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November 26, 2024

Dr. Sanjay Rai, Secretary
Maryland Higher Education Commission
6 North Liberty Street
Baltimore, MD 21201

Dear Dr. Rai:

Please accept this letter requesting a new degree program for **STEM Technology, Mechatronics Engineering Concentration, A.A.S.** We are requesting the approval of this degree to provide students with the engineering, electronic, and computing skills needed for contemporary careers in advanced automated manufacturing industries. STEM Technology A.A.S. in Mechatronics Engineering aligns with the mission of Wor-Wic Community College which is to offer "...high quality, affordable educational offerings, professional training, workforce development opportunities and comprehensive student services that strengthen economic growth and improve the quality of life on the Lower Eastern Shore." It also helps supports our vision that "Wor-Wic will be a dynamic leader partnering with the diverse communities of the Lower Eastern Shore to develop a world-class workforce and deliver excellence in education and training" in such areas of long-term growth with respect to the engineering technology and technician professions.

Check #0278678 was mailed on November 22, 2024, with a letter for the new program requested for Wor-Wic Community College. This letter, corresponding coversheet and proposed new program are being sent electronically.

Please contact me should you have any questions and/or need further information. Thank you for your time and consideration.

Sincerely,



Kristin L. Mallory, Ed.D.
Vice President for Academic Affairs



Office Use Only: PP#

**Cover Sheet for In-State Institutions
New Program or Substantial Modification to Existing Program**

Institution Submitting Proposal	Wor-Wic Community College
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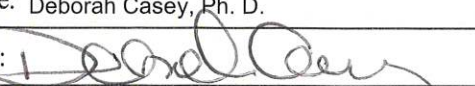
Each action below requires a separate proposal and cover sheet.

- | | |
|---|---|
| <input checked="" type="radio"/> New Academic Program | <input type="radio"/> Substantial Change to a Degree Program |
| <input type="radio"/> New Area of Concentration | <input type="radio"/> Substantial Change to an Area of Concentration |
| <input type="radio"/> New Degree Level Approval | <input type="radio"/> Substantial Change to a Certificate Program |
| <input type="radio"/> New Stand-Alone Certificate | <input type="radio"/> Cooperative Degree Program |
| <input type="radio"/> Off Campus Program | <input type="radio"/> Offer Program at Regional Higher Education Center |

Payment <input checked="" type="radio"/> Yes	Payment <input type="radio"/> No	STARS # 0278678	Payment Amount: \$850	Date Submitted: 11/26/24
Submitted: <input type="radio"/> No	Type: <input checked="" type="radio"/> Check	# 0278678		

Department Proposing Program	STEM		
Degree Level and Degree Type	AAS		
Title of Proposed Program	Mechatronics Engineering		
Total Number of Credits	61		
Suggested Codes	HEGIS: 5301.00	CIP: 15.0407	
Program Modality	<input checked="" type="radio"/> On-campus <input type="radio"/> Distance Education (fully online) <input type="radio"/> Both		
Program Resources	<input checked="" type="radio"/> Using Existing Resources <input type="radio"/> Requiring New Resources		
Projected Implementation Date <small>(must be 60 days from proposal submission as per COMAR 13B.02.03.03)</small>	<input checked="" type="radio"/> Fall <input type="radio"/> Spring <input type="radio"/> Summer Year: 2025		
Provide Link to Most Recent Academic Catalog	URL: http://catalog.worwic.edu		

Preferred Contact for this Proposal	Name:	Kristin L. Mallory, Ed.D.
	Title:	Vice President for Academic Affairs
	Phone:	(410) 334-2813
	Email:	kmallory@worwic.edu

President/Chief Executive	Type Name:	Deborah Casey, Ph. D.
	Signature:	 Date: 11/26/2024
	Date of Approval/Endorsement by Governing Board:	11/14/2024

Revised 1/2021

ACADEMIC PROGRAM PROPOSAL
STEM Technology, Mechatronics Engineering Concentration, A.A.S
Wor-Wic Community College

A. Centrality to Institutional Mission and Planning Priorities:

A.1. Description of program and how it relates to the institutional mission.

The STEM Technology, Mechatronics Engineering Concentration, A.A.S. is designed to provide students with the engineering, electronic, and computing skills needed for contemporary careers in advanced automated manufacturing industries. The expansion of our current STEM Transfer A.S. degrees to add a STEM Technology A.A.S. in Mechatronics Engineering degree aligns with the mission of Wor-Wic Community College which is to offer "...high quality, affordable educational offerings, professional training, workforce development opportunities and comprehensive student services that strengthen economic growth and improve the quality of life on the Lower Eastern Shore". Further, the proposed program supports our vision that "Wor-Wic will be a dynamic leader partnering with the diverse communities of the Lower Eastern Shore to develop a world-class workforce and deliver excellence in education and training".

A.2. How the proposed program supports the institution's strategic goals and evidence that affirms it is an institutional priority.

The Maryland Department of Labor predicts job openings and long-term projected growth in engineering technology and technician occupations (reference C.2.). The proposed program would support our current, five-year strategic plan (2022-2027) which identifies "delivering relevant courses and programs" as a priority.

