

July 6, 2016

MEMORANDUM

TO: State Board of Regents

FROM: David L. Buhler

SUBJECT: Weber State University – Associate of Applied Science in Controls Technology

Issue

Weber State University (WSU) requests approval to offer an Associate of Applied Science (AAS) in Controls Technology effective Fall Semester, 2017. This proposal was approved by the institutional Board of Trustees March 15, 2016.

Background

Workers from the industry who have completed programs in automated manufacturing at applied technology colleges (ATC) are interested in obtaining a technical degree that will enable them to advance within their companies. Promotion is often to a controls engineering technician position which requires the skills needed to install automated equipment, troubleshoot and repair systems, and make software changes to automated processes. Several of WSU's industry partners along the Wasatch Front require that employees possess an associate's degree to be considered for controls engineering technician positions.

Industry partners and representatives from local applied technology colleges and WSU attended a meeting on January 30, 2015 at Autoliv to discuss need for this degree and to develop a pathway from the Bridgerland, Davis, and Weber Applied Technology Colleges to WSU that would provide credit to students who have completed select ATC programs. The proposed associate of applied science degree program is the result of this collaboration. Agreement has been reached for WSU to award 25 credit hours upon completion of a 900+ clock hour ATC program. Unlike the Associate of Applied Science in General Technology degree that is often used for articulation with Utah College of Applied Technology programs and that is provided through special provision of Regent Policy R473, this proposed program leads to a stand-a-lone AAS degree specific for Controls Technology workers. Weber State University is making plans to provide further opportunities for students who complete the Controls Technology AAS program to earn a baccalaureate degree.

The proposed program will prepare graduates to work in the industry as qualified technicians in automated manufacturing environments. Graduates will find opportunities in plant maintenance, installation and support of automated equipment, and manufacturing assembly processes. They will have knowledge and applied skills in electronics, robotics, mechanics, and automated control systems. The program differs from

the current AAS Electronics Engineering Technology degree at WSU as it contains a concentration of automation and controls courses that build on the ATC foundation.

A review of data from the Utah State Department of Workforce Services revealed the following labor market projections for occupations related to the program. This information is specific to the Ogden/Clearfield metropolitan area for the 2012 – 2022 timeframe.

Occupational Group	SOC Code	Average Annual Growth Rate	Annual Median Income
Electro/Mechanical Technicians	17-3024	3.5%	\$39,150
Mechanical Engineering Technicians	17-3027	1.7%	\$42,710
Industrial Machinery Mechanics	49-9041	2.9	\$53,490

Policy Issues

The proposed program has been developed in accordance with Regent Policy R473, *Standards for Granting Credit for Course Work Completed at Applied Technology Centers*. It has also been developed through established institutional procedures and other Board of Regents policies. Chief academic officers as well as faculty in related departments from the Utah System of Higher Education institutions have reviewed the proposal and have provided input. There are no additional policy issues that need to be addressed relative to approval of the program.

Commissioner's Recommendation

The Commissioner recommends the Board of Regents approve the Associate of Applied Science in Controls Technology.

David L. Buhler
Commissioner of Higher Education

DLB/BKC
Attachment

Utah System of Higher Education Program Description - Full Template

Section I: The Request

Weber State University requests approval to offer the following Associate's degree(s): Controls Technology effective Fall 2016. This program was approved by the institutional Board of Trustees on 03/15/2016.

Section II: Program Proposal

Program Description

Present a complete, formal program description.

The Controls Technology program will prepare graduates to work in industry as qualified technicians in highly automated manufacturing environments. Graduates of the Controls Technology program will have knowledge and applied skills in electronics, robotics, mechanics, and automated control systems. The Controls Technology program provides a pathway from an ATC Industrial Automation Maintenance Technician (IAMT) certificate to the AAS Controls Technology degree. The pathway is a result of a strong collaboration between industry partners, high school Career and Technical Education (CTE), Bridgerland, Ogden-Weber, and Davis Applied Technology Colleges (ATCs), and Weber State University (WSU).

The Associate of Applied Science (AAS) in Controls Technology is designed for individuals interested in plant maintenance, installation and support of automated equipment, and manufacturing assembly processes. The degree focuses on automation and controls, building on the practical experience and skills gained from the ATC coursework. The program differs from the current AAS Electronics Engineering Technology degree as it contains a concentration of automation and controls courses that builds on the IAMT certificate that prepare graduates for technical support positions in highly automated facilities.

The Controls Technology AAS degree responds to employer needs to fill positions in automated manufacturing facilities including installation, maintenance, and support of automated equipment in advanced manufacturing environments.

