

Wayne Community College
Program Review and Outcome Assessments, 2018-19

Institutional Goal 2: Ensure Program Excellence

Institutional Goal 3: Improve Student Success

Department Name: Mechatronics Engineering Technology

Mission/Purpose: The mission of the Mechatronics Engineering Technology Program is to prepare students to use basic engineering principles and technical skills in developing, integrating and testing automated, serve mechanical, and other electromechanical systems.

Degrees, Diplomas, and Certificates Offered: List all degrees, diplomas, and certificates offered.

Associate in Applied Science Degree-Mechatronics Engineering Technology (A40350)

Certificate in Mechatronics Engineering Technology Certificate

Describe how the program's mission aligns with the College's vision, mission, core values, and strategic goals.

The Mechatronics Engineering Technology Program endeavors to meet and/or exceed the education and didactics expected in our students by area manufacturing industry partners. Incorporating interpersonal associations as well as professional instruction we provide a gateway for our students into relationships with perspective employers. In recognition of our institutional open door policies, we welcome students at their various skill levels and provide the technical enhancement needed for them to become successful employees that will not only vital assets to employers but also to the communities in which they live.

Activities to ensure curriculum currency (2015-16; 2016-17; 2017-18)

List program curriculum changes, revisions, deletions in table.

Course Title	Date – Updated / Revised / Deleted
DFT 151 (changed to 2 nd semester); ELC 120 (changed to being offered 1 st semester)	Fall 2018
Added ECO 251 – Principles of Micro to 3 rd semester; Added ELC 117 Motors & Controls to 3 rd semester; Eliminated ELC 130 – Advanced Motors/Controls from 3 rd semester	Fall 2018
Eliminated ATR 218 – Work Cell Integration from 4 th semester; Eliminated ATR 280-Robotics Fundamentals from 4 th semester	Fall 2018
Added ATR 218 – Work Cell Integration to 4 th semester; added ELN 260 – Industrial Electronics to 4 th semester; added HYD 121 – Hydraulics / Pneumatics II to 4 th semester; added PCI 261 – Process Control with PLCs to 4 th semester	Fall 2018

Provide an overview of the significance of the program changes and improvements that occurred over the past three years

NA

Advisory Committee: dates, summary of minutes, activities (2015-16; 2016-17; 2017-18)

Summary of Advisory Committee Activities

Year	Meeting Dates	Recommendations / Activities
2015-16	12/12/2016	Review current curriculum
2016-17	12/6/2017	Explained curriculum changes coming 2018 Catalog
2017-18	04/19/2018	Changes in effect and addition of Tech Tuesdays for Night

Describe program's participation with Advisory Committee or external organizations that contribute to maintaining program relevance. *(File Advisory Committee Meeting Minutes for past three years in Program Review Attachment folder.)*

Our advisory board is generally made up of local employers that have hired our graduates. This allows us to receive direct feedback on the quality of our program, as well as changes that may need to be implemented. Former students are often invited, to give a critique of how well the classes prepared them for the job that they now hold.

Analysis of trends in the field or industry

Provide narrative for analysis of trends in the field. *(Are there jobs available for your students? Is there new technology/equipment that needs to be added to your program?)*

The job out-look for entry-level engineering technicians in our geographical area of influence is strong and shows no sign of slowing at this time. One of the most common comments made by our advisory board is the need for additional skilled employees to meet the demands of planned expansions and/or to maintain more advanced automated equipment. Another expressed need is for technicians that have the basic skills to replace those personnel that are retiring. Due to technological advancements, there is a vital need within the department for new equipment required to provide students with up to date training.

