Advisory Committee Fall 2018 Annual Meeting
Industrial Automation Systems
Vernon College – 12:00pm Monday, December 3, 2018 at Century City Room 115

ChrisVenegas – Chair
Ken Thiemer – Vice Chair
Ryan Wallander – Recorder

Members Present:
Marc Bradburry – Triangle Brick
Randy Brooks - Solvay
Casey McShan – Sealed Air
Dakota Patterson – Nextera Energy
Bodie Payne, Oncor Electric Delivery
Kenny Pendley, Oncor Electric Delivery
Dustin Riley – Triangle Brick
Ken Theimer – Evans ENT.
Chris Venegas – Sealed Air
Ryan Wallander, Phillips 66 Pipeline

Staff and Faculty Present:
Dr. Elizabeth Crandall
Shana Drury
Holly Scheller
Mollie Williams
Mark Holcomb

Members Absent:
Kelly Easter
Lori Leonard
Terry Smith
Stephen Storm
John Wright

Ken Theimer was elected as vice-chair; Randy Brooks seconded. Ken Theimer agreed to be the vice chair. Ryan Wallander volunteered to be the recorder.

Chris Venegas discussed the new business:

Program Outcomes:

Chris Venegas asked the faculty member to discussion and review the program outcomes listed below.

1. Apply basic AC/DC electrical and electronic fundamentals to wire, integrate, and troubleshoot electrical devices and systems. Devices used in industrial environments to increase the efficiency of production.
2. Incorporate local, state, and federal safety requirements and guidelines in the design of electrical systems. Automate different manufacture processes.
3. Interpret schematics and wiring diagrams and recognize the sequence of operations occurring in automated electrical systems.
4. Develop programs, calibrate devices, and tune PID parameters for various types of process control systems, including such as pressure, level, flow, and temperature control systems.
5. Establish network communications to integrate electrical devices such as computers, automation controllers, vision systems, robots, drives, etc.
6. Calculate requirements of electrical systems utilized in commercial, industrial, and high voltage distribution and transmission applications.

7. Design, program, integrate and troubleshoot automation control devices such as PLC (Programmable Logic Controllers), PID (Proportional Integral Derivative) Controllers, and PAC (Programmable Automation Controllers).

Chris Venegas began discussions with a comment that he has received when he sends students out to his company for interviews is their lack of mechanical experience. Chris asked if anyone else had ran into those problems. Ryan Wallander stated that when he began with his company the first day of the company training was screwdrivers, wrenches, and hammers. So, it is apparently needed in the field.
One of the faculty members asked how we would teach mechanical. Mark Holcomb stated that a lot of it began with the local need and then the book that is chosen. Mark stated that he would be using a Cengage book that the students could access online. Mark Holcomb and Ken Theimer reviewed the book prior to making that decision. Mark stated the students appreciated the reduced cost using the online books. It gives the instructor quizzes and the ability to review the students time spent in review. Ken Theimer asked the committee to provide some input for the course. One committee member suggested motor alignment, shaft alignment, and belt alignment are some that are used in the motor field. Ken Theimer stated that he was able to have access to some of the alignment training tools that could be brought in for training purposes. Casey McShan stated that bearings, applications, lube, how to install and how to remove are things that he would like to see including the alignment mechanics.

After discussion, Chris Venegas asked for a motion to approve program outcomes as presented.
Bodie Payne made motion to approve program outcomes as presented.
Randy Brooks seconded the motion.

The motion to approve program outcomes passed.

Assessment Methods:

Chris Venegas asked that assessment methods and results be discussed in more detail. Mark Holcomb reviewed the information in the tables below.

(CERTIFICATE ONLY)
INDUSTRIAL AUTOMATION SYSTEMS CAPSTONE EXPERIENCE GRADING RUBRIC

STUDENT: ______________________ **STUDENT ID:** ______________________

Topic	Target = 5 Acceptable = 4 Borderline = 3 Unacceptable = 2 Incomplete = 1	5	4	3	2	1
Resume	The resume was clear, concise, and fully descriptive of the students attributes? • Student met all timeline requirements • Students made all feedback corrections until final resume was approved.					
Programmable Automation Control	Student will perform the 4 task to demonstrate knowledge on circuit construction reading program to feature advanced programming on Allen Bradley SLC 500 or 1400 MicroLogic Control to assess learning in automated controls. **(PO1, PO3, PO5, PO7)**					
Task One:	Did the wiring meet operational and quality standards set by instructor?					