Production operators in automated manufacturing facilities obtain an operator certificate, Operator Level I, requiring 600 hours at an ATC that certifies them to run automated equipment. Maintenance technicians must additionally possess an Industrial Automation Maintenance Technician (IAMT) certificate to perform preventative maintenance. The IAMT certificate requires a minimum of an additional 300 hours of training.

The next step in the progression is a promotion to a controls engineering technician, a qualified individual with the ability to install automated equipment, troubleshoot and repair systems, and make software changes to automated processes. Several of WSU's industry partners along the Wasatch Front require that employees possess an associate's degree in Controls Technology or related area to be considered for the controls engineering technician positions.

Industry partners and representatives from local ATCs, secondary Career and Technical Education leaders, and Weber State University attended a Controls Technology Degree Design Summit on January 30, 2015 at Autoliv to discuss need for this degree and to develop a pathway from high schools and the ATCs to Weber State University that would acknowledge credit for completed IAMT certifications. Part of the AAS Controls Technology degree includes a block of 25 credit hours at Weber State University upon completion of the IAMT certificate. The applied skills obtained through the IAMT certificate are a necessary and valuable part of a Controls Engineering technician career path and add value to an engineering technology degree.

Consistency with Institutional Mission

Explain how the program is consistent with the institution's Regents-approved mission, roles, and goals. Institutional mission and roles may be found at higheredutah.org/policies/policy312/.

The AAS Controls Technology Program is consistent with WSU's mission statement to offer technical degrees. It also provides access to higher educational opportunities. Graduates of the Controls Technology program will contribute to the economic

level of the region and satisfy a growing need for degreed technicians who can support automated manufacturing facilities.

Section III: Needs Assessment

Program Rationale

Describe the institutional procedures used to arrive at a decision to offer the program. Briefly indicate why such a program should be initiated. State how the institution and the USHE benefit by offering the proposed program.

The institution's Engineering Technology program representatives met with an Industrial Advisory Board consisting of members from local industry. Recommendations from the advisory board have been implemented to develop a pathway for engineering technology students who are capable of designing, programming, and maintaining automated processes.

Labor Market Demand

Provide local, state, and/or national labor market data that speak to the need for this program. Occupational demand, wage, and number of annual openings information may be found at sources such as Utah DWS Occupation Information Data Viewer (jobs.utah.gov/jsp/wi/utalmis/gotoOccinfo.do) and the Occupation Outlook Handbook (www.bls.gov/oco).

A review of data from the Utah State Department of Workforce Services revealed the following labor market projections for occupations related to the program. This information is specific to the Ogden/Clearfield metropolitan area for the 2012 - 2022 time frame.

Occupational Group SOC Code Average Annual Growth Rate Annual Median Income

Electro/Mechanical Technicians, SOC Code 17-3024, projected average annual job growth 3.5%, estimated median annual compensation \$39,150

Mechanical Engineering Technicians, SOC Code 17-3027, projected average annual job growth 1.7%, estimated median annual compensation \$42,710

Industrial Machinery Mechanics, SOC Code 49-9041, projected average annual job growth 2.9%, estimated median annual compensation \$53,490

Student Demand

Provide evidence of student interest and demand that supports potential program enrollment. Use Appendix D to project five years' enrollments and graduates. Note: If the proposed program is an expansion of an existing program, present several years enrollment trends by headcount and/or by student credit hours that justify expansion.

Many current electrical engineering technology and manufacturing engineering technology students take additional courses in electronic technology disciplines to enhance their education. Some of these students have requested a cross-discipline program that would increase their marketability. Additionally, students from industry who possess certifications from ATCs and current ATC students are interested in obtaining a technical degree that will enable them to advance their careers.

Similar Programs

Are similar programs offered elsewhere in the USHE, the state, or Intermountain Region? If yes, identify the existing program(s) and cite justifications for why the Regents should approve another program of this type. How does the proposed program differ from or compliment similar program(s)?

Salt Lake Community College (SLCC) offers a Certificate and an AAS in Electrical Engineering Technology (EET) and a competency-based non-credit Electronics Technician certificate. Utah Valley University (UVU) offers an AAS in Mechatronics Technology and an AAS in Electrical Automation and Robotics Technology. Industrial companies in WSU's service area have

tried to recruit graduates to northern Utah but are unable to find enough qualified individuals due to high employment demand in Utah County and Salt Lake County. Weber State University's industry partners have recruited from out-of-state, but this is an expensive hiring approach and often results in low retention rates.

Collaboration with and Impact on Other USHE Institutions

Indicate if the program will be delivered outside of designated service area; provide justification. Service areas are defined in higheredutah.org/policies/policyr315/. Assess the impact the new program will have on other USHE institutions. Describe any discussions with other institutions pertaining to this program. Include any collaborative efforts that may have been proposed.