Strategic Priority 3: Increase student success by expanding support services, delivering relevant courses and programs, and providing flexible scheduling.

Additionally, it is a strategic goal to "develop and implement ... strategies that support student and community needs".

Strategic Priority 1: Develop and implement enrollment, retention, and completion strategies to support student and community needs.

A.3. How the proposed program will be adequately funded for the first five years.

The proposed program includes preexisting coursework that is part of our STEM Transfer and Electro-Mechanical Technologies degrees. It may be offered without the addition of new full-time faculty and using our current physical facilities (see section L). Therefore, it is reliably sustainable using current budgetary support, current personnel, and existing infrastructure.

A.4. Description of institutional commitment to:

a) Ongoing administrative, financial, and technical support of the proposed program

The STEM Technology, Mechatronics Engineering Concentration, A.A.S. will be administered by the Mathematics and Science Department under the General Education Division with support from the Applied Technologies Department in the Occupational and Emerging Technologies Division. Under this organizational assignment, the department heads of these departments will provide direct supervision of the program curriculum, courses, part-time faculty selection and evaluation, budget management, program advisory committee, scheduling courses for each semester, and faculty teaching assignments.

b) Continuation of the program for a period of time sufficient to allow enrolled students to complete the program.

In situations when associate degree and certificate programs are suspended leading to terminating the program, Wor-Wic Community College requires department heads, with the assistance of their division dean, to develop teach-out plans. The teach-out plans to assist students to complete [graduate] the program who have completed at least 9 credits that are unique to the program. The teach-out plan includes a by-semester schedule listing when program specific courses will be available for student registration within the upcoming two years, and the list is communicated with enrolled students. Enrolled students also meet with a college advisor to review the student's transcripts to identify other associate degree and certificate programs that will allow the student to have the maximum number of completed courses for a program graduation.

B. Critical and Compelling Regional or Statewide Need as Identified in the State Plan:

B1. Demand and Need for Program Based on Societal Need

Community colleges, as open enrollment institutions with access to developmental education coursework designed to prepare students for college-level mathematics and English, are uniquely poised to provide minority and educationally disadvantaged students at institutions of higher education access to the jobs of the future. Given the increasingly automated nature of manufacturing, Mechatronics Engineering graduates will be well-positioned for entry into the contemporary workforce.

B2. Consistency with the Maryland State Plan for Postsecondary Education.

The Maryland Higher Education Commission, in the 2022 Maryland State Plan¹, identifies, as a major priority, "Priority 5: Maintain the commitment to high-quality postsecondary education in Maryland". The workforce and wage data (reference Section C) provide compelling evidence that there is positive projected growth and access to quality, high-paying careers.

¹ Maryland Higher Education Commission. (2022). 2022 Maryland State Plan for Higher Education. Retrieved from <https://mhec.maryland.gov/Pages/2022-MarylandStatePlan-MHEC.aspx>

The three primary goals for the postsecondary community in Maryland remain the same:

- **Access:** By providing both a STEM Transfer A.S. Engineering concentration degree and a STEM Technology A.A.S. Mechatronics Engineering concentration degree, Wor-Wic Community College ensures equitable access to affordable and high-quality postsecondary education for residents of the Eastern Shore of Maryland.
- **Success:** Wor-Wic Community College offers evidence of their commitment to practices and policies that will ensure student success as evidenced by the commitment to continuous improvement and rigorous assessment practices (reference Section G3) and by transparently providing comprehensive student and academic support services as evidenced on their website, in the catalog, and via the student portal (reference Section G8).
- **Innovation:** With the existing engineering mathematics and computer studies courses and the addition of electricity courses made possible by recent opening of the Guerrieri Technology Center (reference Section K1), Wor-Wic Community college has a demonstrated commitment to foster innovation through small class sizes, state-of-the art teaching laboratories and classrooms, and faculty who are both skilled and talented (reference Section I1).

C. Quantifiable and Reliable Evidence and Documentation of Market Supply and Demand in the Region and State:

C.1. Potential Industry or industries, employment opportunities, and expected level of entry for graduates of the proposed program.

The STEM Mechatronics Engineering A.A.S. at Wor-Wic Community College is designed to provide direct entry at the entry level in an occupation engineering technologist or technician position. The U.S. Bureau of Labor Statistics May 2023 report ² on Electro-mechanical and Mechatronics Technologists and Technicians identifies the following industries providing employment for Electro-mechanical and Mechatronics Technologists and Technicians.

- Architectural, Engineering, and Related Services
- Scientific Research and Development Services
- Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
- Semiconductor and Other Electronic Component Manufacturing
- Machinery Manufacturing

C.2. Data and analysis projecting market demand and the availability of openings in the job market to be served.

Employment opportunities for Mechatronics graduates are trending upward and are well compensated. Consider the following facts from the U.S. Bureau of Labor Statistics May 2023 report on Electro-mechanical and Mechatronics Technologists and Technicians.

- There were 15,360 jobs in Electro-mechanical and Mechatronics fields.
- The national average annual wage for these jobs was \$72,430.

