ALLEGANY COLLEGE
of MARYLAND
OFFICE OF THE PRESIDENT

July 19, 2021

Dr. James D. Fielder Jr.
Secretary of Higher Education
Maryland Higher Education Commission
6 North Liberty Street
Baltimore, MD 21201

Dear Dr. Fielder:

Allegany College of Maryland respectfully requests approval of the following academic program action:

Creation of the new *Engineering — Automated Manufacturing Technology*, Associate of Applied Science, HEGIS XXXXXX, CIP 15.0613, effective fall, 2022.

Allegany College of Maryland is prepared to offer the new associate of applied science degree in collaboration with our current Automated Manufacturing program in Continuing Education. The AAS degree is designed to train students for entry-level positions as a skilled machinist and to be eligible for up to 14 certifications from the National Institute of Metalworking Skills (NIMS). The AAS curriculum has a total of 67 credits and provides the students with a firm foundation with 28 credits in General Education courses and 39 credits of discipline specific coursework that will provide the student with preparation for sitting for the 14 skill specific credentialing exams and one special merit certificate in CAD.

The new *Engineering — Automated Manufacturing Technology* degree will provide a seamless transition into the program from the local school system and out of the program into developed transfer agreements to four-year institutions. Additionally, graduates would be prepared for entrance into the workforce, meeting local and regional workforce needs.

The fee of $850 for the new academic program will be sent to the Maryland Higher Education Commission via U.S. mail.

CYNTHIA S. BAMBARA, PRESIDENT
301-784-5270 | 301-784-5050 (Fax) | cbambara@allegany.edu

Thank you in advance for your time and consideration of this request. Please contact Dr. Bill Rocks, Dean, Career education at 301-784-5567 or brocks@allegany.edu if you have any questions.

Sincerely,

Dr. Cynthia S. Bambara
President

cc: Dr. Emily A.A. Dow
Dr. Kurt Hoffman, Senior Vice President, Instructional and Student Services
Dr. William R. Rocks, Dean, Career Education

Office Use Only: PP#

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

Institution Submitting Proposal	Allegany College of Maryland

Each action below requires a separate proposal and cover sheet.

- (●) New Academic Program
- ( ) New Area of Concentration
- ( ) New Degree Level Approval
- ( ) New Stand-Alone Certificate
- ( ) Off Campus Program
- ( ) Substantial Change to a Degree Program
- ( ) Substantial Change to an Area of Concentration
- ( ) Substantial Change to a Certificate Program
- ( ) Cooperative Degree Program
- ( ) Offer Program at Regional Higher Education Center

Payment Submitted: (●) Yes ( ) No Payment Type: ( ) R*STARS # (●) Check # Payment Amount: $850 Date Submitted: 07/19/202

Department Proposing Program	Engineering (Proposed)
Degree Level and Degree Type	Associate of Applied Science
Title of Proposed Program	Engineering - Automated Manufacturing Technology
Total Number of Credits	67
Suggested Codes	HEGIS: CIP: 15.0613
Program Modality	(●) On-campus ( ) Distance Education (*fully online*)
Program Resources	(●) Using Existing Resources ( ) Requiring New Resources
Projected Implementation Date	(●) Fall ( ) Spring ( ) Summer Year: 2022
Provide Link to Most Recent Academic Catalog	URL: https://www.allegany.edu/
Preferred Contact for this Proposal	Name: Dr. William R. Rocks Title: Dean, Career Education Phone: (301) 784-5567 Email: brocks@allegany.edu
President/Chief Executive	Type Name: Dr. Cynthia S. Bambara Signature: Cynthia S. Bambara Date: 07/19/2021
	Date of Approval/Endorsement by Governing Board: 6-21-2021

Revised 1/2021

Associates in Applied Science (AAS) – Engineering - Automated Manufacturing Technology

A. Centrality to Institutional Mission and Planning Priorities:

1. Provide a description of the program, including each area of concentration (if applicable), and how it relates to the institution's approved mission.

Allegany College of Maryland's (ACM) mission focuses on the learning outcomes in training and education programs to foster regional economic development. Key components of ACM's mission statement are 1) "to promote a college that enhances lives and the community through education and service" and 2) "to develop the technical competence, knowledge and other essential skills that prepare students for direct entry into the workforce, for career change and advancement, or for transfer to another college or university." The Engineering AAS in Automated Manufacturing Technology addresses both of these outcomes by providing educational opportunities leading to workforce opportunities while supporting local and regional economic development.

Allegany College of Maryland established a Machine Tool Technology program in 2014 at the request of local employers (Alliant Techsystems now Northrop-Grumman, and National Jet, Inc.) Similar to many manufacturers nationwide, both companies knew they were facing the loss of all their skilled workforce due to attrition. The program was met with enthusiasm by both the public and local manufacturers and has expanded significantly in recent years.

