneumatic circuits while students analyze the operation of sequencing circuits and apply troubleshooting principles to identify faulted components.
Aid Code: 10 - undefined.
Co-requisites: (620-117)

Complete Course Listing

620-121 Programmable Automation Controllers (PACs) 1
Credits: 0.5-1

This course is a continuation of the Programmable Logic Controllers course. Introduction to PACs is defined, including Creating Tags & Bit Level Instructions, PAC operation of Timers & Counters, Program Control, Project Organization & Documentation Arrays. Students engage in hands on activities to apply the aforementioned concepts.
Aid Code: 10 - undefined.
Pre-requisites: (620-101)

Complete Course Listing

620-122 Programmable Automation Controllers (PACs) 2
Credits: 0.5-1

This course is a continuation of PACs 1 with further exploration into Analog Inputs/Outputs, connecting Math theories, comparisons, move instructions and data manipulation. Students engage in hands-on lab activities with the aforementioned concepts as well as Interface Wiring.
Aid Code: 10 - undefined.
Co-requisites: (620-121)

Complete Course Listing

620-124 Programmable Logic Controllers - PLCs
Credits: 0.5-1

This course is an introduction to PLCs. Students will learn the parts and operation of a Programmable Logic Controller. They will apply basic ladder logic programming and transfer programs from the PC to the PLC. Students explore tart stop circuits, timers and counters as they relate to the aforementioned concepts.
Aid Code: 10 - undefined.
Co-requisites: (620-109)

Complete Course Listing

620-125 Servos and Process Controls
Credits: 1-2

Servomechanisms are used in various automated systems. Students will study principles and theories of servomechanisms and apply them in the laboratory. Process controls and instrumentation are applied to control loops systems in the laboratory. Electrical and electronic diagrams are studied to understand control loop systems. Some experiments are conducted on: hydraulic servo controls systems, DC motors, AC motors, stepper motors, and other controls systems.
Aid Code: 10 - undefined.
Pre-requisites: (605-106)
Co-requisites: (620-135)

Complete Course Listing

620-126 Robotics 1
Credits: 0.5-1

The students are introduced to the basics of robotics in this course. This includes defining specific terminology, types, configurations, specifications and application characteristics of robots. The student examines the basic parts of the robot and demonstrates their knowledge through the operation of these systems in laboratory exercises.
Aid Code: 10 - undefined.
Pre-requisites: (620-112)
Co-requisites: (620-121)

Complete Course Listing

620-127 Robotics 2
Credits: 0.5-1

This course is a continuation of Robotics 1. Student engage in more advanced programming, using subroutines, Inputs and outputs, as well as data manipulation. Students are exposed to and use schematics as well as examine robotic troubleshooting.
Aid Code: 10 - undefined.
Co-requisites: (620-126)

Complete Course Listing

620-129 Servo Motion Programming
Credits: 0.5-1

This course is a continuation of Servo Systems Introduction in which students learn programming motion control using servo systems. The student will create a motion profile, incorporating Registration and Camming techniques.
Aid Code: 10 - undefined.
Co-requisites: (620-141)

Complete Course Listing

620-131 Solid State Devices 1
Credits: 0.5-1

This course introduces the student to semiconductor materials, the operation of diodes, Zener diodes and the construction of rectifier and filter circuits. Students perform laboratory experiments that include fundamental transistor construction and switching operation in order to verify the theory.
Aid Code: 10 - undefined.
Co-requisites: (620-114)

Complete Course Listing

620-132 Solid State Devices 2
Credits: 0.5-1

This course is a continuation of Solid State Devices 1. Students examine BJT amplifier circuits. JFETs and MOSFETs as well as their uses application in industry. Specifications and schematics of all devices are analyzed.
Aid Code: 10 - undefined.
Co-requisites: (620-131)

Complete Course Listing

620-134 Sensors
Credits: 0.5-1

Covers various types of sensors used in industrial operations such as inductive and capacitive proximity detectors, Hall-effect devices and various optical sensing modes. Applications are explored, and connection modes are verified with hands- on activities.
Aid Code: 10 - undefined.