² U.S. Bureau of Labor Statistics. (2023, May). Occupational Employment and Wage Statistics. Retrieved from [https://www.bls.gov/oes/current/oes173024.htm#\(3\)](https://www.bls.gov/oes/current/oes173024.htm#(3))

- The average annual wage in Maryland was \$84,960 and the Washington-Arlington-Alexandria, DC-VA-MD-WV metropolitan area was identified as the tenth highest paying metropolitan area for Electro-Mechanical and Mechatronics Technologists and Technicians.

C.3. Market surveys providing quantifiable and reliable data on the educational and training needs and the anticipated number of vacancies expected over the next five years.

In the state of Maryland, the Department of Labor³ has projected long-term positive growth (2022-2032) in Architecture and Engineering occupations (+8.43%). Openings for Engineering Technologists and Technicians are projected to increase 6.03%, producing a total of 2,515 job openings in the state.

C.4. Data showing current and projected supply of prospective graduates.

Data from the Maryland Higher Education Commission Enrollment report support the viability of this program at peer Maryland community colleges.

Institution	Program Name	CIP	Enrollment
Anne Arundel Community College	Mechatronics Technology	144201	38
Baltimore City Community College	Robotics/Mechatronics Technology	150405	12
Hagerstown Community College	Mechatronics and Industrial Technology	470105	7

Additionally, prospective students, on Wor-Wic Community College’s campus, include those who begin a STEM Transfer A.S. with a concentration in Engineering who do not continue or complete their degree program. From 2019 to 2024, 123 students, who began a STEM Transfer Engineering A.S. degree program, have changed their degree program (n=49) or become inactive (n=74). For those who changed their degree program, most choose General Studies Transfer A.S.

Students, who successfully complete EGR 101 Introduction to Engineering design, may begin experiencing difficulties in other coursework, particularly mathematics. The addition of a STEM Technology A.A.S. degree with a Mechatronics Engineering concentration provides a viable and achievable alternative pathway for students who are not successful in the advanced coursework of the STEM Engineering Transfer A.S. degree. The proposed program would provide an alternative for students who wish to change their degree (n=49) or a viable option for students who might otherwise become inactive (n=74).

D. Reasonableness of Program Duplication:

D.1. Similar Programs in the State

Anne Arundel Community College offers a program in Mechatronics Technology. Baltimore City Community College offers a program in Robotics/Mechatronics Technology. Hagerstown

³ Maryland Department of Labor. (2022). Maryland Occupational Projections 2022-2032 – Workforce Information and Performance. Retrieved from <https://mhec.maryland.gov/Pages/2022-MarylandStatePlan-MHEC.aspx>

Community College offers a program in Mechatronics and Industrial Technology. All three of these programs are A.A.S. degrees.

The Mechatronics Engineering A.A.S. at Wor-Wic Community college has similar general education requirements as existing programs at Anne Arundel Community College, Baltimore City Community College, and Hagerstown Community College. Additionally, all four programs share a similar mix of electrical, mechanical, and computing coursework designed to prepare students for careers in the automated manufacturing industry.

D.2. Justification for Proposed Program

The proposed program at Wor-Wic Community College would be the only such program on the Eastern Shore of Maryland, with the next closest institution—Anne Arundel Community College—almost 100 miles from the Lower Eastern Shore. Because the closest program is more than 50 miles from Wor-Wic’s campus, offering the Mechatronics Engineering A.A.S. at Wor-Wic will allow students in Wicomico, Somerset, and Worcester counties a more accessible and affordable option to study nearer to where they reside. The proposed Wor-Wic program also offers a more focused selection of coursework for students to meet program requirements and/or electives to help steer students toward program completion.

E. Relevance to High-demand Programs at Historically Black Institutions (HBIs)

The STEM Technology Associate of Applied Science prepares students to enter an occupation immediately after graduation. The University of Maryland Eastern Shore offers a Bachelor of Science in Engineering Technology with a concentration in Electrical/Electronics Engineering Technology which is a different pathway than the multidisciplinary Mechatronics Engineering pathway.

F. Relevance to the Identity of Historically Black Institutions (HBIs)

The STEM Technology A.A.S. with a concentration in Mechatronics Engineering will provide opportunities for all students to gain the knowledge and skills needed in the contemporary, automated workforce. There is no anticipated impact to the identity of Maryland’s HBIs.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes.

G.1. Establishment of Proposed Program and Faculty Who Will Oversee Program

The proposed program will expand the diversity of STEM offerings which are currently restricted to the STEM Transfer Associate of Science degrees and six areas of concentration. Program oversight will be by Dr. Stacey Hall, Department Head of Mathematics and Science and Dr. Patricia Riley, Dean of General Education.

G.2. Educational Objectives:

The STEM Technology, Mechatronics Engineering Concentration A.A.S. degree program concentration prepares students for entry-level mechatronics positions across various

industries, providing them with hands-on skills and knowledge in automation, robotics, and integrated industrial systems.