Faculty Profile

List of Faculty and Status (2015-16; 2016-17; 2017-18)

Faculty / Name	Full-Time / Part-Time
Carter, James	FT (2016/17)
Imes, Kelsie	FT (2015/16) (2016/17)
Keller, Kirk	FT (2015/16) (2016/17) (2017/18)
King, Todd	FT (2015/16) (2016/17) (2017/18)
Knotts, Stephen	FT (2015/16) (2016/17) (2017/18)
McArthur, Bobby	FT (2016/17) (2017/18)
Reese, Steven	FT (2015/16) (2016/17) (2017/18)
Wall, Angela	FT (2015/16) (2016/17)
Walters, Robert	PT (2015/16) (2016/17) (2017/18)
White, Ernie	FT (2015/16) (2016/17) (2017/18)

Have all the faculty credentials been verified? (Verify required documents are in personnel files.)

Yes, through pre-employment and SACSCOC process.

Faculty Contact and Credit Hours

Faculty / Name	Full-Time Part-Time	Summer 2015		Fall 2015		Spring 2016	
		Contact	Credit	Contact	Credit	Contact	Credit
Carter, Eddie	PT					10	15
Imes, Kelsie	PT	10	7	17	12	19	13
Keller, Kirk	FT	9	6	19	18	20	18
King, Todd	FT	14	8	11	8	11	7
Knotts, Stephen	FT	11	7	19	11	40	28
McArthur, Bobby	PT					3	9
Reese, Steven	FT	9	5	20	13	24	15
Wall, Angela	FT	4	2	24	14	18	19
Walters, Robert	PT			5	3	5	3

Faculty / Name	Full-Time Part-Time	Summer 2016		Fall 2016		Spring 2017	
		Contact	Credit	Contact	Credit	Contact	Credit
Carter, Eddie	FT	8	5	25	17	22	15
Imes, Kelsie	PT	5	3				
Keller, Kirk	FT	7	6	21	20	19	15
King, Todd	FT	7	4	14	8	8	5
Knotts, Stephen	FT	9	7	31	17	19	13
McArthur, Bobby	PT			4	2	18	11
Reese, Steven	FT	22	13	21	14	30	18
Walters, Robert	PT			5	3	5	3
White, Ernie	FT	3	3	8	6	5	3

Faculty / Name	Full-Time Part-Time	Summer 2017		Fall 2017		Spring 2018	
		Contact	Credit	Contact	Credit	Contact	Credit
Carter, Eddie	FT	8	5	21	15	26	18
Keller, Kirk	FT	8	5	21	20	1	1
King, Todd	FT	7	4	11	8	16	14
Knotts, Stephen	FT	15	10	18	11	19	13
McArthur, Bobby	FT			26	16	22	14
Reese, Steven	FT	5	3	31	19	24	16
Walters, Robert	PT			5	3	5	3
White, Ernie	FT	3	3	11	9	14	12

It should be noted that many of these instructors teach courses in Industrial Systems Technology, Mechanical Engineering Technology, and/or Mechatronics Engineering Technology, as some courses overlap and are part of the core requirements for each program.

Faculty Demographics (2015-16; 2016-17; 2017-18)

	# Employees	Avg. Years of Service	% of Classes Taught By
Full-Time	7	10	95%
Part-Time	3	17	5%

Provide narrative for adequacy of faculty numbers. (Do you have enough faculty to support your program?)

Currently with one full time instructor in Mechatronics in addition to other full time instructors teaching in common courses from other programs, there is adequate coverage at this time. Our part-time instructors are generally utilized for common departmental courses which give students a choice of sections which aids in student completion and retention. If student numbers increase beyond the safety limits for lab sections, an additional FT / PT instructor may be required

Professional development activities of faculty (2015-16; 2016-17; 2017-18)

Verify departmental professional development (PD) tracking logs are completed and filed in Program Review Professional Development folder.

PD tracking logs are contained in the Program Review Professional Development folder. The tracking logs have been verified.