Complete Course Listing

620-136 Automation 1
Credits: 0.5-1

This course expands the student's knowledge from program courses by exploring Thermocouple and RTD I/O functions in a processor format. Students engage in formatting and using trend charts and high speed counters.
Aid Code: 10 - undefined.
Co-requisites: (620-148)

Complete Course Listing

620-137 Automation 2
Credits: 0.05-1

This course is a continuation of Automation 1, expanding the student's knowledge base by introducing DNET (device net) ENET (EtherNET) communication and Configuring Devices in RSNetworx. Through the use of RSNetworx, students perform these concepts through barcode scanning and RFID functioning.
Aid Code: 10 - undefined.
Pre-requisites: (620-139)

Complete Course Listing

620-138 Automation 3
Credits: 0.05-1

This course is a continuation of Automation 2 and further explores processing functions of locating and editing I/O Tags and Devices, and forcing bits. Students engage in hands on activities which include troubleshooting PAC Systems through analyzing digital, analog and distributed I/O.
Aid Code: 10 - undefined.
Co-requisites: (620-142)

Complete Course Listing

620-139 Machine Vision Systems
Credits: 0.05-1

This course gives students an introduction to vision systems. Students perform activities which include camera setup, lighting parameters, lenses and study their applications. Students program vision systems and integrate them into PAC systems.
Aid Code: 10 - undefined.
Co-requisites: (620-133)

Complete Course Listing

620-141 Process Control 1
Credits: 0.5-1

This course introduces students to process control concepts through Open Loop Discrete Control, PID function, and Temperature Control activities performed in the lab.
Aid Code: 10 - undefined.
Co-requisites: (620-122 and 620-134)

Complete Course Listing

620-142 Process Control 2
Credits: 0.5-1

This course is a continuation of Process Control 1, and analyzes more concepts through lab experiments in Process Level Control, Flow Control, and Pressure Control.
Aid Code: 10 - undefined.
Co-requisites: (620-141)

Complete Course Listing

620-143 Process Control 3
Credits: 0.5-1

This class is a continuation of Process Control 2. The student explores more indepth concepts in the process field by analyzing Weight Control and Loop Calibrations. Hands-on lab activities engage the student in Function Block programming of PID instructions.
Aid Code: 10 - undefined.
Co-requisites: (620-142)

Complete Course Listing

620-144 Human Machine Interfaces (HMI)
Credits: 0.5-1

This course analyzes the configuring and programming of Human Machine Interface (HMI) devices such as panel view touch screens. Students will work with the Allen Bradley FactoryTalk View Application to display and manipulate graphic objects as well as run-time files in a lab environment.
Aid Code: 10 - undefined.
Pre-requisites: (620-121)

Complete Course Listing

620-146 Basic Mechanics
Credits: 0.5-1

This course will examine the proper use of basic hand and power tools. Drilling, tapping, saw use, and semi-precision measurement are demonstrated and performed by the student. Fastener types and specifications are explored.
Aid Code: 10 - undefined.

Complete Course Listing

620-147 Basic Principles of Preventive Maintenance
Credits: 0.5-1

This course introduces students to various types of principles and practices used within industry for predictive and preventative maintenance of equipment from the operators perspective. Topics will include: safety, housekeeping, inspection tools, oil analysis, and lubrication principles.
Aid Code: 10 - undefined.
Co-requisites: 620-903

Complete Course Listing

620-148 Industrial Integration
Credits: 0.5-1

Students analyze the interconnection and communication of industrial devices in this course. Discrete and network I/O communication is examined using Robots and PLCs. Students create a basic system comprised of various industrial devices.
Aid Code: 10 - undefined.
Pre-requisites: (620-122) and (620-127) and (620-911)
Co-requisites: (664-011)

Complete Course Listing

620-149 Project Planning
Credits: 0.05-1

The student examines the parameters and scope under which a project must function and be constructed. Students will engage in planning and the use of control tools such as: a Statement of Work (SOW), a Work Breakdown Schedule (WBS) and Gantt charts. These tools assist the student as they design, plan, and perform the execution of a work cell.
Aid Code: 10 - undefined.
Co-requisites: (620-137) and (809-196)

Complete Course Listing

620-151 Automation Capstone
Credits: 1-4

This course focuses on the integration of a complete automated robotic cell with the many component parts interconnected in order for the cell to operate properly. Student will interface PLC's, robots, personal computers, vision systems, sensors, motor drives, conveyors, fluid power devices, and other programmable or hard automation.
Aid Code: 10 - undefined.
Co-requisites: (620-149) and (809-198)

Complete Course Listing

620-152 Circuit Connection Techniques
Credits: 0.05-1

The basic construction of circuit boards is examined, as well as the acceptability of soldered components. Through hole and surface mount soldering activities, students fuse parts together with tin lead solder and lead free solder techniques.
Aid Code: 10 - undefined.
Co-requisites: (620-119)

Complete Course Listing

620-166 Conveyor Systems
Credits: 0.5-1

In this course, students examine multiple facets of different conveyor systems, components and operation. Students analyze the different aspects of a conveyor system and demonstrate proper fittings for components and operational procedures.
Aid Code: 10 - undefined.
Pre-requisites: (620-146)

Complete Course Listing

620-167 Conveyor Systems 2
Credits: 0.05-1

In this course, students examine multiple facets of different conveyor systems, including the screw, flat belt, and roller conveyors. While incorporating conveyors safety procedures, students will analyze the different systems used to make up an effective belt conveyor and be able to apply standard applications, preventive maintenance, and repair principles when working with various types of conveyors.
Aid Code: 10 - undefined.