Graduates of the STEM Technology, Mechatronics Engineering Concentration AAS degree program will be able to:

1. Apply engineering design processes in developing solutions for business needs.
2. Design, program, and troubleshoot automated machines and robots for industrial applications.
3. Apply integrated skills in electrical, mechanical, and computer technologies to solve mechatronic system problems.
4. Conduct tests, analyze results, and improve processes in electromechanical systems and advanced manufacturing.
5. Communicate effectively in technical environments and work as part of teams.
6. Select, install, debug, and maintain equipment and software for industrial automation and robotics.

G.3. Assessment

a) Student Learning Outcomes

Wor-Wic Community College maintains academic policies and procedures in the college Policies and Procedures Manual (PPM) that are reviewed on a regular basis and revised as needed. In accordance with the PPM, academic programs/courses and faculty are reviewed and assessed annually in line with the student learning outcomes (SLOs). The standard benchmark for courses is a 70% pass rate with regard to course objectives tested at the end of semester final exam. In the department heads' annual program reports, plans of action are developed for the upcoming year to address steps of improvement when benchmarks are not met. The plans of action are reviewed, and updates are prepared twice during the upcoming year: at 6-months and 1-year intervals. Both the dean for the program's division and the Vice President for Academic Affairs prepares responses to the department heads' annual reports.

b) Program Learning Outcomes

Wor-Wic Community College has an extensive and thorough assessment plan that is managed by the Director of Institutional Assessment and Effectiveness. Under the Director, all courses and programs have annual reviews verifying that General Education objectives and student learning outcomes are met. Annually, department heads prepare reports on the status of the programs within the department, course assessments results, and action plans for the next academic year. All programs are reviewed on a five-year cycle.

G.4. Course list including title, semester credit hours and course descriptions, and program requirements.

**Associate of Applied Science STEM Technology
Mechatronics Engineering Concentration
Proposed Pathway**

<u>Summer Session II</u>		Credits
<input type="checkbox"/> SDV 100	Fundamentals of College Study	1
 FIRST YEAR		
<u>Fall Semester</u>		
<input type="checkbox"/> ENG 101*	Fundamentals of English I	3
<input type="checkbox"/> MTH 121*	Precalculus I	3
<input type="checkbox"/> CMP 115*	Fundamentals of Computer Architecture	4
<input type="checkbox"/> EGR 101*	Introduction to Engineering Design	3
<input type="checkbox"/> Elective	General Elective	<u>3</u>
		17
 <u>Spring Semester</u>		
<input type="checkbox"/> ENG 151*	Fundamentals of English II	3
<input type="checkbox"/> MTH 122*	Precalculus II	4
<input type="checkbox"/> CMP 150*	Introduction to Networking	4
<input type="checkbox"/> ELE 101	Principles of Electricity	<u>4</u>
		15/32
 SECOND YEAR		
<u>Fall Semester</u>		
<input type="checkbox"/> PHY 121*	General Physics I	4
<input type="checkbox"/> ELE 240	Robot I: Setup and Programming	3
<input type="checkbox"/> ELE 170	Industrial Controls	4
<input type="checkbox"/> GEN ED	Social/Behavioral Science Requirement	<u>3</u>
		14/46
 <u>Spring Semester</u>		
<input type="checkbox"/> PHY 122*	General Physics II	4
<input type="checkbox"/> COM 200*	Interpersonal Communication	3
<input type="checkbox"/> ELE 230*	Troubleshoot Electro-Mechanical Systems	4
 <input type="checkbox"/> ELE 245	 Robot II: Programming	 2
<input type="checkbox"/> Field Experience		<u>2</u>
		15/61

* This course has a prerequisite

Existing Coursework that will support the STEM Technology Mechatronics Engineering Concentration:

CMP 115 Fundamentals of Computer Architecture (4 Credits)

This course covers the basic organization and design of computers. Topics include the organization and function of central processing units (CPUs), memory, bus structures, input/output devices, operating systems, application software and networks. *Lecture Hours: 39. Laboratory Hours: 26. Laboratory Fee: \$25. Usually offered in the fall.*

CMP 150 Introduction to Networking (4 Credits)

This course provides a background to networks and how they are used. This course covers how local area networks (LANs) are managed, the types of LANs available today and the software that LANs use. Students are also introduced to the concepts of wide area networks. *Lecture Hours: 39. Laboratory Hours: 26. Prerequisite(s): CMP 115 with a grade of "C" or better. Laboratory Fee: \$25. Usually offered in the spring.*

EGR 101 Introduction to Engineering Design (3 Credits)

This course provides an overview and application of the basic tools and techniques of engineering design, including computer-aided design (CAD), data collection and analysis, engineering reports, spreadsheets and the use of software tools. *Lecture Hours: 26. Laboratory Hours: 26. Prerequisite(s): MTH 121 with a grade of "C" or better or an acceptable mathematics placement test score. Usually offered in the fall in even-numbered years.*

ELE 101 Principles of Electricity (4 Credits)

This course introduces the fundamental concept of electricity, including direct current (DC), voltage, power, resistance, inductance, and capacitance. The application of Ohm's law, network analysis and electrical measurement are stressed. Student are introduced to the operation of electric motors. *Lecture Hours: 39. Laboratory Hours: 26. Prerequisite(s): MTH 092 with a grade of "C" or better or an acceptable mathematics placement test score. Laboratory Fee: \$50. Usually offered in the spring.*