Student Demographics

Gender (A40350) Unduplicated			
Academic Year	Female	Male	Total
2015-2016	5	21	26
2016-2017	3	29	32
2017-2018	1	23	24

Gender (C40350) Unduplicated			
Academic Year	Female	Male	Total
2015-2016	.	.	.
2016-2017	.	.	.
2017-2018	0	1	1

Ethnicity (A40350) Unduplicated							
Academic Year	American Indian	African American	Asian or Pacific Islander	Hispanic	Caucasian	Other / Unknown / Multiple	Total
2015-2016	0	5	0	6	15	0	26
2016-2017	0	8	0	8	16	0	32
2017-2018	0	5	0	5	13	1	24

Ethnicity (C40350) Unduplicated							
Academic Year	American Indian	African American	Asian or Pacific Islander	Hispanic	Caucasian	Other / Unknown / Multiple	Total
2015-2016	.	.	.	.	.	.	.
2016-2017	.	.	.	.	.	.	.
2017-2018	0	0	0	0	1	0	1

Age Groups (A40350) Unduplicated						
Academic Year	Under 18	18-24 years	25-34 years	35-44 years	45 and older	Total
2015-2016	0	11	9	3	3	26
2016-2017	0	8	13	6	5	32
2017-2018	0	6	9	6	3	24

Age Groups (C40350) Unduplicated						
Academic Year	Under 18	18-24 years	25-34 years	35-44 years	45 and older	Total
2015-2016	.	.	.	.	.	.
2016-2017	.	.	.	.	.	.
2017-2018	0	1	0	0	0	1

Provide narrative for analysis of student demographics. *(Are you satisfied with your program demographics? Do you have a diverse population of students?)*

Unfortunately, student demographics show racial and gender disparities typical of this career field.

Program Enrollment (Fall, Spring, Summer)

Program Enrollment (A40350) Unduplicated		
Year	Enrollment	3-Year Average
2015-16	26	.
2016-17	32	.
2017-18	24	27

Program Enrollment (C40350) Unduplicated		
Year	Enrollment	3-Year Average
2015-16	.	.
2016-17	.	.
2017-18	1	.

Provide narrative for analysis of program enrollment. *(Is enrollment increasing or decreasing? What possible reasons for increase/decrease? Describe how you plan to address program enrollment.)*

Enrollment has increased in the program, despite a strong job market that tends to depress retraining and enrollment. We are constantly searching for opportunities to recruit students and publicize our program. As these and new venues are found and evaluated, enrollment numbers should reflect the need in the job market

Program Outcomes

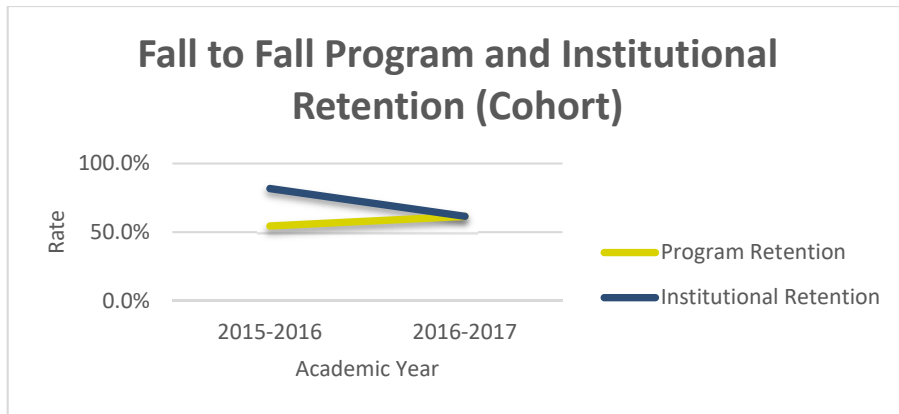
Retention

Baseline: 58% (Average of last two years –2015-16; 2016-17, fall-to-fall program retention)
Standard: 60%
Target: 62%

Data/Results:

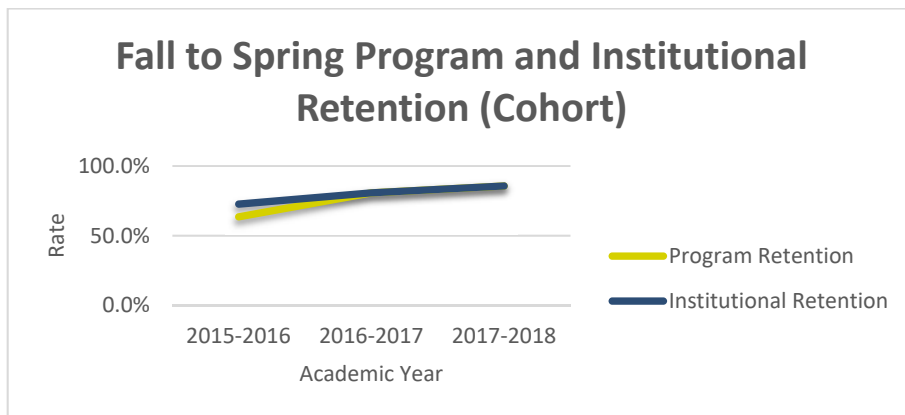
Fall-to-Fall

Year	Fall Enrollment	Grads	Return	Non-Completers	Program Retention	New Program	Institutional Retention
2014-2015							
2015-2016	11	0	6	2	54.5%	3	81.8%
2016-2017	26	5	11	10	61.5%	0	61.5%



Fall-to-Spring

Year	Fall Enrollment	Grads	Return	Non-Completers	Program Retention	New Program	Institutional Retention
2015-2016	11	0	7	3	63.6%	1	72.7%
2016-2017	26	0	21	5	80.8%	0	80.8%
2017-2018	21	0	18	3	85.7%	0	85.7%



Provide narrative for analysis of program retention. *(Based on the data, provide a narrative of your analysis of fall to fall retention. Indicate factors that may have affected your retention. State any changes you plan to address for next year that may affect / increase your retention.)*

Fall to Spring retention is well with in line with the Institutional retention rate. Fall to Fall retention is effected by some students accepting employment based on skills that they have acquired in their first year as well as having earned a program certificate. This speaks to the quality of our program, in that marketable skills are acquired early in the program allowing students to begin above average salaried employment. The advantages of program completion will be addressed in EGR-110, Introduction to Engineering, and emphasized in other classes, so that students may better weigh their options.

Provide narrative for analysis of standard/target. *(As a result of the data analysis, indicate changes to the standard or target. Did you meet your standard/target? If you met your standard/target, what percentage would you like to increase your standard/target? Please provide an overall analysis of the results of your standard/target. Provide percentage of increase/decrease.)*

Program retention standard and target as based on 2016-2018 data is reflective of early program success. As Mechatronics is a newly offered program, lower numbers are to be expected in early development. It is predictable that these numbers (as indicated) will begin to increase with the program popularity.

Completions

Baseline: 8 *(Average of last two years –2016-17; 2017-18)*
Standard: 10
Target: 12

Data/Results:

Number of Graduates (Completions) Unduplicated				
	Degree	Diploma	Certificate	Total
2015-16				
2016-17	5		1	6
2017-18	5		5	10

Provide narrative for analysis of completions. *(Are you satisfied with your completion rates? How might you increase your completion rates?)*

I would like to see a higher a completion rate and expect to see this as the program advances as a recognized innovative alternative to traditional fields of study in the engineering technologies. More in-depth informational and advising sessions will provide students with a richer understanding of completion requirements and provide incentive for program completion.

Provide narrative for analysis of standard/target. *(As a result of the data analysis, indicate changes to the standard or target. Did you meet your standard/target? If you met your standard/target, what percentage would you like to increase your standard/target? Please provide an overall analysis of the results of your standard/target. Provide percentage of increase/decrease.)*

New completion standard and target was set based on the two-year baseline data from 2016-17 and 2017-18.

Job Placement / Employment (to be provided by program)

Baseline: 118% (Average percent employed for the last two years –2016-17 and 2017-18)
Standard: 120%
Target: 125%

Data/Results:

Employment Demand						
Year	Graduates	# Employed (within 1 Yr)	# Seeking More Education (within 1 Yr)	% Employed & Seeking More Education	Unknown	Other/Comments
2015-16	0	0	0	0%		
2016-17	6	4	3	117%		
2017-18	10	5	7	120%		

Provide narrative for analysis of job placement rates. (Are students finding jobs within the program of study?) (How can your program promote higher employment of students in the field?)