There are numerous reasons that this proposed program is needed to address issues in our county: a local youth brain-drain, economic development issues, the outmigration of our local students, and the cost of higher education to citizens and return on their educational investment. The brain drain is real in our rural Appalachian community. Most of our students that are interested in Engineering are leaving the area immediately upon high school graduation. Bypassing our local higher educational institutions, students are earning their degrees and finding work elsewhere. They are not returning to our area to work and start a family. This outmigration of our most-promising youth also translates into an economic development issue for our county; namely a decreasing population, a reduced tax base, and a lack of a highly-educated available workforce for recruiting new businesses. The current program has also attracted the attention of current engineering students as well as the Engineering programs at Frostburg State University. According to the Manufacturing Institute Industry-based credentials embedded in manufacturing programs of study can serve as a powerful hook to attract students, win support from employers, and promote articulation and linkages across educational institutions. Formed in 1995 by the metalworking trade associations to develop and maintain a globally competitive workforce, NIMS sets skill standards for industry, certifies individual skills against the standards and accredits training programs that meet NIMS quality requirements. NIMS operates under rigorous and highly disciplined processes as the only developer of American National Standards for the nation's metalworking industry accredited by the American National Standards Institute (ANSI).

By providing these streamlined on and off ramps, ACM has developed a program to seamlessly move students from high school to 2- year college to 4-year institution. Our challenge as a college is to provide career pathways where students can enter and exit at various points having earned valuable credentials along the way even if life takes them in a different direction after they begin. ACM is already collaborating with both the Allegany County Public School System Center for Career and Technical Center as well as Frostburg State University.

Allegany County and the surrounding area is home to many such employers, including Northrup-Grumman, Hunter-Douglas, American Woodmark, National Jet, Berkley Springs Instrumentation, Schroeder Industries, Keystone Lime, Cintas, Barry Plastics, Garrett Container, Beitzel Corporation, RH Lapp, AES Warrior Run, Mount Savage Firebrick, Sierra Hygiene, MDL Manufacturing, Phoenix Technology, Pilgrim's Pride, Closet Maid, and AirCon Engineering.

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

"Allegany College of Maryland is a lifelong learning community dedicated to excellence in education and responsive to the changing needs of the communities we serve. Our focus is the preparation of individuals in mind, body, and spirit for lives of fulfillment, leadership, and service in a diverse and global society. We are committed to engaging students in rich and challenging learning opportunities within a small college atmosphere that is known for its personal touch".

The mission of Allegany College of Maryland is to deliver diverse and relevant education centered around student success in a supportive and engaging community. While the development of this program meets all the mission-based guiding principles of our mission, it especially develops the technical competence, knowledge, and other essential skills that prepare students for direct entry into the workforce, for career change and advancement, or to transfer to another college or university.

The Engineering AAS in Automated Manufacturing Technology was developed in collaboration with industry and business leaders through outreach practices and the formation program advisory and curriculum committees. The proposed AAS degree creates a professional career pathway leading to employment and sustainable wage both regionally and nationwide.

ACM's program instructional staff has significant experience in advanced manufacturing technologies. During the past year, ACM has hired additional instructors to support the expanding workforce development programs in machining, industrial maintenance technology, and welding. One of those full-time faculty members will become the program coordinator upon approval of the degree program.

ACM recently partnered with Allegany County Government in an initiative and has developed a state-of-art advanced manufacturing training center, Western Maryland Works, in nearby LaVale, Maryland. With this expansion, ACM Continuing Education and Workforce Development has worked diligently in the development of training programs leading to industry-recognized credentials in Machining, Industrial Maintenance Technology (Mechatronics), and Welding. In all, participants in these industry-approved training programs are able to earn the following credentials/certifications:

NIMS Machining Level I (13 credentials)
Measurement, Material, and Safety
Job Planning, Benchwork, and Layout
Drill Press I
Milling I
Turning Operations I (Between Centers)
Turning Operations I (Chucking)
Grinding I
Metalforming I
CNC Mill Programming Setup and Operation
CNC Mill Operation
Lathe Programming Setup and Operation
Lathe Operation
Certificate of Special Merit

NIMS Machining Level II (10 credentials)
Drill Press II
Milling II
Turning II (Between Centers)
Turning II (Chucking)
Grinding II (Cylindrical)
Grinding II (Surface)
CNC Mill II
CNC Lathe II

EDM II (2-Axis Wire)
EDM II (Plunge)