Complete Course Listing

620-168 Lathe Operations for Industrial Technicians
Credits: 0.5-1

This course examines the basics of lathe fabrication processes that are common to the Electro Mechanical and Industrial Maintenance field. Students will demonstrate the basics of metal turning techniques.
Aid Code: 10 - undefined.
Co-requisites: (620-146)

Complete Course Listing

620-169 Milling Operations for Industrial Technicians
Credits: 0.5-1

This course is designed to outline for students the basics of milling fabrication processes that are common to the Electro-Mechanical and Industrial Maintenance field. Through demonstration and practice, students will be able to identify machine parts, analyze their function, and perform simple milling operations. Students will be able to demonstrate the basic use of mills, related safety, maintenance, metal cutting theory, cutting tools, and work holding for the mill.
Aid Code: 10 - undefined.
Co-requisites: (620-146)

Complete Course Listing

620-170 Valves, Gaskets and Seals
Credits: 0.5-1

Students will examine and demonstrate standard procedures related to installing, maintaining, and replacing valves, gaskets, and seals in industrial applications.
Aid Code: 10 - undefined.
Pre-requisites: (620-146)

Complete Course Listing

620-171 Human Relations in the Industrial Setting Internship
Credits: 1-2

This course is designed to give students insight into how an individual's behaviors and abilities affect their relationships with others at work and with customers. Areas stressed include presenting a professional image in seeking employment, developing a positive work attitude, reliability on the job and an awareness of personal adjustments required for gainful employment.
Aid Code: 10 - undefined.

Complete Course Listing

620-172 Machine Setup & Installation
Credits: 0.5-1

This course examines standard applications of rigging, machine leveling, and alignment of shafts, couplings, and bearings. Students will be able to identify types of rigging equipment, estimate loads, and demonstrate proper construction of ropes and slings while practicing standard safety procedures.
Aid Code: 10 - undefined.
Pre-requisites: (620-146)

Complete Course Listing

620-173 Blueprint Reading for Machine Prints
Credits: 0.05-1

This course is designed to demonstrate the basics of machine print reading. Students will be able to analyze and recognize unique features of machining assembly prints. The student will interpret orthographic projection drawings including sectional, auxiliary views, threads, surface finishes, geometric dimensions, and tolerances.
Aid Code: 10 - undefined.

Complete Course Listing

620-174 Mechanical Power Transmission
Credits: 0.5-1

This course engages students in the application of gears, belts, bearings, chain drives, and lubrication processes used in industry. Students will interpret and apply the basic industry standard principles of operation, installation, preventative maintenance, and repair procedures.
Aid Code: 10 - undefined.
Pre-requisites: (620-146)

Complete Course Listing

620-175 Servomechanisms 1
Credits: 0.5-1

Servomechanisms employ closed-loop feedback to improve control of various automated systems. In this course, students analyze principles of open and closed-loop systems, including the fundamental coverage of PID control modes. Feedback sensing devices such as encoders, tachometers, resolvers and LVDTs are examined, and the operation of position and velocity control systems is demonstrated in the lab. Experiments are conducted on DC motors, AC motors, stepper motors, and hydraulic servo control systems.
Aid Code: 10 - undefined.
Co-requisites: (620-121)

Complete Course Listing

620-177 Bearings and Shafts
Credits: 0.5-1

Introduction to four main classifications of bearings. Proper installation, lubrication and removal of bearings. Properties of bearings and estimation of life span. Proper bearing selection. Shaft inspection and repair.
Aid Code: 10 - undefined.
Pre-requisites: (620-146)

Complete Course Listing

620-178 Pump Repair and Maintenance
Credits: 0.5-1

This course focuses on inspection, testing, service, repair, and maintenance of pumps and pumping systems. Examination of pumps, pump types, operating specifications, and their applications as well as components such as packings, seals, gaskets, materials of construction, and related instrumentation are included.
Aid Code: 10 - undefined.
Pre-requisites: (620-147
Co-requisites: 620-170)

Complete Course Listing

620-435 Machine Electrical Systems -24
Credits: 2.4

This course will teach basic relay Logic ; sensors; Variable Frequency Drives; and, Programmable Logic Controller.
Aid Code: 47 - undefined.

