

# CTE Program Narrative

**NAME OF COLLEGE:** San Joaquin Delta College

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**DATE:** 4/20/2016

**DIVISION:** Applied Science, Business, and Technology

**FACULTY:** Kamran Sedighi

**PROGRAM NAME:** Automation Technology - Mechatronics

**REASON FOR APPROVAL REQUEST (Check One):**

- New Program Proposal
- Program Revision Proposal (Substantial or TOP Code Changes)
- Locally Approved

**TYPE OF DEGREE:**

- Certificate of Achievement
- Associate of Arts
- Associate of Science
- Associate of Arts for Transfer
- Associate of Science for Transfer
- Other

**TRANSFER APPLICABILITY:** Yes  No

**ATTACHMENTS/INFORMATION REQUIRED:**

Labor/Job Market Data and Analysis  
Advisory Committee Meeting Minutes  
List of Advisory Committee Members  
Employer Survey, if applicable

## 1. Statement of Program Goals and Objectives

*Identify the goals and objectives of the program. For CTE programs, the statement must include the main competencies students will have achieved that are required for a specific occupation. The statement must, at a minimum, clearly indicate the specific occupations or fields the program will prepare students to enter and the basic occupational competencies students will acquire.*

*If the program is selective, describe relevant entry criteria and the selection process for admission to the program. Specify all mandatory fees that students will incur for the program aside from the ordinary course enrollment fee.*

The objective of this new degree is to offer students opportunities to gain skills and knowledge in robotics and automation (mechatronics) while preparing them to be critical thinkers, effective communicators, and have the knowledge of the multiple dimensions of the modern world. San Joaquin Delta College in partnership with local industries has developed an academic program that prepares the students for the Associate of Science (A.S.) Degree in Automation Technology - Mechatronics and aligns with industry standards and certifications. Industry recognized degrees provide measurable benefits to Automation Technician (Mechatronics) students and their potential employers.

## 2. Catalog Description

*Enter exactly as it will appear in the catalog, including program outcomes. The description must also*

- *Convey the certificate's goals(s) and objectives*
- *Provide an overview of the knowledge and skills that students who complete the requirements must demonstrate (student learning outcomes)*
- *List all prerequisite skills or enrollment limitations*
- *Mention any risks, such as occupations that are inherently competitive or low-salaried and/or occupational areas where inexperienced graduates are not generally hired.*
- *For CTE programs, the description must list the potential careers students may enter upon completion.*
- *Convey what the student may expect as an outcome*

*If applicable, reference accrediting and/or licensing standards. If there is a widely recognized certification provided by a professional association, specify whether the program will fully prepare completers for the recognized professional certification.*

This program will take the student through the major components of industrial robotics and automation. Electronics and electrical applications are covered to develop troubleshooting techniques. Robotics will provide familiarity with the basic movement and placement of equipment. An Electric Motors course is intended to provide experience with current drive systems. Programmable Logic Controllers will be covered to provide computer based control and programming. Through a selected progression of electronic, electrical, mechanical, and troubleshooting courses, the student will be able to function as an Electronics Automation Technician/Mechanic.

Program Learning Outcomes

1. Students will troubleshoot robotics circuits at 100% accuracy to industry standards.
2. Students will create a Ladder Logic Diagram to control a Programmable Logic Controller.
3. Students will construct and control a pick-and-place pneumatic system.

### 3. Program Requirements

The program requirements must be consistent with the catalog description. The number of units, specific course requirements and the sequence of the courses must be coherent, complete and appropriate. Display the program requirements in a table format that includes all courses required for completion of the program (core requirements and required or restricted electives), subtotal of core units, and total program units. For each course, indicate the course department number, course title, and unit value.

#### Display of Program Requirements

Core Courses	Title	Units
E-TECH 047	Introduction to Industrial Control Systems	3
ELECT 011	AC and DC Network Analysis	4
ELECT 012	Solid State Devices	4
ELECT 013A	Digital Logic, Circuits, and Systems	4
ELECT 014B	Advanced Electronics Troubleshooting	2.5
ELECT 017	Robotics / Automation Introduction	4
ELECT 018	Robotics / Automation /Mechatronics Systems	4
<b>Minimum Major Units Required</b>		<b>25.5</b>
<b>Local GE pattern</b>		<b>24.0</b>
<b>Elective Units</b>		<b>10.5</b>
<b>Minimum Units for the Degree</b>		<b>60.0</b>

#### Display of Proposed Sequence

Year 1, First Semester	Units
ELECT 011	4.0
ELECT 013A	4.0
GE	3.0
GE	3.0
<b>Total</b>	<b>14.0</b>

Year 1, Second Semester	Units
E-TECH 047	3.0
ELECT 012	4.0
GE	3.0
GE	3.0
<b>Total</b>	<b>13.0</b>

Summer Term	Units
GE	3.0

Year 2, First Semester	Units	Year 2, Second Semester	Units
ELECT 017	4.0	ELECT 014B	2.5
GE	3.0	ELECT 018	4.0
GE	3.0	Elective	4.0
GE	3.0	Elective	4.0
Elective	2.5		
<b>Total</b>	<b>15.5</b>	<b>Total</b>	<b>14.5</b>