Chief academic officers as well as faculty in related departments from the Utah System of Higher Education institutions have reviewed the proposal and have provided input. Due to employment demand for individuals prepared in this discipline, it is believed that there will not be significant negative impacts to other USHE institutions. Faculty in the WSU EET program collaborated with SLCC faculty to establish an AAS EET degree at SLCC that mirrors Weber State's existing AAS EET program. This provides a pathway from SLCC for students that complete the AAS EET to pursue the BS EET at Weber State University. The Controls Technology degree is a collaboration with the ATCs and offers a pathway for students who complete the IAMT certificate at an ATC.

External Review and Accreditation

Indicate whether external consultants or, for a career and technical education program, program advisory committee were involved in the development of the proposed program. List the members of the external consultants or advisory committee and briefly describe their activities. If the program will seek special professional accreditation, project anticipated costs and a date for accreditation review.

The AAS Controls Technology program will not seek specialized program accreditation. Industry partners, advisory board committee members and ATC technical education partners were all involved in the development of the AAS Controls Technology degree. Additionally, several industry representatives provided the institution several letters of support for the program.

Section IV: Program Details

Graduation Standards and Number of Credits

Provide graduation standards. Provide justification if number of credit or clock hours exceeds credit limit for this program type described in R401-3.11, which can be found at higheredutah.org/policies/R401.

The AAS Controls Technology degree requires 69 total credit hours. Students must receive a C or better in all program required courses and complete all General Education requirements.

Admission Requirements

List admission requirements specific to the proposed program.

No special admission or application requirements are needed for the program.

Curriculum and Degree Map

Use the tables in Appendix A to provide a list of courses and Appendix B to provide a program Degree Map, also referred to as a graduation plan.

Section V: Institution, Faculty, and Staff Support

Institutional Readiness

How do existing administrative structures support the proposed program? Identify new organizational structures that may be needed to deliver the program. Will the proposed program impact the delivery of undergraduate and/or lower-division education? If yes, how?

The Engineering Technology Department is prepared to offer the Controls Technology program and all resources are currently in place. No additional courses or curriculum will need to be developed for the AAS degree except for adjustments to a couple of 4000 level courses that will be revised for delivery at the sophomore level. Credit for the IAMT certificate from the ATCs will be given toward the AAS Controls Technology degree. The IAMT certificate must include at least 900 hours of coursework offered by the ATCs which would be accepted as a block of 25 credit hours toward the AAS Controls Technology program.

The 900 hour ATC certification includes knowledge and skills in the following areas:

- Industrial safety
- Industrial automation
- Electrical motors
- Programmable Logic Controllers
- Fundamental Electronic Circuits
- Industrial Robotics
- Human Machine Interfaces
- Troubleshooting
- Soldering

The IAMT certificate provides an applied technical foundation for the AAS Controls Technology program.

The AAS Controls Technology degree includes 20 hours of coursework in Electronics Engineering Technology and Manufacturing Engineering Technology. Twenty-four credit hours in math and WSU general education requirements must also be fulfilled. With the block of 25 credit hours from the ATC certificate a total of 69 credit hours is required for degree completion.

It is expected that the AAS Controls Technology program will result in an increase in enrollment in the Electronics Engineering Technology program at WSU.

Faculty

Describe faculty development activities that will support this program. Will existing faculty/instructors, including teaching/graduate assistants, be sufficient to instruct the program or will additional faculty be recruited? If needed, provide plans and resources to secure qualified faculty. Use Appendix C to provide detail on faculty profiles and new hires.

No additional faculty will be required for the Controls Technology program. An increase in enrollment would be expected in the Electronics Engineering Technology courses.

Staff

Describe the staff development activities that will support this program. Will existing staff such as administrative, secretarial/clerical, laboratory aides, advisors, be sufficient to support the program or will additional staff need to be hired? Provide plans and resources to secure qualified staff, as needed.

No additional staff will be required for the Controls Technology program.

Student Advisement

Describe how students in the proposed program will be advised.

The Engineering Technology department has a dedicated advisor for all programs and a General Education advisor. Additionally, each program has a faculty advisor who meets with students once per year.

Library and Information Resources

Describe library resources required to offer the proposed program if any. List new library resources to be acquired.

No additional library resources will be required since all of the courses in the proposed program already exist at WSU.

Projected Enrollment and Finance

Use Appendix D to provide projected enrollment and information on related operating expenses and funding sources.

Section VI: Program Evaluation

Program Assessment

Identify program goals. Describe the system of assessment to be used to evaluate and develop the program.