At this point in time our program has no formal way of tracking student employment after graduation. This data is from informal student contact, but is believed to be accurate. All of our students that were actively seeking employment, were employed within a month of graduation.

Provide narrative for analysis of standard/target. (As a result of the data analysis, indicate changes to the standard or target. Did you meet your standard/target? If you met your standard/target, what percentage would you like to increase your standard/target? Please provide an overall analysis of the results of your standard/target. Provide percentage of increase/decrease.)

New employment demand standard and target was set based on the two-year baseline data from 2016-17, and 2017-18. Standard target was generally met and is a viable target to aspire to. At this point in time, with lower enrollment numbers, one person can greatly affect percentages.

Provide narrative for analysis of Labor Market Data. (Review Labor Market Data provided and provide an assessment of the data.)

The data points to a flat, or slight decline (-6% to -7%) in the jobs growth in the near future. This is contrary to what we are hearing from our advisory committee and local employers that we have visited. As local industries update and automate, they are actively seeking employees with the skills that our program provides.

Licensure and Certification Passing Rates (if applicable)

Baseline: XX% (Average of last three years; identify last three licensure years)
Standard: XX%
Target: XX%

Data/Results: *Not applicable to the Mechatronics Engineering Technology program.*

Licensure / Certification Exam – Title

Year	# Tested	% Passing
2010-11		
2012-13		
2013-14		
2014-15		
2015-16		
2016-17		

Provide narrative for analysis of licensure / certification passing rates. (Are you satisfied with your program licensure rates?)

Not applicable.

Provide narrative for analysis of standard/target. (As a result of the data analysis, indicate changes to the standard or target. Did you meet your standard/target? If you met your standard/target, what percentage would you like to increase your standard/target? Please provide an overall analysis of the results of your standard/target. Provide percentage of increase/decrease.)

Not applicable.

Third-Party Credentials (if applicable)

Baseline: 14 (Average number of completers for the last three years –2015-16, 2016-17, and 2017-18)
Standard: 18
Target: 22

Data/Results:

Third-Party Credentials

Year	Credentials for Program of Study	# Tested	# Completers
2015-16	16	16	16
2016-17	14	14	14
2017-18	12	12	12

Provide narrative for analysis of third-party credentials. (Are there other industry-recognized credentials that needs to be addressed for the program of study?) (What are other means to promote program third-party credentials?)

The FANUC Robotics certification course is required of all students enrolled in the program (including IST). Industry partners have expressed a need for collaborative robotics as well as welding robotics programs. Both of these will continue to be addressed through planning objectives.

Provide narrative for analysis of standard/target. (As a result of the data analysis, indicate changes to the standard or target. Did you meet your standard/target? If you met your standard/target, what percentage would you like to increase your standard/target? Please provide an overall analysis of the results of your standard/target. Provide percentage of increase/decrease.)

New third-party credential standard and target was set based on the three-year average (baseline).

Course Success

Analysis of student success in courses (2015-16; 2016-17; 2017-18)

Provide narrative for analysis of student success in courses. (Ex – Are more students successful in online courses versus traditional? Are students more successful in certain courses?)

Students have much better success in traditional or hybrid classes as opposed to online courses. In our program, students do better in courses with strong lab components.

Analysis of student success in distance learning courses (2015-16; 2016-17; 2017-18)

Course Success Rates by Method of Instruction				
Semester	Department	Course Number	% Success	Method of Instruction
2015-2016	Mechatronics	ATR-112		Hybrid
2016-2017	Mechatronics	ATR-112	92%	Hybrid
2017-2018	Mechatronics	ATR-112	88%	Hybrid
2015-2016	Mechatronics	EGR-285		Hybrid
2016-2017	Mechatronics	EGR-285	88%	Hybrid
2017-2018	Mechatronics	EGR-285	100%	Hybrid
2015-2016	Mechatronics	ELC-117		Hybrid
2016-2017	Mechatronics	ELC-117	96%	Hybrid
2017-2018	Mechatronics	ELC-117	84%	Hybrid
2015-2016	Mechatronics	ELC-213		Hybrid
2016-2017	Mechatronics	ELC-213	85%	Hybrid
2017-2018	Mechatronics	ELC-213	85%	Hybrid
2015-2016	Mechatronics	MEC-130	88%	Hybrid
2016-2017	Mechatronics	MEC-130	90%	Hybrid
2017-2018	Mechatronics	MEC-130	60%	Hybrid