Wiring	• All power was distributed to devices • Inputs were correctly identified and wired • Outputs were correctly identified and wired • Student used terminal blocks to simplify troubleshooting system and remote connections • Quality of wiring reflected neatness, operational, and function ability.					
Task Two: Communications	Did the student successfully establish communication between the PLC and PC? • Configure Communication Driver using RS Linx Serial connections					
Task Three: Programming	Did the programming meet scenario as described in capstone project? • Design integrated with AC Drive properly. • All digital inputs/outputs only were configured properly. • All digital inputs/outputs commands only allowed scenario to operate properly. • Program was well organized and used advanced programming commands.					
Task Four: Editing Program	Did the programmer edit the program to allow easy understanding to non-technical observers? • Student created/modified descriptions to reflect proper name. • Student added description of input/outputs • Rungs had descriptors to identify operations.					
Adjustable Frequency Drive	Using an Allen-Bradley Flex 40, students will develop operational program which utilitize Scaled parameter Analog signal Control. **(PO1, PO3, PO4, PO5)**					
Task One: Wiring	Was wiring completed with meeting Quality standards and function properly? • Power connections were made correctly. • All motor connections were made correctly • All connections to smart board were made correctly.					
Task Two: Advanced Parameter Setting	Student set all parameters correctly, so drive integrated properly with PLC to perform task? • Basic parameters setting according to motor nameplate data • Start/stop and reverse functions were programmed • Digital preset speeds were programmed					
Robotic Workcell Construction	Student will use Motoman or Fanuc Robotic arm to construct Workcell to handle material as assigned in Project 1 scenario					
Task One: Programming	Student programmed robot movements to place part in proper location • Program points • Program gripper/vacuum functions • Program wait/time functions • Routing Function					
Task Two: Edits	Student edited all program points speeds and movement paths as required by scenario • Adjusted speed to 25 % in joint movement • Adjusted speed to 150mm/second for all linear movements • Changed coordinate motion to appropriate movement • Establish safe hover points • Calculated time for cycle					

Motor Control Troubleshooting	Following proper safety procedures, students will use schematic wiring diagram and digital Multimeter to locate fault. **(PO1, PO3, PO4, PO5)**					
Task One: Fault One	Did the student use a systematic approach and locate the fault in the control circuit? • Student interpreted schematic properly • Student used multimeter to diagnose circuit problem trouble • Student located trouble and was able to explain his/her systematic approach					
Task Two: Fault Two	Did the student use a systematic approach and locate the fault in the control circuit? • Student interpreted schematic properly • Student used multimeter to diagnose circuit problem trouble • Student located trouble and was able to explain his/her systematic approach					
Task Three: Fault Three	Did the student use a systematic approach and locate the fault in the control circuit? • Student interpreted schematic properly • Student used multimeter to diagnose circuit problem trouble • Student located trouble and was able to explain his/her systematic approach					
Task Four: Fault Four	Did the student use a systematic approach and locate the fault in the control circuit? • Student interpreted schematic properly • Student used multimeter to diagnose circuit problem trouble • Student located trouble and was able to explain his/her systematic approach					
Electrical Design Calculation	Students calculated per National Electric Code (NEC) sizing of conductor, overcurrent protection, and overload protection for motor circuit. (PO1, PO2, PO3, PO6)					
Task One: Electrical System calculations	Student will write and attach calculation report with following required National Electric Code calculations. • Short circuit analyze on feeder and the 3 branch circuit overcurrent devices • Perform all motor circuit calculation to include: 1. Branch and feeder wire size 2. Overload protection 3. Branch circuit protection 4. Full Load Current Per NEC Art. 430 requirements					
Personal Responsibility	Student demonstrated ability to connect choices, actions, and consequences to ethical decision-making to include: • Meeting timeline milestones • Fostering a safe and productive lab environment • Attending class with minimum absences • Arriving for class on time • Working well with other classmates • Secure tools and equipment					
Total (100)						

MASTERY OF PROGRAM CONTENT: 90-100 __________
PROFICIENT AT PROGRAM CONTENT: 99-80 __________
COMPETANT AT PROGRAM CONTENT: 79-70 __________
UNSATISFACTORY SCORE: Below 70 __________

(ASSOCIATE DEGREE ASSESSMENT)

INDUSTRIAL AUTOMATION SYSTEMS CAPSTONE EXPERIENCE GRADING RUBRIC

STUDENT: ______________________ STUDENT ID: ________________________

Topic	Target = 5 Acceptable = 4 Borderline = 3 Unacceptable = 2 Incomplete = 1	5	4	3	2	1
Resume	The resume was clear, concise, and fully descriptive of the students attributes? • Student met all timeline requirements • Students made all feedback corrections until final resume was approved.					
Programmable Automation Control	Student will perform the 4 task to demonstrate knowledge on circuit construction reading program to feature advanced programming on Compact Logic Controller to assess learning in automated controls. **(PO1, PO3, PO5, PO7)**					
Task One: Wiring	Did the wiring meet operational and quality standards set by instructor? • All power was distributed to devices • Inputs were correctly identified and wired • Outputs were correctly identified and wired • Student used terminal blocks to simplify troubleshooting system and remote connections • Quality of wiring reflected neatness, operational, and functionability.					
Task Two: Communications	Did the student successfully establish communication between the PLC and PC? • Configure an Ethernet/IP Communication Driver using RS Linx • Modify Ethernet/IP Address using RSLogix 5000 Software • Perform Pinging IP Address (Perform in ELPT2449, Industrial Automation)					
Task Three: Programming	Did the programming meet scenario as described in capstone project? • Design integrated with AC Drive properly. • All digital and Analog inputs/outputs were configured properly. • All digital and Analog inputs/outputs commands allowed scenario to operate properly. • Program was well organized and used advanced programming commands.					
Task Four: Editing Program	Did the programmer edit the program to allow easy understanding to non-technical observers? • Student created/modified tags to reflect proper name. • Student added description of input/outputs • Rungs had descriptors to identify operations.					
Instrumentation Wiring and calibration	Using an instrument calibration form, student will use a Rosemount 2-wire temperature/pressure transmitter to perform a calibrate procedure and analysis. **(PO4)**					
Task One: Wiring strategy	Did the student demonstrate a clear understanding of set-up procedures? • Wiring was properly completed • External device/s was properly connected.					
Task Two: Meter use	Student was able to connect and use Fluke 787/789 instrumentation meter properly. • Meter was connected properly • Student sourced 4 to 20 mA signal to the transmitter					