Complete Course Listing

620-600 Robotics for Fun
Credits: 0.05-1

Aid Code: 60 - undefined.

Complete Course Listing

620-701 Trade Math Review for Mechatronics Apprentices
Credits: 0.05-1

Course competencies include building apprentice skills working with fractions, decimals, formulas and ratios commonly used by the trade. Measurement, tolerances and interpreting trade related information will help apply math concepts to industrial and manufacturing work processes. Basic algebra, geometry and trigonometry will be applied to mechatronics job duties and tasks. Converting between US and metric units is also included. Course provides a foundation for mechanical and electrical problem-solving involving math.
Aid Code: 50 - undefined.

Complete Course Listing

620-702 Mechatronic Principles
Credits: 1-2

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-703 DC Electricity for Mechatronics
Credits: 0.5-1

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-704 AC Electricity for Mechatronics
Credits: 0.5-1

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-705 Motors & Motor Control for Mechatronics
Credits: 1-2

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-706 Electrical Codes for Mechatronics
Credits: 0.05-1

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-707 Welding Basics for Mechatronics
Credits: 0.05-1

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-708 Fluid Power Systems for Mechatronic Apprentices
Credits: 1-2

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-709 Servos and Drives for Mechatronics
Credits: 0.05-1

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-710 Power Transmission Systems for Mechatronics
Credits: 0.05-1

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-711 Machining Concepts for Mechatronics
Credits: 1-2

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-712 Introduction to Programmable Logic Controllers
Credits: 1-2

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-714 HMI Technologies & PLC Applications for Mechatronics
Credits: 1-2

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-715 Introduction to Robotic Systems for Mechatronics
Credits: 1-2

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-716 Introduction to Robotic Integration
Credits: 1-3

This program configuration represents a statewide model for class cohorts in the related instruction portion of the mechatronics technician apprenticeship. The model outlines related instruction for 3 years and 6 semesters (terms). It reflects a total of 864 hours of combined on-campus lecture, demonstration, shop, and hands-on learning aligned with DWD-BAS apprenticeship training standards. This model is designed for class meetings one day per week, and every week during 2 semesters per year. This model provides foundational skills apprentices will need in on-the-job learning during the final 2 years of their apprenticeship. The model provides 288 hours of learning in each of the following disciplines: mechanical, electrical, and automation. This model aligns WTCS learning outcomes with relevant industry/manufacturing standards as identified by an industry validated DACUM and Exhibit A work processes approved by the state trade committee. Supporting documentation may be found in the BAS Mechatronics Technician Job Book pending in 2016-7. The model also aligns common and consistent course numbers that colleges may use across the WTCS (along with recommended hours, credits and pre-requisites). This curriculum model may be interpreted and implemented by the colleges as required to meet local needs and in support of local work processes approved by the trade and DWD-BAS.
Aid Code: 50 - undefined.

Complete Course Listing

620-900 Safety 1
Credits: 0.05-1

This course focuses on workplace safety, health and inspections. OSHA standards are introduced, how to prepare for and conduct inspections, how to become acutely aware of various hazards and ways in which to effectively communicate to others that they exist. Students will demonstrate the proper use of personal protective equipment (PPE), and fire and safety emergency responsiveness.
Aid Code: 10 - undefined.

Complete Course Listing

620-902 Mechanics of Learning for Industrial Technologies
Credits: 0.5-1

This course is designed for students enrolled in industrial maintenance, electro-mechanical technology, automation technology, and manufacturing engineering technology programs at BTC. Students explore strategies to develop study skills for success in their programs. Through hands-on experience, learners apply study skills, learn how to think critically, and use information resources and technology. Focus will be on the use of college resources, goal setting, time management, flexible learning success strategies, and Flex Lab processes and procedures at the Advanced Manufacturing Training Center. Students will complete this course prior to starting other courses in their program. NOTE: Class taught in both Summer and Fall semesters.
Aid Code: 10 - undefined.

Complete Course Listing

620-903 Troubleshooting Integrated Manufacturing Systems 1
Credits: 0.5-1

This course is an introduction to Integrated Manufacturing Systems, providing context for future coursework in maintenance and automation programs. Students analyze the sequence of operations in a manufacturing system, explore HMI navigation, and apply a troubleshooting methodology that is used in sequencing machines.
Aid Code: 10 - undefined.