Provide narrative for analysis of student success in distance learning courses. (Are distance education course success rates equivalent to the success rates for other methods of instruction?)

Distance Education students have a slightly lower success rate than traditional or hybrid courses. One of our main online course is offered during the summer semester, which could account for the lower success rate.

Analysis of Program Learning Outcomes (PLO) (2015-16; 2016-17; 2017-18)

- Document PLO cycle for the next four years (2018-19, 2019-20, 2020-21, and 2021-22) in the table below.
- File program learning outcome reports for the past three years (2015-16, 2016-17, and 2017-18) in the Program Review Attachment folder.
- Document changes to the program learning outcomes and/or assessment cycle.

Assessment Cycle	Program Learning Outcomes
2018-19	PLO 4 (collection and analysis SP2019)
2019-20	PLO 1 (collect in Spring and assess annually in the Summer)
2020-21	PLO 1 (collect in Spring and assess annually in the Summer)
2021-22	PLO 1 (collect in Spring and assess annually in the Summer)

Program Learning Outcomes for 2016/17 – 2017-18 /

The Mechatronics Program Learning Outcome sequence is going to be changed to a single Outcome that will be collected in the summer semester and assessed in the following summer semester.

Assessment will have a comprehensive approach to the following competencies:

- 1) Interpret technical drawings, schematics, and diagrams as they relate to automated process control systems.
- 2) Troubleshoot process control system components in an automated system.
- 3) Analyze the interaction between the various components of a system that could include fluid power, mechanical, servo, and electrical components to operate an automated system.
- 4) Analyze, construct and test automated systems including electronic sensors, mechanical actuators and computer control.
- 5) Fabricate and assemble mechanical/automated assemblies from technical drawings job specific tools.

Other Assessments**Analysis of graduate survey data (2015-16; 2016-17; 2017-18)**

Provide narrative for analysis of program-specific graduate survey data. *(What did you learn from the results? What did your graduates indicate needed to be revised within your program?)*

For the 2017 cross tab analysis, 100% of the students were either satisfied or very satisfied in the program specific questions. Due to the general nature of the graduate survey, useful program specific data is difficult to obtain.

Analysis of employer survey data (2015-16; 2016-17; 2017-18)

Provide narrative for analysis of program-specific employer survey data. *(What did employers indicate needs improvement within your program (equipment, facilities, and program offerings/certificates?)*

Employers requested an increased emphasis on basic hand tool use and identification. MEC-130 has expanded the hand tool training and safety to satisfy these expressed needs.

External Reviews

In addition to SACSCOC, is there an accrediting body specifically related to the program? If so, please name the professional organization, describe the program's current status, and most recent date of accreditation.

N/A

Resources**Program facilities - location and adequacy**

Provide narrative for program facilities adequacy and/or needs.

Program desperately needs more room. Hocutt 140 is used for four different labs, requiring equipment to be rearranged for each class. This uses instructional and lab time just to setup and reset the room. Hocutt 250 is also a multiuse room where students must store projects so that the space is available for another class. Course scheduling is also complicated by limited lab space.

Library resources

Provide narrative for program library resources. (Are library resources adequate for your program?)

Library resources are adequate for the program.

Planning Objectives (2015-16; 2016-17; 2017-18)

- Verify previous year's prioritized planning objectives end-of-year status reports are filed in Program Review Planning Objective EOY (End of Year) Status Reports folder.
- Provide a summary of planning objectives submitted for the last three years, including the use of results, of the planning objectives in the table provided.