Task Three: calibration	Student performed calibrate procedure? • Student properly completed form • Student adjusted range and span properly • Student analyzed before and after service data					
Adjustable Frequency Drive	Using an Allen-Bradley Flex 40, students will develop operational program which utilize Scaled parameter Analog signal Control. **(PO1, PO3, PO4, PO5)**					
Task One: Wiring	Was wiring completed with meeting Quality standards and function properly? • Power connections were made correctly. • All motor connections were made correctly • All connections to smart board were made correctly.					
Task Two: Advanced Parameter Setting	Student set all parameters correctly so drive integrated properly with PLC to perform task? • Basic parameters setting according to motor nameplate data • Start/stop and reverse functions were programmed • Digital preset speeds were programmed					
Robotic Workcell Construction	Student will use Motoman or Fanuc Robotic arm to construct Workcell to handle material as assigned in Project 1 scenario					
Task One: Programming	Student programmed robot movements to place part in proper location • Program points • Program gripper/vacuum functions • Program wait/time functions • Routing Function					
Task Two: Edits	Student edited all program points speeds and movement paths as required by scenario • Adjusted speed to 25 % in joint movement • Adjusted speed to 150mm/second for all linear movements • Changed coordinate motion to appropriate movement • Establish safe hover points • Calculated time for cycle					
Motor Control Troubleshooting	Following proper safety procedures, students will use schematic wiring diagram and digital Multimeter to locate fault. **(PO1, PO3, PO4, PO5)**					
Task One: Fault One	Did the student use a systematic approach and locate the fault in the control circuit? • Student interpreted schematic properly • Student used multimeter to diagnose circuit problem trouble • Student located trouble was able to explain his/her systematic approach					
Task Two: Fault Two	Did the student use a systematic approach and locate the fault in the control circuit? • Student interpreted schematic properly • Student used multimeter to diagnose circuit problem trouble • Student located trouble was able to explain his/her systematic approach					
Task Three: Fault Three	Did the student use a systematic approach and locate the fault in the control circuit? • Student interpreted schematic properly • Student used multimeter to diagnose circuit problem trouble					

	• Student located trouble was able to explain his/her systematic approach					
Task Four: Fault Four	Did the student use a systematic approach and locate the fault in the control circuit? • Student interpreted schematic properly • Student used multimeter to diagnose circuit problem trouble • Student located trouble was able to explain his/her systematic approach					
Electrical Design Calculation	Students calculated per National Electric Code (NEC) sizing of conductor, overcurrent protection, and overload protection for motor circuit. (PO1, PO2, PO3, PO6)					
Task one: SCCR Analysis	Student will calculate the short circuit analysis for 2 scenario per ELPT 2443, Electrical Systems Design, final exam.					
Task Two: Power Correction	Student calculate 2 Power Correction problems correctly per ELPT 2443, Electrical Systems Design, final exam.					
Task Three: Bill of Material	Student will identify different characteristics and system improvement actions as per ELPT 2443, Electrical Systems Design, final exam.					
Task Four: Electrical System calculations	Student will write and attach calculation report with following required National Electric Code calculations. • Short circuit analyze on feeder and the 3 branch circuit overcurrent devices • Perform all motor circuit calculation to include: 5. Branch and feeder wire size 6. Overload protection 7. Branch circuit protection 8. Full Load Current Per NEC Art. 430 requirements					
Personal Responsibility	Student demonstrated ability to connect choices, actions, and consequences to ethical decision-making to include: • Meeting timeline milestones • Fostering a safe and productive lab environment • Attending class with minimum absences • Arriving for class on time • Working well with other classmates • Secure tools and equipment					
Total (100)						

MASTERY OF PROGRAM CONTENT:	90-100	__________
PROFICIENT AT PROGRAM CONTENT:	99-80	__________
COMPETANT AT PROGRAM CONTENT:	79-70	__________
UNSATISFACTORY SCORE:	Below 70	__________

Industrial Automation Systems (IAS)
Capstone project #1
Program course: ELMT 2441 Electromechanical Systems

1. The following assignment is identified as an IAS program capstone project. It evaluates the student's knowledge of curriculum and training in CETT 1402 (Basic Electricity), ELPT 2419 (Introduction to PLCs), ELPT 1441 (Motor Control), ELMT 2433 Industrial Electronics, and ITNW 1325 Fundamentals of Networking, RBTC 1405 Robotic Fundamentals, and ELMT 2441 Electromechanical Systems.