The program educational goals for the AAS Controls Technology program are consistent with the goals of the Engineering Technology programs, to assure specifically that:

1. Graduates will receive an applications-oriented education and upon completion will be prepared to make significant contributions in technology-based career fields.
2. Graduates will demonstrate requisite technical skills for building, testing, operating, and maintaining automated and electronic systems.
3. Graduates will demonstrate their knowledge using oral, written, and graphical communications.
4. Graduates will have the abilities and skills to work in a variety of different industries and businesses including manufacturing, mechanical, electrical, architectural, and government.
5. Graduates will demonstrate a commitment to quality, ethics, service and continuous improvement in personal and professional situations.

The Program Educational Goals are generated by department faculty and reviewed by the Industry Advisory Committee. Only after approval by the Industry Advisory Committee are they formalized. They are then reviewed every other year and modified as needed to ensure they remain consistent with the institutional mission and industry and student needs.

Student Standards of Performance

List the standards, competencies, and marketable skills students will have achieved at the time of graduation. How and why were these standards and competencies chosen? Include formative and summative assessment measures to be used to determine student learning outcomes.

At the end of their study, Controls Technology students will have attained the ability to:

- apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities;
- apply a knowledge of mathematics, science, engineering, and technology to engineering technology

problems that require limited application of principles but extensive practical knowledge;

- conduct standard tests and measurements, and to conduct, analyze, and interpret experiments;
- function effectively as a member of a technical team;
- identify, analyze, and solve narrowly defined engineering technology problems;
- apply written, oral, and graphical communication in both technical and non-technical environments, and be able to identify and use appropriate technical literature;
- understand the need for and be able to engage in self-directed continuing professional development;
- address professional and ethical responsibilities, including a respect for diversity; and
- possess a commitment to quality, timeliness, and continuous improvement.

Although the Controls Technology program will not seek specialized accreditation, these goals were selected to remain compliant with the current ABET accreditation that the EET program possesses.

The Controls Technology program will use the following tools for assessment:

- Direct Assessment - course or program embedded assessment tools
- Course assignment, quiz, and exam scores - 70% or better is a passing grade
- Certifications
- Course Rubrics - used for student projects in project-based courses
- Indirect Assessment - program surveys and program reviews
- Industry Advisory Board - Annual industry advisory board review

Appendix A: Program Curriculum

List all courses, including new courses, to be offered in the proposed program by prefix, number, title, and credit hours (or credit equivalences). Indicate new courses with an X in the appropriate columns. The total number of credit hours should reflect the number of credits required to be awarded the degree.

For variable credits, please enter the minimum value in the table for credit hours. To explain variable credit in detail as well as any additional information, use the narrative box at the end of this appendix.

Course Number	NEW Course	Course Title	Credit Hours
General Education Courses (list specific courses if recommended for this program on Degree Map)			
General Education Credit Hour Sub-Total			
Required Courses			
EET 1130		Digital Systems	4
EET 1140		DC Circuits (note: EET 1110 prereq covered with IAMT Cert)	3
EET 2010		AC Circuits	3
EET 2120		Power and Motors	4
EET 2170		Industrial Controls	3
MFET 2XXX		Process Automation	1
MFET 2XXXL		Process Automation Lab	2
MFET 2410		Quality Concepts and Statistical Applications	3
MATH 1010		Intermediate Algebra	4
MATH 1060		Trigonometry	3
COMM HU2110		Intro to Interpersonal Communications	3
ECON SS1010		Econ as a Social Science	3
ENGL EN1010		Introductory College Writing	3
NTM 1701		Intro to Word Processing	1
NTM 1703		Intro to Spreadsheets	1
PHYS PS1010		Elementary Physics	3
Required Course Credit Hour Sub-Total			44
Elective Courses			
		Block of credit IAMT Certification Applied Technical College	25
Elective Credit Hour Sub-Total			25
Core Curriculum Credit Hour Sub-Total			69

Program Curriculum Narrative

Describe any variable credits. You may also include additional curriculum information.

The Controls Technology degree will accept a block of credit from the local ATCs for an Industrial Automation Maintenance Technician certificate that requires a minimum of 900 hours. The credits will be transferred to Weber State University as a block of 25 credit hours towards the AAS Controls Technology degree.

As part of the articulation agreement with the ATCs, the prerequisite EET 1110 will be covered in the block of transfer credits for the IAMT Certificate.