ELE 170 Industrial Controls (4 Credits)

This course covers AC and DC electric motors, motor performance measurement and manual motor starters; control transformers; basic control, reversing motor, sequence and timer circuits; magnetic motor control; and component-level and systems-level troubleshooting. *Lecture Hours: 26. Laboratory Hours: 52. Prerequisite(s): ELE 101. Laboratory Fee: \$50. Usually offered in the fall.*

ELE 230 Troubleshoot Electro-Mechanical Systems (4 Credits)

This course covers relay control, event sequencing, time-based sequencing, inductive, capacitive, magnetic reed, hall effect and photoelectric sensors and their applications. Examples of topics covered include how to manually override a solenoid-operated directional control valve, the operation of a limit switch in an event sequencing circuit, the function of a time-delay relay in time-driven sequencing, the operation of transistors used in electronic sensors, characteristics that affect capacitive proximity sensor operation, the operation of a magnetic reed switch, soldering and how to design a relay circuit that senses a web of material. *Lecture Hours: 26. Laboratory Hours: 52. Prerequisite(s): ELE 170. Laboratory Fee: \$50. Usually offered in the spring.*

ELE 240 Robot I: Setup and Programming (3 Credits)

This course introduces the student to robotic axes, movement control and navigating the teach pendant. Robotic frames and basic programming commands such as conditional branching and wait and call instructions are addressed. The tasks that an operator, technician, engineer or programmer needs to setup, record and/or troubleshoot programs are covered. *Lecture Hours: 13. Laboratory Hours: 39. Prerequisite(s): ELE 101. Laboratory Fee: \$50. Usually offered in the fall.*

ELE 245 Robot II: Programming (2 Credits)

This course covers the basic tasks and procedures required for an operator, technician, engineer or programmer to set up, teach, test and modify iRVision applications. Upon successful completion of this course, the student can identify the components of a vision system, install vision hardware, develop an application, program the robot, perform error recovery procedures and follow recommended safety practices. *Lecture Hours: 13. Laboratory Hours: 26. Prerequisite(s): ELE 240 or permission of the department head. Laboratory Fee: \$50. Usually offered in the spring.*

MTH 121 Precalculus I (3 Credits)

This course covers the advanced algebra necessary to prepare students for the study of calculus. Topics include solving, graphing and modeling with linear, quadratic, polynomial, rational, radical, exponential, logarithmic equations and inequalities. Systems of equations in two variables and operations with matrices are also included. *Lecture Hours: 39. Prerequisite(s): MTH 099 with a grade of "C" or better or an acceptable mathematics placement test score. Usually offered in the fall and spring.*

MTH 122 Precalculus II (4 Credits)

This course is a continuation of MTH 121. Trigonometry and advanced algebra are studied to prepare students for calculus. Trigonometric topics include angle measurement, definitions of the six trigonometric functions from the right triangle and unit circle perspectives, graphs, identities, inverses and equations. Algebraic topics include polar coordinates, parametric equations and a review of functions and graphs. A problem-solving approach utilizes applications and a graphing calculator throughout the course. *Lecture Hours: 52. Prerequisite(s): MTH 121 with a grade of "C" or better or an acceptable mathematics placement test score. Usually offered in the fall and spring.*

PHY 121 General Physics I (4 Credits)

This is the first part of a two-semester algebra-based course designed to introduce students to Newtonian mechanics and applications. Topics include kinematics, dynamics, gravitation, rotational motion, conservation laws, equilibrium and fluids. *Lecture Hours: 39. Laboratory Hours: 26. Prerequisite(s): MTH 121 with a grade of "C" or better or permission of the department head. Laboratory Fee: \$30. Usually offered in the fall.*

PHY 122 General Physics II (4 Credits)

This is the second part of a two-semester algebra-based course designed to introduce students to electricity and magnetism, wave motion, optics and selected topics in modern physics. *Lecture Hours: 39. Laboratory Hours: 26. Prerequisite(s): PHY 121 with a grade of "C" or better or permission of the department head. Laboratory Fee: \$30. Usually offered in the spring.*

G.5. General Education Requirements

SDV 100 – Fundamentals of College Study (1 credit) [Not a General Education core requirement, but a core course requirement at Wor-Wic Community College]

English and Composition Requirement:

ENG 101 – Fundamental of English I (3 credits)

Math Requirement:

STEM Technology

Mechatronics Engineering Area of Concentration: MTH 121 – Precalculus I (3 credits)

Biological/Physical Science Requirement (4 credits):

STEM Technology program

Mechatronics Engineering Area of Concentration:

PHY 121 – General Physics I (4 credits)

Arts and Humanities Requirement (3 credits):

ENG 151 – Fundamentals of English II (3 credits)

Social/Behavioral Science Requirement (3 credits): Choose from

ECO 120 – Survey of Economics (3 credits)

ECO 151 – Principles of Macroeconomics (3 credits)

ECO 201 – Principles of Microeconomics (3 credits)

GEO 102 – Human Geography (3 credits)

HIS 101 – World Civilization I (3 credits)