Part 1: Programmable Logic Controllers (PLC)/AFD circuit design:

Project assignment: As a plant Electronic Technician, you have been assigned to design, construct, and program a PLC automated control circuit for a turntable conveyor system to paint parts. The circuit integrates conventional switching devices with PLC operations and Adjustable Frequency Drive (AFD) motion control along with an analog temperature control device (pot). The project as four tasks to be performed by the student and each task must be approved by the instructor before preceding to the next tasked. Students are evaluated as Mastery of Content, Proficient at Content, Competent at Content, or Not Satisfactory completing project. A time milestone of 10 hours is the course benchmark for complete of this capstone project. If course time allows, students may use extended hours to complete the project with a reduction of grading points.

Scenario: A finished mill part is placed on a conveyor belt system to move through the final stage of completion. Each part is placed by a robotic arm onto a turntable on the conveyor belt. The conveyor belt runs a consist speed of 10 Hz and stops at the two stations (Dual Start/Stop) in the painting department (Start/Stop PB). Once the part reaches the sprayer, a limit switch (LS1) turns on the paint sprayer and starts rotating the turntable @ 20 Hz for 10 seconds. After this is completed the conveyor starts back @ 10 HZ, and the turntable stops. The part continues on the conveyor until it reaches the heating unit where it again stops (LS2) and starts the turntable @ 30 Hz for 20 seconds to dry the part. The conveyor then starts to take part to the palletizing department where another robotic arm places the part onto the pallet for final drying and shipment.

The technician will, also, design a lighting system to indicate the movement (start/stop) of the conveyor, the spraying process, the heating process. Also, the process will need a flashing light to indicate a trouble situation which is indicated by the operator pushing an emergency stop button. Student will also program a robotic arm to perform the material handling function.

A Compact logic trainer will be used to develop and construct a static wiring circuit for the project scenario. Allen Bradley MicroLogic 1400 units will be used as the offline/online programming controllers and either the industrial Motoman or Fanuc robotic arms to simulate the material handling process.

Task: For Project assessment, student will earn the following as assigned through capstone rubrics.

1. Connect wiring points
2. Quality of wiring
3. Programming of PLC

4. Programming of AFD
5. Edit and document of comments on PLC program
6. Operational check of circuit

Chris Venegas asked for a motion to approve assessment methods and results.
Ken Theimer made motion to approve assessment methods and results as presented.
Bodie Payne seconded the motion.

The motion to approve assessment methods and results passed.

Workplace Competency

Workplace competencies were discussed in detail as the table reflects below.

Program Outcome	Number of students who took course or licensure exam	Results per student	Use of results
1. *Apply basic AC/DC electrical and electronic fundamentals to wire, integrate, and troubleshoot electrical devices and systems.	ELPT 2443 Electrical Systems Design/ ELPT 2449 Industrial Automation	1 students @ Mastery 2 students @ Satisfactory 1students @ N/C	Capstone Project #1 & CP #3
2. **Incorporate local, state, and federal safety requirements and guidelines in the design of electrical systems.	ELPT 2443 Electrical Systems Design	1 students @ Mastery 2 students @ Satisfactory 1 students @ N/C	Midterm and Final Capstone Circuit Sizing and Protection – CP #2
3. ** Interpret schematics and wiring diagrams and recognize the sequence of operations occurring in automated electrical systems.	ELPT 2449 Industrial Automation	1 students @ Mastery 2 students @ Satisfactory 1 students @ N/C	Associated with all Capstone Projects
4. *Develop programs, calibrate devices, and tune PID parameters for various types of process control systems, including such as	ELPT 2449 Industrial Automation	1 students @ Mastery 2 students @ Satisfactory	CP #3 – Tuning of temperature/Pressure instrumentation devices

pressure, level, flow, and temperature control systems.		1 students @ N/C	
5. *Establish network communications to integrate electrical devices such as computers, automation controllers, vision systems, robots, drives, etc.	ELPT 2449 Industrial Automation	1 students @ Mastery 2 students @ Satisfactory 1 students @ N/C	CP #1
6. **Calculate requirements of electrical systems utilized in commercial, industrial, and high voltage distribution and transmission applications.	ELPT 2443 Electrical Systems Design	1 students @ Mastery 2 students @ Satisfactory 1students @ N/C	Midterm and Final Capstone Circuit Sizing and Protection – CP #2
7. *Design, program, integrate and troubleshoot automation control devices such as PLC (Programmable Logic Controllers), PID (Proportional Integral Derivative) Controllers, and PAC (Programmable Automation Controllers).	ELPT 2443 Electrical Systems Design/ ELPT 2449 Industrial Automation	1 students @ Mastery 2 students @ Satisfactory 1students @ N/C	Capstone Project trouble shooting lab Project #3/Robotic Workcell CP #4

After discussion, Chris Venegas asked for a motion to approve workplace competency.
Ryan Wallander made motion to approve workplace competency as presented.
Dakota Patterson second the motion.