	Major	GE	Elective
Year 1, Fall	8.0	6.0	
Year 1, Spring	7.0	6.0	
Summer Term		3.0	
Year 2, Fall	4.0	9.0	2.5
Year 2, Spring	6.5		8.0
<b>Total</b>	<b>25.5</b>	<b>24</b>	<b>10.5</b>

#### 4. Master Planning (Background and Rationale)

*Given the stated goals and objectives, address the role the proposed program will fulfill in the college’s mission and curriculum offerings. This discussion may include some history of the program proposal origins, a description of the program purpose, and/or the program’s relevancy for the region and college.*

*The proposal must demonstrate a need for the program that meets the stated goals and objectives in the region the college proposes to serve with the certificate. A proposed new certificate must not cause undue competition with an existing program at another college.*

*If any expenditures for facilities, equipment or library and learning resources are planned, please explain the specific needs in this section.*

*If the program is to be offered in close cooperation with one or more specific employers, a discussion of the relationship must be provided.*

The Mechatronics degree at San Joaquin Delta College centers on teaching students the major components of industrial robotics and automation as well as the general education requirements to create a well-rounded individual. The degree supports District Strategic Goal (#4) "... work with industry partners to enhance and reinvigorate CTE programs and offerings." The coursework provide the students with skills for entry level positions as Robotics and Automation Technicians and PLC programmers. Curriculum content is based on industry standards and skills that can be applied to any automation and mechatronic system. Students attain skills using state of the art equipment and trainers while working in real world case scenarios. Through a selected progression of electronics, electrical, mechanical, and troubleshooting courses, the student will be able to function as an Electronics and Automation Technician/Mechanic.

#### 5. Need for Program

##### a. Enrollment and Completer Projections

*Address and justify the number of projected students or “annual completers” to be awarded the certificate each year after the program is fully established.*

Course	Title	2013-2014		2014-2015	
		Annual Sections	Annual Enrollment Total	Annual Sections	Annual Enrollment Total
<b>CB01: Course Department Number</b>	<b>CB02: Course Title</b>				
ELECT 011	AC and DC Network Analysis	2	25	2	25
ELECT 012	Solid State Devices	1	10	1	10
E TECH 047	Introduction to Industrial Control Systems	1	10	1	10

ELECT 017	Robotics / Automation Introduction	2	25	2	25
ELECT 013A	Digital Logic, Circuits, and Systems	1	10	1	10
ELECT 014B	Advanced Electronics Troubleshooting	1	10	1	10
ELECT 018	Robotics / Automation /Mechatronics Systems	1	10	1	10

**Annual Completers – Projected: 2**

**b. Labor Market Information (LMI)**

*Summarize the Labor Market Information (LMI) and employment outlook (Including citation for the source of the data) for students exiting the program.*

*Enter table or chart as a separate attachment.*

See Supporting Documentation below

**c. Employer Survey (if applicable)**

*When strong LMI data is not available, an employer survey may be submitted. Provide a copy of the survey, including the number of those surveyed, number of responses, and a summary of the results. The survey must address the extent to which the proposed degree or certificate will be valued by employers.*

Not applicable

**6. Place of Program in Curriculum/Similar Programs**

*Review the college’s existing program inventory, then address the following questions:*

- *Do any active inventory records need to be made inactive or changed in connection with the approval or the proposed program? If yes, please specify.*
- *Does the program replace any existing program(s) on the college’s inventory? Provide relevant details if this program is related to the termination or scaling down of another program(s).*
- *What related programs are offered by the college?*

The proposed new degree enhances the existing Electronics Technology program with advanced courses. Currently there are no existing programs that address the specific needs of the Automation Maintenance Technician. This program will focus on those needs. Currently Industry and our advisory board is requesting us to develop robotics and automation maintenance technicians thus the need for this degree This is due to the fact that so many manufacturing companies exist in

central valley and their manufacturing lines are semi- or fully automated and thus qualified automation maintenance technicians are needed. A good percentage of workers and students are returning for these types of courses and certifications due to the industry need or to advance in their current jobs. The students are able to complete this degree within two years.

### 7. Similar Programs at Other Colleges in Service Area

*List similar programs offered at other colleges within the Central/Mother Lode Region that may be adversely impacted. Enter 'none' if there are no similar programs.*

College	Program
None	

## Supporting documentation required

### Labor Market Information

*In a separate attachment, provide current Labor Market Information showing that jobs are available for program completers within the local service area. Statewide or national LMI may be included as supplementary support but evidence of need in the specific college service area or region is also necessary.*

Based on data gathered from California Department of Education Labor Market Info web site (<https://www.labormarketinfo.edd.ca.gov/>) and MPICT labor reports there is a projected growth of Automation Maintenance Technician +18.5% for San Joaquin County by 2022. The message I receive from this data is that the employment of new Automation Technicians will increase with the growing number of manufacturing industries. Therefore, a new program that addresses the needs of Automation Industry is needed.