HIS 151 – World Civilizations II (3 credits)

HIS 151H – World Civilizations II, Honors (3 credits)

HIS 201 – American History I (3 credits)

POL 101 – American Government (3 credits)

PSY 101 – Introduction to Psychology (3 credits)

PSY 201 – Human Relations (3 credits)

SOC 101 – Introduction to Sociology (3 credits)

SOC 101H – Introduction to Sociology, Honors (3 credits)

Mechatronics Engineering Area of Concentration Courses:

*COM 200 – Interpersonal Communication (3 credits)

CMP 115 – Fundamentals of Computer Architecture (4 credits)

CMP 150 – Introduction to Networking (4 credits)

EGR 101 – Introduction to Engineering Design (4 credits)

ELE 101 – Principles of Electricity (4 credits)

ELE 170 – Industrial Controls (4 credits)

ELE 230 – Troubleshoot Electro-Mechanical Systems (4 credits)

ELE 240 – Robot I: Setup and Programming (3 credits)

ELE 245 – Robot II: Programming (2 credits)

*MTH 122 – Precalculus II (3 credits)

*PHY 122 – General Physics II (4 credits)

* Course meeting general education requirements

G.6. Specialized Accreditation

The Mechatronics Engineering AAS has no specialized accreditation or graduate certification requirements for the program or for the students.

G.7. Contracting with Another Institution or Non-Collegiate Organization

The Mechatronics Engineering AAS requires no contracting with another institution or non-collegiate organization.

G.8. Provide assurance and any appropriate evidence that the proposed program will provide students with clear, complete, and timely information on the curriculum, course and degree requirements, nature of faculty/student interaction, assumptions about technology competence and skills, technical equipment requirements, learning management system, availability of academic support services and financial aid resources, and costs and payment policies.

Wor-Wic Community College documents the curricula requirements for all programs in the annual college catalog. In addition to curricula, the program's learning objectives are also documented in the catalog along with each course description. Consistent with standard college catalog practices, the catalog includes the academic calendar, college admissions process and requirements, tuition and fees schedule, financial aid and loans process, student advisement and academic standards, and processes for student grievance and complaints. Current and past college catalogs are accessible on the Wor-Wic Community College website.

Wor-Wic students can find information about support services through three key channels. By exploring the college's website and its dedicated sections for student services, students can learn about academic advising, financial aid, mental health counseling, and career services. By visiting the Student Services office, students can access academic support, disability services, counseling, tutoring, mentorship, career planning assistance, and counseling, tutoring, mentorship, and career planning assistance. By utilizing online portals and tools, such as myWor-Wic, students can access student advising, financial aid, and disability and mental health support.

G.9. Advertising, Recruiting, and Admissions Materials

Wor-Wic Community College has processes in place to ensure accuracy of college advertisements, as well as recruitment and admissions materials. Once a new program is approved, it is entered into the college catalog, which is used as the basis for any program description, advertisement or publication. The department head for the program approves any information being disseminated before it is made public.

H. Adequacy of Articulation

The Mechatronics Engineering AAS is designed as an occupational degree. There are no programs at partner institutions (e.g. Salisbury University, University of Maryland Eastern Shore, University of Maryland College Park, etc.) that would support articulation.

I. Adequacy of Faculty Resources**I.1. Quality of Program Faculty and List of Faculty**

Faculty Member	Terminal Degree and Field	Full or Part-time	Rank/Title	Courses Taught
Mustapha Habibi	Ph.D. Physics	Full-time	Assistant Professor of Physical Science	PHY 121- General Physics I PHY 122- General Physics II
Joe Jimmerson	M.S. Aeronautic Science	Part-time	Instructor	EGR 101 Introduction to Engineering Design
Berrin Kilicarlan	Ph.D. Mathematics	Full-time	Associate Professor of Mathematics	MTH 121-Precalculus I
Kathie Noonan	Ed.S. Mathematics Education	Full-time	Associate Professor of Mathematics	MTH 122- Precalculus II
Joe Roche	M.Ed. Education	Full-time	Applied Technologies Department Head and Associate Professor of Trades	ELE 101-Principles of Electricity ELE 170-Industrial Controls ELE 230-Troubleshoot Elec-Mech Systems ELE 240-Robot I: Setup & Programming ELE 245-Robot II: Programming

I.2. Ongoing Pedagogy Training for Faculty in Evidence-Based Best Practices**a) Pedagogy that meets the needs of students**

Wor-Wic Community College supports faculty professional development and encourages faculty participation in professional growth activities, including workshops, webinars, and off-site training focused on current and relevant teaching topics and best practices, including enhancing accessibility for students with disabilities. The college fosters a collaborative environment that encourages innovation and excellence, allowing faculty to contribute significantly to student access and success as well as campus pedagogical development. Furthermore, faculty are involved in program development and creation of new opportunities, enhancing their expertise and dedication to discipline specific professional development.

Wor-Wic also offers faculty opportunities to apply for college and grant funds to offset the costs of additional professional development opportunities.

b) The learning management system (LMS)

Wor-Wic Community College has adopted Blackboard Learn—Ultra Experience for the college’s learning management system (LMS). Accessibility of courses is checked using Ally for Blackboard, which automatically checks for accessibility issues and generates accessible formats.