The motion to approve workplace competency as presented passed.

Review program curriculum:

Industrial Automation Systems, A.A.S.

CIP 15.0303

Instructional Location – Skills Training Center
ASSOCIATE IN APPLIED SCIENCE DEGREE (Probable Completion Time - 2 years)

General Education Requirements (15 SH)

ENGL 1301	Composition I	3
GOVT 2305	Federal Government (Federal Constitution and Topics)	3
MATH 1314	College Algebra	3
	or	
MATH 1332	Contemporary Mathematics	3
SPCH 1315	Public Speaking	3
SFF>	Language, Philosophy, and Culture or Creative Arts Elective	3

Related Requirements (3 SH)

ITNW 1325	Fundamentals of Networking Technologies (A)	3

Major Requirements (42 SH)

ELPT 1411	Basic Electrical Theory (A)	4
	or	
HART 1401	Basic Electricity for HVAC	4
CBFM 2417	Mechanical Maintenance	4
ELMT 2433	Industrial Electronics	4
ELPT 1441	Motor Control	4
ELPT 1457	Industrial Wiring	4
ELPT 2339	Electrical Power Distribution	3
ELPT 2355	Programmable Logic Controllers II	3
ELPT 2419	Programmable Logic Controllers I	4
ELPT 2443	Electrical Systems Design	4
ELPT 2449	Industrial Automation	4

RBTC 1405	Robotic Fundamentals	4
	Total Credit Hours:	**60**

> *To be selected from the following: **ARTS 1301**, **DRAM 1310**, **DRAM 2366**, **ENGL 2322**, **ENGL 2323**, **ENGL 2327**, **ENGL 2328**, **ENGL 2332**, **ENGL 2333**, **HIST 2311**, **HIST 2312**, **MUSI 1306***
***ELPT 1411**, **ELPT 1441**, **ELPT 1457**: Apprentice Credit - Credit will be awarded for these courses to individuals who have completed an electrical apprenticeship program.*
** Approved elective to be selected from the following courses: **CETT 1307**(A), **COSC 1301** or **ITSC 1301**(A) or **BCIS 1305**, **EEIR 2366**, **ELMT 2339**, **ITSE 1402** (A), **MCHN 2444***
***(A)** Course included on the State's Advanced Technical Credit list. (See **Advanced Technical Credit**.)*

Verification of Workplace Competencies: Capstone Experience –

ELPT 2443	Electrical Systems Design	4
ELPT 2449	Industrial Automation	4

* For CNC option, students must have completed or be concurrently enrolled in the MCHN certificate program courses. Students in the Machining-CNC Certificate of Completion have the option to complete the Industrial Automation Systems A.A.S. degree. This option applies to the following block of machining courses to the IAS degree plan: **MCHN 1426**, **MCHN 2403**, **MCHN 2433**, **MCHN 2441**, and **MCHN 2444**. This block of MCHN courses replaces the following block of IAS courses: **ELPT 1457**, **ELPT 2339**, **ELPT 2443**, **ITNW 1325**. Other course substitutions will not be approved for the MCHN and the IAS blocks of courses.

Industrial Automation Systems Electrical/Energy Technology, Level 1 Certificate

CIP 15.0303

Level 1 Certificate

Instructional Location - Skills Training Center
CERTIFICATE OF COMPLETION (Probable Completion Time – 9 months or 32 weeks)

Major Requirements (34 SH)

ELPT 1411	Basic Electrical Theory (A)	4
	or	
HART 1401	Basic Electricity for HVAC	4
ELMT 2433	Industrial Electronics	4
ELPT 1441	Motor Control	4

ELPT 1457	Industrial Wiring	4
ELPT 2339	Electrical Power Distribution	3
ELPT 2419	Programmable Logic Controllers I	4
ELPT 2443	Electrical Systems Design	4
ITNW 1325	Fundamentals of Networking Technologies (A)	3
RBTC 1405	Robotic Fundamentals	4
	Total Credit Hours:	**34**

ELPT 1411, ***ELPT 1441***, ***ELPT 1457***: *Apprentice Credit - Credit will be awarded for these courses to individuals who have completed an electrical apprenticeship program.*
(A) *Course included on the State's Advanced Technical Credit list. (See* ***Advanced Technical Credit****.)*

Verification of Workplace Competencies: Capstone Experience –

ELPT 2443	Electrical Systems Design	4

Industrial Automation Systems Occupational Skill Award (12 Semester Hours):

ELPT 1411	Basic Electrical Theory (A)	4
	or	
HART 1401	Basic Electricity for HVAC	4
ELPT 1441	Motor Control	4
ELPT 1457	Industrial Wiring	4

ELPT 1411 Basic Electrical Theory - Basic theory and practice of electrical circuits. Includes calculations as applied to alternating and direct current.