NIMS Industrial Maintenance Technology (9 credentials)
Maintenance Operations and Rigging Technology
Basic Mechanical Systems
Basic Hydraulic Systems
Basic Pneumatic Systems
Electrical Systems
Electronic Control Systems
Process Control Systems
Maintenance Piping
Maintenance Welding

AWS Welding
Shielded Metal Arc Welding
Metal Inert Gas (MIG)
Gas Tungsten Arc Welding (TIG)

ACM's Continuing Education and Workforce Development Department has purchased equipment and curriculum and has been able to significantly increase the number of students and participants in these training programs. In an ongoing effort to meet the needs of advanced manufactures in our region, ACM will be expanding certification to include the following:

Autodesk-Certified Associate
CAM 2.5 Axis Milling and Turning
Design and Drafting,
FANUC (NOCTI)- Certified Robot Operator
Operator 1
Operator 2
Technician 1
Technician 2
Stratasys-Professional Proficiency Certificate
Additive Manufacturing

3. Provide a brief narrative of how the proposed program will be adequately funded for at least the first five years of program implementation. (Additional related information is required in section L.

Funding to support instructional needs will be drawn from existing Continuing Education and Workforce Development budget and resources. Current administrative and technical support is available to implement and sustain the program. As indicated previously an industry-recognized credentialing workforce development program, instructional staff and state-of-art full-scale training equipment is already in place. ACM will utilize current operational budget for full and part-time instructional staff.

4. Provide a description of the institution's a commitment to:
a) ongoing administrative, financial, and technical support of the proposed program

ACM vigorously supports aligning academic programs to meet state and local workforce needs. This program will be administered through the Advanced Manufacturing Office of Continuing Education and Workforce Development Department. This department is fully integrated into college hierarchy and ACM is committed to the ongoing administrative, financial, and technical support for this degree program. This proposed program will report to the Senor Vice President of Instructional and Student Affairs and has the support of the President's Staff and the Board of Trustees.

The proposed AAS in Engineering-Automated Manufacturing Technology (ENGT) meets all three of the Maryland State Plan for Postsecondary Education.

Access: This program will allow for access at various levels of entry. Students who chose to only earn NIMS credentials can enter the program through our existing CE classes. Successful completion will allow them to secure a job as a machinist locally, regionally, or anywhere in the nation. NIMS is a nationally recognized certification and remove the guesswork from the human resource process. Additionally, students will also have the option to earn Robotics Certifications, Stratasys 3D Printing Certifications, and AutoCad Certifications. ACM is aligning the curriculum to the CCTE curriculum to ensure a seamless transfer from high school to ACM.

Success: By offering true stackable credentials while ensuring that statutes, regulations, policies, and practices that support the student are meeting the needs of both traditional and non-traditional, students are ensured of success.

Innovation: Embedding credentials within the curriculum while fostering the already existing partnership with Allegany County Public Schools and Frostburg State University is an innovative approach. In addition, because this program has experienced tremendous success in Workforce Development, partnerships with local and regional manufacturers is very strong.

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

General education, core, and non-credit workforce development courses are preexisting offerings. All college programs are assessed for viability based upon relevant content and applicability and enrollment trends. If a department decides to remove a credit program from the course catalog, all consideration will be made to ensure amble time to complete program requirements. We envision this program to be a long-standing and permanent program.

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

1. Demonstrate demand and need for the program in terms of meeting present and future needs of the region and the State in general based on one or more of the following:

a) The need for the advancement and evolution of knowledge

According the National Association of Manufacturers (NAM), nearly 12 million Americans (or 9% of the workforce) are employed directly in manufacturing. The industry is a strong job creator and generates jobs in other industries.

According to the Society of Manufacturing Engineers (SME), 9 out of 10 manufacturers are having difficulty finding skilled workers and indicate this trend has created a gap in the workforce. The same survey showed that not having access to a talented workforce is impacting production, quality, innovation and growth in the industry. According to SME, to close the workforce shortage gap the follow workforce development trends are occurring in the industry. (1) Manufacturing are taking ownership in training and development needs in finding and developing a strong pipeline of employees. (2) Partnerships with local academic institutions (Secondary and Post-Secondary) are pivotal to providing the sophisticated training and education programs. (3) Manufacturers want to know that an employee is able to apply the knowledge and skills through industry-recognized credentialing.

b) Societal needs, including expanding educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education

This degree program greatly expands learning opportunities for minorities, non-traditional (women), and economically disadvantaged students. The region has established advanced manufacturing employers seeking highly skilled workforce.