All faculty are required to use a class shell prepared for each class section. Faculty have preparatory access to class shells before the semester, providing them time and resources to create course syllabi and configure the online gradebook.

LMS training and support are provided by the Wor-Wic Distance Learning department. The department Instructional Technologist and Instructional Designer provide logistical and pedagogical support through regularly scheduled professional development opportunities and case-by-case trouble shooting.

c) Evidenced-based best practices for distance education, if distance education is offered.

Wor-Wic Community College is a member of Maryland Online (MOL), Quality Matters (QM), and Online Learning Consortium (OLC). Courses are designed with support from Learning Services, the Instructional Designer, and the Instructional Technologist. Online courses are evaluated and updated in line with Quality Online Instruction (QOI) standards.

J. Adequacy of Library Resources

The Wor-Wic Community College Library Resource Centers (LRC), located in Brunkhorst Hall, is a research facility supporting academic programs on and off campus. The LRC provides computer use on campus and 24/7 access to academic resources and digital collections through its website. The Director of Library Services coordinates the LRC and supervises the efforts of the librarian, assistant librarians, and library aides who provide research assistance, facilitate research workshops and student orientations, and maintain research guides for faculty and students. Library staff also assist with software access, document formatting, reference and citation usage, and interlibrary loan. Remote LRC services are provided via telephone, library email, and live chat sessions.

In addition to the Wor-Wic Community College LRC, current Wor-Wic students have access to the libraries at Salisbury University and the University of Maryland Eastern Shore. Both sites are traditional libraries with electronic and physical resources.

K. Adequacy of Physical Facilities, Infrastructure, and Instructional Equipment

K.1. Physical Facilities, Infrastructure, and Equipment Assurances

Wor-Wic Community College currently supports a STEM Transfer AS degree with six areas of concentration that include a broad offering of STEM coursework that ensures adequate physical facilities, infrastructure, and instructional equipment to support the existing mathematics and engineering courses. Our mathematics program is further supported by the Mathematics laboratory what provides students with access to computers and tutoring support.

Wor-Wic Community College has recently opened the Guerrieri Technology Center (GTC). The building contains an industrial and welding technology lab containing training equipment for Mechatronics Engineering Technology subjects and concepts. Equipment provided for the GTC Industrial Technology lab includes:

Amatrol Mechanical Drives, Laser Alignment, Portable Measuring, Amatrol T7017A AC/DC Electrical Learning System, Amatrol 85-MT5_Electric Motor Control Learning System, Amatrol 85 MT2 Basic Electrical Machines and Motor Troubleshooting Learning System, Amatrol 85-SN1 Sensor Technology Training System Module, 90-EC1A Electrical Relay Control Learning System, 850-MT6B Electrical Wiring Learning System, 85-MT6BA VFD-PLC Wiring Learning System add on to 850-MT6B, 85-MT6BB Industrial Soldering Learning System, Rigging equipment for lifting and equipment handling.
Amatrol Skills Boss for manufacturing and Skills Boss Logistics systems for teaching distribution and manufacturing processes, system operations, and maintenance concepts.
Amatrol Alternative Energy Learning System 850-AEC, 950-SPF1 Solar PV Installation, and 950-MPF1 Mechanical Fabrication Learning System.
Fanuc FENCELESS LR Mate 200iD articulating robot arm

K.2. Distance Education Assurances

To support distance education and off-campus access to college and class resources, Wor-Wic Community College provides students and faculty electronic credentials and log-in access to the college's myWor-Wic portal. The myWor-Wic portal connects students, faculty, and distance education staff to the Blackboard learning management system, an email account, electronic library resources, and registration information. Students who register for online scheduled class sections must complete a mandatory Blackboard tutorial and assessment before accessing course material. Faculty responsible for facilitating online learning and evaluating student success have access to effective support in course design and delivery and are supported in using the LMS through the office of Learning Services. Learning Services and Informational Technology collaborate to provide technological support to all faculty, students, and staff.

L. Adequacy of Financial Resources with Documentation

L.1. Table 1—Resources and Narrative Rationale

The STEM Technology AAS degree program Mechatronics Engineering concentration will attract a combination of full-time and part-time students. Future tuition and fees for each year are calculated at the rate of a 3% increase from the previous year’s tuition and fees.

TABLE 1: PROGRAM RESOURCES					
Resource Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Reallocated Funds	0	0	0	0	0
2. Tuition/Fee Revenue (c + g)	\$18,770.72	\$31,317.57	\$44,600.33	\$58,652.38	\$66,959.34
a. Number of F/T Students	3	5	7	9	10
b. Annual Tuition/Fee Rate	\$4499.04	\$4634.01	\$4773.03	\$4916.22	\$5063.71
c. Total F/T Revenue (a * b)	\$13,497.12	\$23,170.05	\$33,411.21	\$44,245.98	\$50,637.10
d. Number of P/T Students	4	6	8	10	11
e. Credit Hour Rate	\$164.80	\$169.74	\$174.83	\$180.08	\$185.48
f. Annual Credit Hour	8	8	8	8	8
g. Total P/T Revenue (d * e * f)	\$5,273.60	\$8,147.52	\$11,189.12	\$14,406.40	\$16,322.24
3. Grants, Contracts & Other External Sources	0	0	0	0	0
4. Other Sources	0	0	0	0	0
TOTAL (Add 1 – 4)	\$18,770.72	\$31,317.57	\$44,600.33	\$58,652.38	\$66,959.34

L.2. Table 2—Program Expenditures and Narrative Rationale

The courses in the program are required in other associate degree programs and are already assigned to existing full-time faculty. There are no anticipated program expenditures.