Explain atomic structure and basic values such as voltage, current, resistance, and power; determine electrical values for combination circuits in direct current (DC) and alternating current (AC) containing resistance, inductance, and capacitance; summarize the principles of magnetism; calculate voltage drop based on conductor length, type of material, and size; and utilize electrical measuring instruments.

HART 1401 Basic Electricity for HVAC - Principles of electricity as required by HVAC, including proper use of test equipment, electrical circuits, and component theory and operation.

Demonstrate knowledge of basic principles of electricity, electrical current, circuitry, and air conditioning devices; apply Ohm's law to electrical calculations; perform electrical continuity, voltage, and current tests with appropriate meters; and demonstrate electrical safety.

CBFM 2417 Mechanical Maintenance - General principles of mechanical and electrical systems related to inspection, repair, and preventative maintenance of facility equipment.

Identify mechanical and electrical components; perform inspections, repairs, and preventative maintenance; and distinguish between critical and non-critical equipment conditions.

ELMT 2433 Industrial Electronics - Devices, circuits, and systems primarily used in automated manufacturing and/or process control including computer controls and interfacing between mechanical, electrical, electronic, and computer equipment. Includes presentation of programming schemes.

Describe how electronic input and output circuits are used to control automated manufacturing and/or process systems; identify basic elements used for input, output, timing, and control; define how programmable electronic systems use input data to alter output responses; troubleshoot a representative system; and demonstrate how system operation can be altered with software programming.

ELPT 1441 Motor Control - Operating principles of solid-state and conventional controls along with their practical applications. Includes braking, jogging, plugging, safety interlocks, wiring, and schematic diagram interpretations.

Identify practical applications of jogging and plugging; describe the types of motor braking and their operating principles; explain different starting methods for large motors; and demonstrate proper troubleshooting methods on circuits using wiring and schematic diagrams.

ELPT 1457 Industrial Wiring - Wiring methods used for industrial installations. Includes motor circuits, raceway and bus way installations, proper grounding techniques, and associated safety procedures.

Interpret electrical blueprints/drawings; compute circuit sizes and overcurrent protection for the installation of branch circuits, feeders, and service entrance conductors; explain the proper installation of wiring devices according to electrical codes; demonstrate grounding methods; identify industrial wiring methods including conduit bending; and demonstrate proper safety procedures.

ELPT 2339 Electrical Power Distribution - Design, operation, and technical details of modern power distribution systems including generating equipment, transmission lines, plant distribution, and protective devices. Includes calculations of fault current, system load analysis, rates, and power economics.

Explain major parts of utility systems; compare overhead systems versus underground systems; discuss mechanical design considerations to meet codes, standards, climate, and terrain relating to the utility systems; explain considerations for utility line; analyze energy economics; explain how smart grid technologies and standards effect power distribution systems.

ELPT 2355 Programmable Logic Controllers II - Advanced concepts in programmable logic controllers and their applications and interfacing to industrial controls.

Convert ladder diagrams into programs; explain digital/analog devices used with programmable logic controllers; apply advanced programming techniques; execute and evaluate control system operation; and implement interfacing and networking schemes.

ELPT 2419 Programmable Logic Controllers I - Fundamental concepts of programmable logic controllers, principles of operation, and numbering systems as applied to electrical controls.

Identify and describe digital logic circuits and explain numbering systems; explain the operation of programmable logic controllers; convert ladder diagrams into programs; incorporate timers and counters utilizing programmable logic controllers; and execute and evaluate programs.

ELPT 2443 Electrical Systems Design - Electrical design of commercial and/or industrial projects including building layout, types of equipment, placement, sizing of electrical equipment, and all electrical calculations according to the requirements of the National Electrical Code (NEC).

Strategically locate electrical equipment within a building; calculate electrical loading for a building; manipulate electrical loads to balance systems; size service equipment feeding a building; and analyze the layout of materials and equipment for special or hazardous locations; calculate a Return on Investment including current funding options for energy efficient and renewable energy products.

ELPT 2449 Industrial Automation - Electrical control systems, applications, and interfacing utilized in industrial automation.

Apply advanced programming techniques utilizing programmable logic controllers; implement digital/analog interfacing schemes; explain the operation of communication and network methods; devise control system specifications; and explain the operation and applications of distributed control systems.

RBTC 1405 Robotic Fundamentals - An introduction to flexible automation. Topics include installation, repair, maintenance, and development of flexible robotic manufacturing systems.

Describe the history of robotics and its impact on production and the labor force; define the term "robot" and describe general characteristics; explain the physics of robot motion and use different teaching pendants; and describe the characteristics of different types of robot control systems, applications of robots, and end-of-arm tooling.

Mark Holcomb discussed the addition of EEIR 2366 (Electrical/Electronic Practicum) to course active inventory. To be used as a 3 credit hour substitution for those students working in the field.
After much discussion, Chris Venegas asked for a motion to approve program as presented.
Bodie Payne made motion to approve program as presented.
Ryan Wallander second the motion.