Maryland is a leading state in providing access to higher education to our residents through a variety of focused programs. The state has a fundamental commitment to equity, equality, and embracing diversity. *Allegany College of Maryland is also asking for state-wide designation for this degree.*

2. Provide evidence that the perceived need is consistent with the **Maryland State Plan for Postsecondary Education**.

a. Goal 1 – Access:

With nearly 60 associate degree, certificate and letter-of-recognition programs in career areas, *Allegany College of Maryland develops and delivers quality academic offerings, services and activities that are accessible, affordable and flexible to help students achieve their goals*.
The proposed degree is constructed for exceptional affordability. ACM tuition is $3,630 per year for in-district residents. The expense of this program is 6% less expensive than the average Maryland in-district tuition of $3,861 for 2-year colleges.

Nearly 90% of ACM students received grant aid in 2018/19. The average total aid amount was $5,121 (60% of students received aid in the form of Pell Grants from the U.S. Federal Government).

b. Goal 2 – Success

To support an environment that promotes quality teaching and learning is guiding principle at ACM. Furthermore, ACM delivers quality instruction, academic support and student services for all delivery methods.

The Pathways for Success Program at Allegany College of Maryland (ACM) is a TRiO Student Support Services project funded through a grant from the U.S. Department of Education. Program goals include increasing the retention, grade point average, graduation and transfer rates of first generation, income eligible students as well as those students with documented disabilities. In addition, transparent policies, admission and enrollment procedures, and wrap-around student support services. ACM is piloting Navigate which is a Student Success Software System that assists students and advisers with the most up-to-date about students' progress in their classes. Math tutors, the reading and writing center (RAWC), learning specialists are all available to promote the teaching and learning process.

Maryland is a leading state in providing access to higher education to our residents through a variety of focused programs. The state has a fundamental commitment to equity, equality, and embracing diversity.

c. Goal 3 – Innovation

Consistent with the Maryland State Plan, ACM continues to offer innovative training and education programs to increase employability of graduates within today's regional and global economy. Such as this proposed degree.

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

1. Describe potential industry or industries, employment opportunities, and expected level of entry (*ex: mid-level management*) for graduates of the proposed program.

Data illustrates a significant demand for highly-skilled advanced manufacturing workforce throughout the state of Maryland. In 2015 Maryland's 3,680 manufacturing businesses generated $20.2 billion in gross state product and employed more than 109,000 persons. The state supports numerous 21st century manufacturing industries.

Nevertheless, the State of Maryland, like the rest of the nation, has witnessed a dramatic change in the manufacturing industry. These changes are largely driven by technology. Modern factories have more automated and traditional manufacturing methods which have been replaced with cutting edge technologies yet, we need an educated workforce to operate the technology. A highly educated workforce enables Maryland's advanced manufacturing companies to innovate, develop, and produce in an automated manufacturing environment.

2. **Present data and analysis projecting market demand and the availability of openings in a job market to be served by the new program.**

Maryland Department of Labor Industry Projections for 2018-2020 indicate marginal growth in workforce demand for manufacturing; however, numerous areas in manufacturing are expected to grow. These areas include Electrical Equipment (1.36%), Petroleum and Coal Products (5.43%), Wood Product Manufacturing (2.54%), Furniture and Related Products (3.08%), Machinery Manufacturing (3.71%), Chemical Manufacturing (2.44%), and Computer/Electronic Product (1.71%).

Allegany County and the surrounding area is home to many such employers, including Northrup-Grumman, Hunter-Douglas, American Woodmark, National Jet, Berkley Springs Instrumentation, Schroeder Industries, Keystone Lime, Cintas, Barry Plastics, Garrett Container, Beitzel Corporation, RH Lapp, AES Warrior Run, Mount Savage Firebrick, Sierra Hygiene, MDL Manufacturing, Phoenix Technology, Pilgrim's Pride, Closet Maid, and AirCon Engineering. Based on our letters of support, there will continue to be a projected need.

3. **Discuss and provide evidence of market surveys that clearly provide quantifiable and reliable data on the educational and training needs and the anticipated number of vacancies expected over the next 5 years.**

Department of Labor data (O-Net) indicates Manufacturing Engineering/Technologists (17.3029.060) post-secondary requirements education (88%) with a median wage of $63,200 annual sectors in advanced manufacturing.

4. **Provide data showing the current and projected supply of prospective graduates.**

Department of Labor statistics (O-Net) indicates the State of Maryland has limited training programs for Manufacturing Engineering/Technologists (17.3029.060). Only five training programs with none currently located in the Western Maryland region. Annually, current programs graduate less than 50 students (two-year training program).

D. Reasonableness of Program Duplication:

1. Identify similar programs in the State and/or same geographical area. Discuss similarities and differences between the proposed program and others in the same degree to be awarded.