Complete Course Listing

620-904 Fluid Power 3: Intermediate Pneumatics
Credits: 0.5-1

This course continues the study of pneumatics. Emphasis is placed on the electrical controls of pneumatic circuits while students analyze the operation of sequencing circuits and apply troubleshooting principles to identify faulted components.
Aid Code: 10 - undefined.
Co-requisites: 620-116 and 620-101

Complete Course Listing

620-905 Machine Setup & Installation 2
Credits: 0.5-1

This course is a continuation of Machine Setup & Installation 1. By the end of this course, students will be able to move a load with a crane, level and align equipment, and set anchoring devices. Emphasis is placed on standard safety procedures for all machine setup operations.
Aid Code: 10 - undefined.
Co-requisites: (620-172)

Complete Course Listing

620-906 Fluid Power 4: Intermediate Hydraulics
Credits: 0.5-1

This course continues the study of hydraulics. Students will analyze the design and function of hydraulic pumps, flow control valves, and actuators.
Aid Code: 10 - undefined.
Co-requisites: (620-117) and (620-101)

Complete Course Listing

620-907 Fluid Power 5: Advanced Hydraulics
Credits: 0.5-1

In this course, students examine characteristics of fluid conductors, selection of hydraulic fluids, troubleshooting of hydraulic systems, and repair of hydraulic components.
Aid Code: 10 - undefined.
Pre-requisites: (620-906)

Complete Course Listing

620-908 Maintenance Management
Credits: 0.5-1

This course explores basic principles of maintenance management, including preventive maintenance, predictive maintenance, work order management, and project management. Students perform the duties of scheduling, purchasing, inventory management, and stakeholder communication with internal and external customers.
Aid Code: 10 - undefined.
Pre-requisites: (620-147)

Complete Course Listing

620-910 Electric Motors 2
Credits: 0.5-1

In this course, students examine motor contactors and starters, industry wiring best practices, and how to design and wire control circuits.
Aid Code: 10 - undefined.
Co-requisites: (620-106) and (620-113)

Complete Course Listing

620-911 Variable Speed Drives 2
Credits: 0.5-1

In this course, students build on skills obtained in Variable Speed Drives 1 to program and troubleshoot AC drives.
Aid Code: 10 - undefined.
Pre-requisites: (620-910)
Co-requisites: (620-107)

Complete Course Listing

620-913 Servomechanisms 2
Credits: 0.5-1

This course is a continuation of Servomechanisms 1. Students build servo systems from schematics, demonstrate calibration and span procedures for instrumentation, and program servo motion systems to complete basic motion tasks.
Aid Code: 10 - undefined.
Co-requisites: (620-175)

Complete Course Listing

620-914 Supervisory Control and Data Acquisition (SCADA) Systems
Credits: 0.5-1

Students identify the basic components of Supervisory Control and Data Acquisition (SCADA). Current manufacturer specific software is used to monitor and operate servo controllers and PID controllers from an HMI screen. In addition, students create and configure data trending tools and run-time files.
Aid Code: 10 - undefined.
Co-requisites: (620-144)

Complete Course Listing

620-915 Troubleshooting Integrated Manufacturing Systems 2
Credits: 1-2

This capstone course challenges students to apply the full range of their Automation Engineering Technology skills in order to perform advanced troubleshooting and repair of various faults in a fully integrated manufacturing system. Students combine and apply their knowledge and skill in electrical, hydraulic and pneumatic systems, as well as PLC programming and robot control.
Aid Code: 10 - undefined.
Co-requisites: (620-148 or 620-172)

Complete Course Listing

620-996 Work-Based Learning 1: Equipment Operation
Credits: 0.5-1

Students work as an equipment operator for Blackhawk Manufacturing. The student will be trained how to operate the equipment in the manufacturing cell and learn the sights, sounds, and smells of the equipment and get a feel for when something is running properly or not. Students will also be required to complete “end of shift” reflections on what they have learned.
Aid Code: 10 - undefined.

Complete Course Listing

620-997 Work-Based Learning 2: Preventive Maintenance
Credits: 0.5-1

Students will work as a preventive maintenance technician servicing and maintaining the equipment that they operated in WBL 1. The students will be required to complete “end of shift” reflections on what they have learned.
Aid Code: 10 - undefined.

Complete Course Listing

620-998 Work-Based Learning 3: Maintenance Troubleshooting
Credits: 0.5-1

Students will complete more advanced maintenance activities such as diagnosing and replacing malfunctioning electrical and mechanical components. The students will be required to complete “end of shift” reflections on what they have learned.
Aid Code: 10 - undefined.

Complete Course Listing

620-999 Work-Based Learning 4: Integration
Credits: 0.5-1

Students will install and troubleshoot a new piece of equipment for the manufacturing cell to increase it’s functionality and level of automation. The students will be required to complete “end of shift” reflections on what they have learned.
Aid Code: 10 - undefined.

Complete Course Listing