The motion to approve program as presented passed.

Review of Matrices:

Chris Venegas led the discussion on Review Secretary's Commission on Achieving Necessary Skills (SCANS), General Education, Program Outcomes Matrices, and Institutional Outcomes Matrices and asks the faculty to expand on them.

Mark Holcomb explains the matrices below.

Program: Industrial Automation Systems								**Credential: Associate in Applied Science (AAS) Degree**
Award: Industrial Automation Systems Associate in Applied Science (AAS) Degree								
Cip: 15.0303								
LIST OF ALL COURSES REQUIRED AND IDENTIFIED COMPETENCIES								
SCANS COMPETENCIES							**Course Number**	**Course Title**
1	**2**	**3**	**4**	**5**	**6**	**7**		
X		X	X		X	X	ITNW 1325*	Fundamentals of Networking Technologies
X		X	X		X		ELPT 1411*	Basic Electrical Theory
X		X	X		X		HART 1401*	Basic Electricity for HVAC
X	X	X	X		X	X	CBFM 2417	Mechanical Maintenance
X		X	X		X	X	ELMT 2433*	Industrial Electronics
X		X	X		X		ELPT 1441*	Motor Control
X		X	X		X		ELPT 1457	Industrial Wiring
X	X	X	X		X	X	ELPT 2339*	Electrical Power Distribution
X	X	X	X		X	X	ELPT 2355	Programmable Logic Controllers II
X		X	X		X	X	ELPT 2419*	Programmable Logic Controllers I
X	X	X	X		X	X	ELPT 2443*	Electrical Systems Design
X		X	X		X	X	ELPT 2449	Industrial Automation
X	X	X	X		X		RBTC 1405*	Robotic Fundamentals
						7. BASIC USE OF COMPUTERS		
					6. WORKPLACE COMPETENCIES			
				5. PERSONAL QUALITIES				
			4. THINKING SKILLS					
		3. SPEAKING AND LISTENING						
	2. WRITING							
1. READING								

Program: Industrial Automation Systems							Credential: Associate in Applied Science (AAS) Degree
Award: Industrial Automation Systems Associate in Applied Science (AAS) Degree							
Cip: 15.0303							
LIST OF ALL COURSES REQUIRED AND IDENTIFIED CORE OBJECTIVES							
GENERAL EDUCATION CORE OBJECTIVES						**Course Number**	**Course Title**
1	**2**	**3**	**4**	**5**	**6**		
X	X	X	X		X	ITNW 1325*	Fundamentals of Networking Technologies
X		X	X			ELPT 1411*	Basic Electrical Theory
X		X	X			HART 1401*	Basic Electricity for HVAC
X	X		X	X	X	CBFM 2417	Mechanical Maintenance
X						ELMT 2433*	Industrial Electronics
X			X			ELPT 1441*	Motor Control
X		X	X			ELPT 1457*	Industrial Wiring
X		X				ELPT 2339*	Electrical Power Distribution
X	X		X	X		ELPT 2355	Programmable Logic Controllers II
X			X			ELPT 2419*	Programmable Logic Controllers I
X	X	X			X	ELPT 2443*	Electrical Systems Design
X	X		X		X	ELPT 2449	Industrial Automation
X	X		X			RBTC 1405 *	Robotic Fundamentals
					6. Personal Responsibility		
				5. Social Responsibility			
			4. Teamwork				
		3. Empirical and Quantitative Skills					
	2. Communication Skills						
1. Critical Thinking Skills							

Program: Industrial Automation Systems	Credential: Associate in Applied Science (AAS) Degree
Award: Industrial Automation Systems Associate in Applied Science (AAS) Degree	
Cip: 15.0303	

LIST OF ALL COURSES REQUIRED AND OUTCOMES

OUTCOMES							Course Number	Course Title
1	**2**	**3**	**4**	**5**	**6**	**7**		
				X			ITNW 1325*	Fundamentals of Networking Technologies
X		X	X	X		X	ELPT 1411*	Basic Electrical Theory
X	X	X			X		HART 1401*	Basic Electricity for HVAC
X	X	X					CBFM 2417	Mechanical Maintenance
X		X	X	X		X	ELMT 2433*	Industrial Electronics
X	X	X			X		ELPT 1441*	Motor Control
X	X	X			X		ELPT 1457*	Industrial Wiring
	X	X			X		ELPT 2339*	Electrical Power Distribution
		X	X	X		X	ELPT 2355	Programmable Logic Controllers II
X	X	X	X	X		X	ELPT 2419*	Programmable Logic Controllers I
X	X	X			X		ELPT 2443*	Electrical Systems Design
X		X	X	X		X	ELPT 2449	Industrial Automation
X				X		X	RBTC 1405 *	Robotic Fundamentals

7. Design, program, integrate and troubleshoot automation control devices such as PLC (Programmable Logic Controllers), PID (Proportional Integral Derivative) Controllers, and PAC (Programmable Automation Controllers).

6. Calculate requirements of electrical systems utilized in commercial, industrial, and high voltage distribution and transmission applications.