Summary of Planning Objectives

Planning Year	Objective(s) Submitted	Use of Results
2015-16	FESTO MEC Labs	Extensively used in multiple classes
2016-17	FESTO MEC Lab expansion kits	Not Funded
2017-18	ABB Collaborative Robot	Not Funded

Overall analysis of the strengths of the program

Provide narrative for analysis of the strengths of the program.

The Mechatronics program has had excellent success in employment of our students. The basic skills that are learned in the program are in high demand. Program feedback, both formal and informal, from our local employers has been quite positive. Students are generally comfortable speaking with instructors about problems that may be interfering with their course work. Many times solutions can be found that allow the students to continue their educational goals.

Overall analysis of the weaknesses of the program

Provide narrative for analysis of the weaknesses of the program.

In an ever-changing technological landscape keeping up with the latest technology and trends is difficult. Proper utilization of new equipment is often hampered by the lack of space to properly instruct our students. Constant setup and tear down routines tax the time allotment of quality lab usage. Students are unable to

leave projects setup till next meeting, meaning they have to rebuild on every return to lab. Additional lab space would help to reduce this weakness.

Recommendations

- Complete 2018-2019 Program/Service Review/Outcome Assessment Recommendation Worksheet to address action items from program review and outcome analysis with target date; and methods to assess action items.
- File Review/Outcome and Assessment Recommendation Worksheet in Recommendation and Follow-Up folder.
- Recommendation follow-up reports to be addressed spring semester following review year (2019-20 and 2020-21).

Recommendations from Program Review and Outcome Assessments

Name of Program: Mechatronics Engineering Technologies

2018-2019 Program Review and Outcome Assessments Recommendations

(Address program outcome assessments that fall below the established standard and/or target and additional recommendations resulting from the review.)

Outcome <i>(Identify projected outcomes as a result of your program/service review.)</i>	Target Date <i>(Identify your projected target date for completion of action items.)</i>	Actions/strategies to achieve outcomes and how you will assess the action/strategy
Retention - Retention – Inform students of the benefits of staying in the program. Baseline = 58% Standard = 60% Target = 62%	Fall 2021	Dedicate part of EGR-110, Intro to Engineering Tech, to explain the benefits of program completion and how that will affect the students long term earnings goal. Spend time explaining the services available through WCC’s Student Services to make students are aware of available resources. We will then compare retention rates and assess this strategy.
Completions - Update certificates and add a diploma to the program to allow more paths to completion. Baseline = 8# Standard = 10# Target = 12#	Fall 2021	Program pathways have been updated and is being stressed to new or potential students. Evening classes are being offered geared toward specific certificates. We will review completion rates during the first two years of the change compared to the previous two years.
Job Placement - Continue visiting and speaking to area employers to strengthen the bond with WCC.	Ongoing	Visit local employers, as well as invite them to visit our labs and meet our students. Opening the lines of communication allows us to hear of job opportunities and builds trust,

Implement an Alumni Database to track student success. Baseline = 118% Standard = 120% Target = 125%	Spring 2019	when we recommend a student for employment. By being able to contact our alumni, we can get valuable feedback, as well having “a person inside” when facilities are searching for employees.
Licensure/Certification Passing Rates (if applicable) - Not applicable	N/A	N/A
Third-Party Credentials (if applicable) – Add new NC3 certificates as training and equipment become available. Baseline = 14# Standard = 18# Target = 22#	Fall 2021	Acquire applicable training equipment through the college’s planning & budget process and seek grant funding, as appropriate.

Approvals

- Using DocuSign (electronic signature), the Office of Institutional Effectiveness (IE) will review the Program/Service Review and Outcome Assessments when completed by the responsible program/service personnel. The Office of Institutional Effectiveness will forward the review documents to the appropriate administrator upon completion.
- Using DocuSign (electronic signature), appropriate Vice President/Associate Vice President is asked to review and approve the Service Review and Outcome Assessment and Recommendations as submitted.

IE Acceptance / Date: Dorothy Moore 6/8/2020

Administrator Approval / Date: Patty Pfeiffer 6/8/2020