Employment Development Department		2012-2022 Occupational Employment Projections												
Labor Market Information Division		Stockton-Lodi Metropolitan Statistical Area												
Published: February 2015		(San Joaquin County)												
SOC Code*	Occupational Title	Estimated Employment 2012**	Projected Employment 2022	Numeric Change 2012-2022 [1]	Percent Change 2012-2022	Annual Average Percent Change	Average Annual Job Openings			2014 First Quarter Wages [5]		Education and Training Levels [7]		
							New Jobs [2]	Replacement Needs [3]	Total Jobs [4]	Median Hourly	Median Annual	Entry Level Education	Work Experience	On-the-Job Training
51-2022	Electrical and Electronic	110	130	20	18.2%	1.8%	2	1	3	\$13.38	\$27.830	7	None	ST OJT

### List of Members of Advisory Committee

*This list must include advisory committee member names, job titles, and affiliations.*

Sergio F. Calderon	Professor	San Joaquin Delta College
Gerardo Calderon	VP, Operations	San Joaquin Delta College
Jose Cazarez	Electronics Instructor	Modesto Junior College
Brad Martin	Design Supervisor	Lawrence Livermore National Laboratory
Gillian Murphy	Dean, Applied Science	San Joaquin Delta College
Sandra Nishimura	Instructor	Lincoln Tech Academy
Eric Saragoza	Instructor	Merlo Institute of Environmental Studies
Erick Schmig	Telecommunications Supervisor	Lawrence Livermore National Laboratory
Kamran Sedighi	Professor	San Joaquin Delta College
Tyler Sinclair	System Admin	OG Packing
David Tayco	Instructor	Weber Institute of Technology
Salvador Vargas	Dean, CTE and Workforce Development	San Joaquin Delta College

### **Recommendation of Advisory Committee (Meeting Minutes)**

*In a separate attachment, provide minutes of the advisory committee meetings at which the program was discussed and approved, with relevant areas highlighted, as well as a summary of the advisory committee recommendations.*

In advisory committee meetings, the Automation Technician (Mechatronics) Associate of Science Degree was discussed and was met with a positive response. The employers welcomed the idea because they will be able to hire our students, with the skills they are looking for.

See Minutes below



## Minutes

Electronics Technology / CISCO Academy		
3.5.2015	4:00 pm	Budd 221G
Meeting called by	Kamran Sedighi	
Type of meeting	Advisory Board Meeting	
Facilitator	Kamran Sedighi / Sergio Calderon	
Note taker	Sandra Nishimura	
Timekeeper	Kamran Sedighi	
Attendees	Sergio F. Calderon, Gerardo Calderon, Jose Cazarez, Brad Martin, Sandra Nishimura, Erick Schmig, Tyler Sinclair, David Tayco, Salvador Vargas	
Approve Min.		
10 min	Sergio F. Calderon	
Discussion	Board was asked to review and approve Minutes.	
Conclusions	Board approved Minutes as such.	
Action Items	Person Responsible	Deadline
Minutes approved	Salvador Vargas	
	Mark North	
New Certificates and Degree		
20 min	Kamran Sedighi / Sergio Calderon	
Discussion	Electronics Technology Certificate of Achievement / Automation Technician (Mechatronics) Certificate of Achievement / Automation Technology (Mechatronics) Associate of Science Degree	
	Gave Board a summary of the Electronics Technology Certificate that was updated and a new Certificate of Achievement and Associate of Science Degree in Automation Technology (Mechatronics) which will be in Fall 2016 Catalogue.	
Conclusions	Board approved Both Electronics Technology and the Automation Technician (Mechatronics) Certificates of Achievement as well as the Associate of Science Degree in Automation Technology (Mechatronics) by all members, Board indicated that new courses should be developed in Robotics and Automation to enhance students' skills.	

Action Items	Person Responsible	Deadline
Kamran acknowledged the need for these courses and will work with staff to develop	Kamran Sedighi	
<b>[Agenda Topic]</b>		
15 min	Tyler Sinclair	
Discussion	Both programs help student's success in the industrial maintenance industry as both Electronics and Automation work side by side. Purchase of new equipment and trainers to develop the program was strongly recommended by the board.	
Evan Stone indicated that the students with both skill sets are more valuable as both areas can be addressed rather than having two employees be dispatched to do the work. Jose Cazares indicated that additional equipment will benefit students and give them a more enhanced experience to integrate the work force.		
Dean Vargas explained how there is a need for a new type of employee that have skills in multiple disciplines such as welding, electronics, automation, machining, etc. and how new employers can train these new types of people much easier and faster. The entire board agreed.		
Conclusions	Both programs will be looked at and be modernized to keep up with industry request. Brad indicated that A well rounded ET can make a difference at Lawrence Livermore labs, yet they could not give us feedback on what are the exact needs.	
Action Items	Person Responsible	Deadline
Look at potential equipment that meet the needs of industry as Delta develops the new programs.	Kamran Sedighi Sergio F. Calderon	