Degree Map

Degree maps pertain to undergraduate programs ONLY. Provide a degree map for proposed program. Degree Maps were approved by the State Board of Regents on July 17, 2014 as a degree completion measure. Degree maps or graduation plans are a suggested semester-by-semester class schedule that includes prefix, number, title, and semester hours. For more details see <http://higheredutah.org/pdf/agendas/201407/TAB%20A%202014-7-18.pdf> (Item #3).

Please cut-and-paste the degree map or manually enter the degree map in the table below.

First Year Fall	Cr. Hr.	First Year Spring	Cr. Hr.
EET 1130 Digital Systems	4	EET 1140 DC Circuits	3
MATH 1010 Intermediate Algebra	4	MATH 1060 Trigonometry	3
NTM 1701 Intro to Word Processing	1	NTM 1703 Intro to Spreadsheets	1
ECON SS1010 Econ as a Social Science	3	PHYS PS 1010 Elementary Physics	3
Total	12	Total	10
Second Year Fall	Cr. Hr.	Second Year Spring	Cr. Hr.
EET 2010 AC Circuits	3	MFET 2410 Quality Concepts and Stats	3
EET 2120 Power and Motors	4	COMM HU2110 Intro to Interpersonal Comm	3
EET 2170 Industrial Controls	3	MFET 2XXX Process Automation	1
		MFET 2XXXL Process Automation Lab	2
		ENGL EN1010 Introductory College Writing	3
Total	10	Total	12
Third Year Fall	Cr. Hr.	Third Year Spring	Cr. Hr.
Total		Total	
Fourth Year Fall	Cr. Hr.	Fourth Year Spring	Cr. Hr.
Total		Total	

Appendix D: Projected Program Participation and Finance

Part I.

Project the number of students who will be attracted to the proposed program as well as increased expenses, if any. Include new faculty & staff as described in Appendix C.

Three Year Projection: Program Participation and Department Budget						
	Year Preceding Implementation	New Program				
		Year 1	Year 2	Year 3	Year 4	Year 5
Student Data						
# of Majors in Department	80	100	120	120	120	120
# of Majors in Proposed Program(s)	////	6	8	10	12	12
# of Graduates from Department	12	12	12	14	14	14
# Graduates in New Program(s)	////	0	2	4	4	4
Department Financial Data						
	Department Budget					
	Year Preceding Implementation (Base Budget)	Year 1	Year 2	Year 3		
		Addition to Base Budget for New Program(s)	Addition to Base Budget for New Program(s)	Addition to Base Budget for New Program(s)		
<i>Project additional expenses associated with offering new program(s). Account for New Faculty as stated in Appendix C, "Faculty Projections."</i>						
EXPENSES – nature of additional costs required for proposed program(s)						
<i>List salary benefits for additional faculty/staff each year the positions will be filled. For example, if hiring faculty in year 2, include expense in years 2 and 3. List one-time operating expenses only in the year expended.</i>						
Personnel (Faculty & Staff Salary & Benefits)	\$1,138,685	\$0	\$0	\$0		
Operating Expenses (equipment, travel, resources)	\$50,000	\$200,000	\$0	\$0		
Other:	\$0	\$0	\$0	\$0		
TOTAL PROGRAM EXPENSES	////	\$200,000	\$0	\$0		
TOTAL EXPENSES	\$1,188,685	\$1,388,685	\$1,188,685	\$1,188,685		
FUNDING – source of funding to cover additional costs generated by proposed program(s)						
<i>Describe internal reallocation using Narrative 1 on the following page. Describe new sources of funding using Narrative 2.</i>						
Internal Reallocation	\$1,188,685					
Appropriation						
Special Legislative Appropriation						
Grants and Contracts		\$200,000				
Special Fees						
Tuition						
Differential Tuition (requires Regents approval)						
PROPOSED PROGRAM FUNDING	////	\$200,000	\$0	\$0		
TOTAL DEPARTMENT FUNDING	\$1,188,685	\$1,388,685	\$1,188,685	\$1,188,685		
Difference						
Funding - Expense	\$0	\$0	\$0	\$0		

Part II: Expense explanation

Expense Narrative

Describe expenses associated with the proposed program.

There are no new expenses associated with the AAS Controls Technology program. All courses are existing.

The \$200,000 expenditure in year 1 is anticipated funding from a Collaborative Department of Labor Proposal (see Revenue Narrative 2 below).

Part III: Describe funding sources

Revenue Narrative 1

Describe what internal reallocations, if applicable, are available and any impact to existing programs or services.

N/A

Revenue Narrative 2

Describe new funding sources and plans to acquire the funds.

The institution anticipates funding through a collaborative Department of Labor (DOL) proposal to purchase new automation equipment and provide training for faculty. The entire DOL proposal is around \$1.5 million, which includes funding for WSU, DATC, OWATC, and BATC.