TABLE 2: EXPENDITURES					
Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Faculty (b + c below)	0	0	0	0	00
a. #FTE	0	0	0	0	0
b. Total salary	0	0	0	0	0
c. Total benefits	0	0	0	0	0
2. Admin. staff (b + c below)	0	0	0	0	0
a. #FTE	0	0	0	0	0
b. Total salary	0	0	0	0	0
c. Total benefits	0	0	0	0	0
3. Support staff (b + c below)	0	0	0	0	0
a. #FTE	0	0	0	0	0
b. Total salary	0	0	0	0	0
c. Total benefits	0	0	0	0	0
4. Equipment	0	0	0	0	0
5. Library	0	0	0	0	0
6. New or renovated space	0	0	0	0	0
7. Other expenses	0	0	0	0	0
TOTAL (Add 1 - 7)	0	0	0	0	0

M. Adequacy of Provisions for Evaluation of Program

M.1. Evaluation Procedures—Courses, Faculty, Student Learning Outcomes

In accordance with the Wor-Wic Community College's PPM, academic programs, courses and faculty are reviewed/assessed annually on the student learning outcomes (SLOs) which result from annual assessment activities. The standard benchmark for courses is a 70% pass rate for course objectives tested during the end of semester final exam. In the department heads' annual program reports, plans of action are developed for the upcoming year to address steps of improvement when benchmarks are not met. The plans of action are reviewed, and updates are prepared twice during the upcoming year: at 6-months and 1-year intervals. Both the dean for the program's division and the Vice President for Academic Affairs prepares responses to the department head's annual reports.

Part-time faculty members are evaluated by the department head and the evaluations include classroom observations as needed, as well as student input. Online surveys requesting the opinions of students are distributed at the end of each semester. The survey results are returned directly to the vice president for academic affairs, who provides each faculty member, the department head and dean with a compilation of the student surveys. Students enrolled in a new part-time faculty member's first semester of teaching receives an abbreviated survey at the midterm point of the semester and the survey results are returned directly to the faculty member, who submits a summary of these surveys to the dean and the vice president for academic affairs.

M.2. Evaluation of Proposed Program's Effectiveness

In accordance with Wor-Wic Community College's Assessment policies and procedures, all programs and courses are reviewed annually to validate the status with meeting objectives and outcomes. Department heads prepare annual reports on the successes, challenges, and achievements. Programs are also reviewed using a standard program review process every five years.

N. Consistency with the State's Minority Student Achievement Goals

Per Wor-Wic Community College's policies and procedures, the college has a standing Cultural Diversity committee consisting of representation from students, faculty, college staff and administrators. The committee is responsible for annually reviewing the Cultural Diversity Plan and scheduling events for the college community.

The Cultural Diversity Plan states: "Wor-Wic Community College is committed to a plan of cultural diversity that promotes inclusivity of diverse students and employees. The college has created a welcoming atmosphere on campus and has infused cultural diversity in all college programs, services, and communications. The college has demonstrated this commitment to cultural diversity through its vision, values, mission, and goals stated in the institutional strategic plan. The strategic plan of the college is in alignment with the diversity goals of the Maryland State Plan for Postsecondary Education, including implementation strategies and timelines for meeting the goals."

Wor-Wic's student body represents a wide array of diversity with 40 percent of the students identified as non-white. Wor-Wic exceeds the average of non-white residents in the service region, as 31.8% of the population identify as non-white in this area.

O. Relationship to Low Productivity Programs Identified by the Commission

The Mechatronics Engineering AAS is not related directly to an identified low productivity program.

P. Adequacy of Distance Education Programs

P.1. Provide affirmation and any appropriate evidence that the institution is eligible to provide Distance Education.

Wor-Wic Community College is eligible to provide Distance Education as described by the Middle States Commission on Higher Education (MSCHE) and has been approved to offer Distance Education by the Maryland Higher Education Commission (MHEC), according to the Commission's Institutional Approval to Offer Distance Education—COMAR 13B.02.03.22B (as of January 4, 2019).

P.2. Provide assurance and any appropriate evidence that the institution complies with the C-RAC guidelines, particularly as it relates to the proposed program.

Wor-Wic Community College is a participating member of The National Council for State Authorization Reciprocity Agreements (NC-SARA). According to the 22.1 Version of the SARA Policy Manual (June 27, 2022), "C-RAC Guidelines adopted by the Council of Regional Accrediting Commissions are incorporated in the requirements of SARA as policies." College compliance with C-RAC guidelines is overseen by the office of Learning Services.