Institution	Program Name	Credential	Description	Key Differences
Community College of Baltimore County (CCBC)	Engineering Technology (Mechanical Engineering Technology Computer-Aided Design Concentration)	Associates of Applied Science	This AAS program is designed to prepare the student for an entry-level position in the engineering field, generally working under the direction of an engineer.	This program is well outside the region. The curriculum focus on Mechanical Engineering Principles.
	Computer-Aided Manufacturing (CNC Machinist, CNC Programming, Manual Machinist, Quality Assurance Technician)	Certificate	This certificate program is designed for entry-level position to manufacture parts from metal and plastics using saws, surface grinders, manual mills and lathes, and CNC machining centers and CNC lathes.	This program is well outside the region. The curriculum focus on focus is manufacturing. This program is very similar.
Hagerstown Community College	Mechanical Engineering Technology, Computer-Aided Design	Associates of Applied Science	This AAS program is designed for entry-level position in scientific, engineering, and technical skills necessary to function as a contributing member of the engineering team.	This program is greater than 60 miles from ACM. The curriculum focus on Mechanical Engineering Principles.

	Mechanical Engineering Technology, Computer-Aided Design	Certificate	This Certificate program is designed for entry-level career in construction, architecture, geo-spatial technologies, manufacturing, and other industries requiring computer-aided drafting and design skills.	This program is greater than 60 miles from ACM. The curriculum focus on Mechanical Engineering Principles.
	Advanced Manufacturing Systems	Associates of Applied Science	This AAS program is designed for entry-level position with a sequence of technical and manufacturing courses for students who are currently in, or plan to enter, today's advanced manufacturing environment	The curriculum focus on focus is manufacturing. This program is very similar.
Wor-Wic Community College	Engineering Technology, Drafting Concentration	Associate of Applied Science	This AAS program is designed for entry-level position and provides a comprehensive review of modern manufacturing techniques and processes.	This program is well outside the region. The curriculum focus on focus is manufacturing. This program is very similar.

2. Provide justification for the proposed program.

This new degree program will provide students the opportunity to prepare for highly-skilled careers with regional manufactures. ACM will be able to develop and sustain a pipeline of skilled technicians to industry partners around the county and beyond.

The Engineering in Automated Manufacturing Technology degree program aligns the program competencies with industry nomenclature and enables students to better identify the appropriate academic pathway needed to prepare for jobs in advanced manufacturing industries locally. All modifications have been developed intentionally and based on several important factors, including: 1) Expanding engineering technology career and technical education with options for local LEA articulation; 2) Increasing student engagement in STEM and advancing postsecondary opportunities for high school students; and 3) Creating a pathway to college as well as the workforce.

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

1. Discuss the program's potential impact on the implementation or maintenance of high-demand programs at HBI's.

The proposed degree program has no foreseeable impact, negatively or positively, on programs at HBI's.

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

1. Discuss the program's potential impact on the uniqueness and institutional identities and missions of HBIs.

Allegany College of Maryland is not aware any impacts to HBI's.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes (as outlined in COMAR 13B.02.03.10):

1. Describe how the proposed program was established, and also describe the faculty who will oversee the program.

This degree program was developed in collaboration with regional business partners and industry subject-matter experts. Coursework and curriculum design was developed in accordance with input from the initial Program Advisory Committee, the College's Curriculum Committee, review of other community college engineering programs, and information from four-year engineering programs. Full-time and Adjunct Faculty from the Engineering – Automated Manufacturing Department will oversee the applied associate degree.

2. Describe educational objectives and learning outcomes appropriate to the rigor, breadth, and (modality) of the program.

The Engineering-Automated Manufacturing Technology program is designed to prepare students with the opportunity for theory-based (knowledge) and performance-based (hands-on) experiences crucial to advanced and automated manufacturing processes. Through the integration of mathematics, robotics, metallurgy, manual tooling skills, programmable machinery applications, computer-assisted machining techniques and additive manufacturing, students can acquire the critical skills leading to successful employment. Students will be eligible for National certification based on industry-written, industry-approved standards.

Allegany College of Maryland's Engineering-Automated Manufacturing Technology Goals and Outcomes have been developed in conjunction with ACM's mission, vision, values and institutional priorities. Engineering-Automated Manufacturing Technology graduates of Allegany College of Maryland will be able to demonstrate proficiency at the time of graduation in each of the following Goals and Outcomes:

- An ability to identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics. (ACM GEN ED Goals – Written and Oral Communication, Scientific and Quantitative Reasoning, Critical Analysis and Reasoning, and Technological Competency)
- An ability to apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. (ACM GEN ED Goals – Written and Oral Communication, Scientific and Quantitative Reasoning, Critical Analysis and Reasoning, Technological Competency, and Personal and Civic Responsibility)
- An ability to communicate effectively with a range of audiences. (ACM GEN ED Goals – Written and Oral Communication, and Informational Literacy)
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. (ACM GEN ED Goals – Written and Oral Communication, Informational Literacy, and Personal and Civic Responsibilities)
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. (ACM GEN ED Goals – Written and Oral Communication, Technical Competency, Personal and Civic Responsibility, and Arts and Humanities Inquiry)
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions. (ACM GEN ED Goals – Written and Oral Communication, Scientific and Quantitative Reasoning, Critical Analysis and Reasoning, and Technical Competency)
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. (ACM GEN ED Goals – Written and Oral Communication, Scientific and Quantitative Reasoning, and Critical Analysis and Reasoning)

3. Explain how the institution will:
a) provide for assessment of student achievement of learning outcomes in the program
Student learning outcomes will be assessed utilizing the following:

- Summative Assessment – Summative assessment will be used to evaluate student learning at the end of an instructional unit by comparing it against a standard or benchmark. Summative assessments will include unit exams, midterm exam, final exam, creation of an artifact (performance based), hands-on demonstration (rubric driven), and industry-recognized examination.

- Formative Assessments – Formative assessments will be used to monitor student learning and provide ongoing feedback that can be used by instructors to improve their teaching and students to improve their learning. Formative assessments will include concept mapping, summarization of topics, comparison and contracting, and work layout.
- Industry-Recognized Credentials – Course specific credentialing is a vital component to the student learning and employment. Credentials are earned when both components of the credentials (theory & performance) have been completed, evaluated, and vetted.

b) document student achievement of learning outcomes in the program

Student Learning Outcomes (SLO) will be collected and documented using ACM's Learning Management System (LMS) which is Brightspace D2L.

4. Provide a list of courses with title, semester credit hours and course descriptions, along with a description of program requirements

<u>ENGT101: Machine Tool Applications, Material Handing/Fluid Power & Metallurgy (3 credits)</u>
This course will provide the theory and practical applications of projects using fundamental shop equipment such as manual mills, manual lathes, drill presses, surface grinders and CNC mills and lathes. Emphasis will be on shop safety, quality control, and safety. Students will also be introduced to the science of physical metallurgy and why certain metals exhibit their physical properties and their application to modern manufacturing and selection of metals.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Discuss the evolution of machining and machine tools.
- Discuss the principles of the basic types of machining processes.
- Define OSHA and NIOSH and describe their purpose.
- Identify appropriate PPE and proper housekeeping used in a machining environment.
- Identify guards and barriers, proper handling and lifting, and compressed air safety.
- Describe Lockout/tagout for equipment, hazardous materials and proper methods of labeling and documentation.
- Identify and demonstrate proper use of semi-precision calipers, squares, combination sets, protractors and semi-precision fixed gages.

- Identify and demonstrate proper use of precision measurement measuring tools including micrometer caliper, Vernier measuring tools, Vernier scales, bevel protractor, dial indicators, surface plate, optical comparator and coordinate measuring machine (CMM).
- Describe the difference between ferrous and nonferrous metals.
- Compare and contrast low, medium, and high-carbon steels.
- Define an alloy and an alloying element and the differences/similarities between steel and cast iron.
- Demonstrate understanding of the AISI/SE system of classification for steels and the UNS classification of carbon and alloy steels.
- Demonstrate understanding of AA/IADS classification of aluminum alloys.
- Identify UNS designations for stainless steels, cast iron, and nonferrous alloys.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level I - Measurement, Materials, and Safety.

ENGT102: Quality Control with Geometric Dimensions & Tolerances (3 credits)

This course will provide the proper use of modern precision measurement tools such as micrometers/calipers, surface plate work, laser micrometers, digital height gages and coordinate measuring machines (CMM) and the interpretation of the data obtained from their use. Use of these tools will ensure that machined parts are acceptable as defines by the GD&T documents. Hands-on skills competencies include the areas of reaming, sawing, threading, and safety. Blueprints are the universal form of communication in manufacturing plants and machine shops. Students will learn how to read and interpret blueprints and study different views of an object, including dimensioning techniques, tolerance methods and drawing notes.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Discuss the purpose of a process plan and describe its major parts.
- Define and discuss the purpose of quality control.
- Discuss the purpose of an inspection plan and describe its key points.
- Define Statistical Process Control (SPC) and its purpose.
- Identify and discuss the features of X-bar and R-charts.
- Explain the benefits of geometric tolerancing.
- Identify datum features and determine their order of precedence.
- Identify and interpret each of the characteristic symbols.
- Describe the material condition modifiers and how “bonus” tolerance occurs.