5. Establish network communications to integrate electrical devices such as computers, automation controllers, vision systems, robots, drives, etc.

4. Develop programs, calibrate devices, and tune PID parameters for various types of process control systems, including such as pressure, level, flow, and temperature control systems.

3. Interpret schematics and wiring diagrams and recognize the sequence of operations occurring in automated electrical systems.

2. Incorporate local, state, and federal safety requirements and guidelines in the design of electrical systems. Automate different manufacture processes.

1. Apply basic AC/DC electrical and electronic fundamentals to wire, integrate, and troubleshoot electrical devices and systems. Devices used in industrial environments to increase the efficiency of production.

Program: Industrial Automation Systems	**Credential: Associate in Applied Science (AAS) Degree**
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LIST OF ALL COURSES REQUIRED AND OUTCOMES

OUTCOMES							**General Education Outcomes**
1	**2**	**3**	**4**	**5**	**6**	**7**	
X	**X**	**X**	**X**	**X**	**X**	**X**	1. Critical Thinking Skills
	X	**X**	**X**	**X**	**X**	**X**	2. Communication Skills
X			**X**	**X**			3. Empirical and Quantitative Skills
X			**X**			**X**	4. Teamwork
	X						5. Social Responsibility
X	**X**	**X**	**X**	**X**	**X**	**X**	6. Personal Responsibility

7. Design, program, integrate and troubleshoot automation control devices such as PLC (Programmable Logic Controllers), PID (Proportional Integral Derivative) Controllers, and PAC (Programmable Automation Controllers).

6. Calculate requirements of electrical systems utilized in commercial, industrial, and high voltage distribution and transmission applications.

5. Establish network communications to integrate electrical devices such as computers, automation controllers, vision systems, robots, drives, etc.

4. Develop programs, calibrate devices, and tune PID parameters for various types of process control systems, including such as pressure, level, flow, and temperature control systems.

3. Interpret schematics and wiring diagrams and recognize the sequence of operations occurring in automated electrical systems.

2. Incorporate local, state, and federal safety requirements and guidelines in the design of electrical systems automated different manufacture processes.

1. Apply basic AC/DC electrical and electronic fundamentals to wire, integrate, and troubleshoot electrical devices and systems devices used in industrial environments to increase the efficiency of production.

Chris Venegas asked for a motion to approve matrices as presented.
Ryan Wallander made motion to approve matrices as presented.
Bodie Payne seconded the motion.

The motion to approve matrices as presented passed.

Program statistics:

Chris Venegas proceeded into discussing Program statistics

- Program Statistics:
  - Graduates 2017-2018: (6)
  - Enrollment Summer 2018: (5)
  - Majors Fall 2018-2019: (33)
  - Enrollment Fall 2018: (81 Total student enrollment in 6 classes/13.5 per class

Local Demand:

Ryan Wallander they are looking for some people who can do it all, he thought demand would be strong over the next few years.
Chris Venegas stated that there would be several retirements in the future.
Dakota Patterson stated that an employee with electrical and mechanical experience is great. In mid-year 2019, there will be 5 to 6 openings. .
Randy Brooks stated that Solvay just did interviews a couple months ago and picked a graduate from the program. The industry is still here and there is a need for the program.
Kenny Pedley stated that Oncor did paid internship at their facility to get employees in on a temporary basis to show the students the facility and how the company works. Kenny also shared that the value for this program is definitely there in this industry.
Casey McShan

Evaluation of facilities and equipment:

Chris Venegas opened up discussion on evaluation of facilities, equipment, and technology. Recommendation for acquisition of new equipment and technology.

1. 4 to 6 -Compact Logic PLC to match current software revision
2. 3-IR cameras FlIR6
3. 6-Siemen 1200 PLCs
4. New classroom computerized projector system

External learning experiences:

Chris Venegas moved discussion to external learning experiences, employment, and placement opportunities

State reported completer placement rate for 15030000-Electrical Engineering Technologies/Technicians is 95% for 2013-16.

Professional development of faculty:

The Chair moves to professional development of faculty and recommendations:

Completed Introduction to Thermography Level I – November 2018
Scheduled Siemens PLC training December 2018
Attending Texas Association of Career Technical Educator's annual conference in April 2019
In-House PD training

Promotion and publicity:

Chris Venegas proceeds to promotion and publicity (recruiting) about the program to the community and to business and industry

Individual STC tours
Participated in Workforce Solution's Career Safari
Vernon College Preview day
Sophomore Roundup (*)
Community Event

Serving students from special populations:

Chris Venegas would like to discuss serving students from special populations.

1. individuals with disabilities;
2. individuals from economically disadvantaged families, including foster children;
3. individuals preparing for non-traditional fields;
   1 female
4. single parents, including single pregnant women;
5. displaced homemakers; and
6. individuals with limited English proficiency

Adjourn
The meeting adjourned at 1:30pm

Recorder Signature:	Date:	Next Meeting: Fall 2019
Ryan Wallender	12/5/18	