- Correctly interpret GD&T feature control frames, and explain the impact on manufacturing and inspection.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level I – Job Planning, Benchwork, and Layout

ENGT103: Mill Applications (3 credits)

This course will provide the basic theory and practical applications of basic metalworking. The class will emphasize manual mill applications, shop safety, and continue with material selection, job planning, benchwork, and layout. Tools used will include: Manual and CNC milling machines, drill presses, pedestal grinders, band saws, hand tools and measuring tools. Students will demonstrate the following competencies: Applied Math- IPR/IPM Calculations, SFM to RPM Conversion, use of Scientific Calculator; Cutting Tool Assembly – Fitting, Inspection of Cutters/Holders, Configuration of LOC and EOH; Cutting Tool Selection- Cutter Application, Features/Attributes, Manufacturers Technical Data References; GD&T- Datum Reference Frame, Degrees of Freedom, Feature Control Frame Geometric Control Symbols Geometric Tolerancing Categories, Characteristics and Zone Shapes; Inspection- Feature with/without Size Verification, Perpendicularity, Position, and Surface Finish Verification, Thread Gaging; Machine Maintenance – Coolants, Oils and Lubrications, Refractometer Readings; Machine Safety; Machining Applications- Counterboring, Countersinking Drilling, Reaming Tapping, Drilling, Face milling Peripheral Milling, Plunge Milling, Reaming, and Slot Milling; Material Preparations- Bar Stock Sizes, Butting Blanks, and Deburring; Measurements – Reading Micrometers, Reading Steel Rule, Reading Vernier Scales Use of Calipers, Dial Indicators, Drop Indicators, Micrometers, and Steel Rules; Operations – Deburring; Print Reading – Block Tolerances, Line Types and Conventions, Orthographic Projection, Surface Finish Requirements, Title Blocks and Revisions; Process Planning- Machines Selection and Configuration, Operation Sequencing, and Workholding Concepts/Devices and Setup- Aligning Cutters to center Punch, Mounting Stops, Moveable Vise-Jaw Adjustment, Aligning a Vise/Fixture, Establish XY Zero from a Hole, Establish XY Zero from Two Surfaces, and Tramming.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Identify the components of the vertical milling machine.
- Demonstrate proficiency in the complete process planning, basic manual milling machining applications, machine set ups, operations, inspection techniques and safety standards.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level I – Drill Press

- NIMS Machining Level I – Milling

ENGT104: Lathe Applications (3 credits)

This course will provide instruction on the theory and practical applications used to safely set up and operate manual metal turning engine lathes as well as an introduction into CNC lathes. Students will demonstrate the following competencies: Applied Mathematics- IPR Calculations, SFM to RPM Conversion, Cutting Tool Assembly- Fittings, Inspection of Cutters and Holders, Cutting Tool Selection- Cutter Applications, Cutter Features/Attributes, Manufacturers Technical Data References, GD&T, Inspection – Datum Reference Frame, Degrees of Freedom, Feature Control Frame, Geometric Control Symbols, Geometric Tolerancing Categories, Characteristics, and Shapes, Machine Maintenance- Coolants, Oils and Lubrications, Refractometer Readings, Machine Safety, Machining Applications- Facing Knurling, OD/ID Grooving, Threading, Turning, Material Preparation- Bar Stock Sizes, Sawing Blanks, Measurements- Reading Micrometers, Steel Rules, Vernier Scales, Use of Calipers, Dial Indicators, Drop Indicators, Micrometers, and Steel Rules, Operations- Deburring and Part Loading; Print Reading – Block Tolerances, Line Types, and Conventions, Orthographic Projection, Surface Finish Requirements, and Title Blocks and Revisions; Process Planning – Machine Configuration, and Selection; Operation Sequencing, Work holding Concepts; Setup- Mounting Chucks/Collets, Setting Tools Center and Diameter, Tailstock Alignment and Safety.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Demonstrate proficiency in the complete process planning, between centers applications, machine set ups, operations inspections techniques and safety standards.
- Demonstrate that the they have the skills and knowledge to complete process planning, basic chucking applications, machine set ups, operations, inspection techniques and safety standards.
- Demonstrate machining applications including: boring, drilling, facing, ID grooving, ID threading, OD Grooving, OD Threading, and OD Turning.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level I – Turning Operations (Between Centers)
- NIMS Machining Level I – Turning Operations (Chucking)

ENGT120: Introduction to Computerized Numeric Control (CNC) Programming and Machining (3 credits)

This course will provide an introduction to basic concepts of Computer Numerical Control (CNC) Machining practices and programming. Students will demonstrate that they are able to set and operate both a CNC Milling

Center as well as CNC Turning Center; maintain quality and safety standards, keep records, maintain equipment and supplies. Students will demonstrate the following competencies: Applied Math – IPM Calculations, Pythagorean Theorem, Right Angle Trigonometry, SFM to RPM Conversion, and Sign Numbers; Cutting Tool Assembly – Configuration (LOC and EOH), Holder Applications, Fitting, Inspection of Cutters and Holders; Cutting Tool Selection – Cutter Applications, Features/Attributes, Manufacturer's Technical Data References; GD&T – Data Reference Frame, Degrees of Freedom, Feature Control Frame, Geometric Control Symbols, Geometric Tolerancing Categories, Characteristics, and Zone Shapes; Inspection – Feature with/without Size Verification; Flatness Verification, Hole Gaging, Perpendicularity, Position, Profile of a Surface, and Surface Finish Verification; Machine Maintenance – Coolants, Oils and Lubrications, Refractometer Readings; Machining Applications – Drilling, Face Milling Peripheral Milling, Pocket Milling Reaming and Tapping.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Demonstrate the ability to setup and operate a CNC Milling Center; maintain quality and safety standards; keep records; maintain equipment and supplies.
- Demonstrate the ability to be able to setup and operate a CNC Turning Center; maintain quality and safety standards; keep records; maintain equipment and supplies.
- Demonstrate proficiency in Deburring, Fixture Offset Adjustments, Geometry Offset Adjustments, Machine Controls, Machine Startup and Shutdown, Machine Warm UP, Part Loading (Chuck/collet and vise/fixture), Work shift adjustments and Tool Height Offset Adjustments.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level I – CNC Milling: Programming Setup and Operations
- NIMS Machining Level I – CNC Turning: Programming Setup and Operations

ENGT220: Advanced Computerized Numeric Control (CNC) Programming and Machining (4 credits)

This course will provide theory and practice in CNC programming using G Code, Conversational and Computer Aided Design (CAD)/ Computer Aided Manufacturing (CAM) programming for two, three, and four-axis millings and turning Centers. Students will practice on a variety of machines. Students will demonstrate the following competencies: Applied Math – IPM Calculations, SFM to RPM Conversion, and Sign Numbers; Cutting Tool Assembly – Configuration (LOC and EOH), Holder Applications, Fitting, Inspection of Cutters and Holders; GD&T - Feature Control Frame, Geometric Control Symbols, Geometric Tolerancing Categories, Characteristics, and Zone Shapes; Inspection – Feature with/without Size Verification; Flatness Verification, Hole Gaging, Perpendicularity, Position, Profile of a Surface, and Surface Finish Verification; Machine Maintenance – Coolants, Oils and

Lubrications, Refractometer Readings; Machining Applications – Drilling, Face Milling Peripheral Milling, Pocket Milling Reaming and Tapping, Facing , and OD Turning.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Demonstrate proficiency at machining parts by operating a computer numerical control (CNC) machine; maintain quality and safety standards; keep records; maintain equipment and supplies; and perform routine preventative maintenance.
- Students will demonstrate and understanding of linear interpolation for CNC Milling and CNC turning.
- Define basic G and M codes for CNC turning and milling.
- Demonstrate understanding of radial and diametral programming.
- Demonstrate understanding of the principles of tool nose radius compensation for CNC Turning.
- Demonstrate the radius method for circular interpolation.
- Demonstrate understanding of two-dimensional CNC milling.
- Demonstrate understanding of drilling and tapping canned cycles for milling.
- Demonstrate understanding of cutter radius compensation (cutter comp) for milling.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level I – CNC Milling: Operator
- NIMS Machining Level I – CNC Lathe: Operator

ENGT201: Fixture Design and Fabrication (4 credits)

This course will provide hands-on design and fabrication techniques utilized to workholding fixtures and jigs to support and locate parts for various manufacturing processes such as machining, welding, painting, forming, inspection, assembling, and part locating. Machine tools and equipment used to produce fixturing are manual and CNC milling machines and turning center, 3D printers, and a variety of other machines. Students will be exposed to TIG (GTAW) welding and utilize CAD to design projects for 3D Printing.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Discuss design considerations in different cutting and forming tools.
- Discuss the analysis and design of the different dies, jigs and fixtures.
- Demonstrate basic welding techniques with exposure to TIG (GTAW) welding.
- Demonstrate the ability to utilize CAD to design projects for 3D printing.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level I – Metalforming
- Stratasys – Additive Manufacturing Certification

ENGT212: Electrical Discharge Machining (EDM) (3 credits)

This course will provide programming and operation of wire and ram-type electrical discharge machines (EDM). Small hole EDM, fine wire, and four-axis ram and wire operations. Applying EDM theory to produce specified surface finishes and accuracy. Upon completion, students will be given a print, process plan, select proper electrode material and produce electrode, select proper workholding devices, EDM fluids, and perform EDM operation called out on the process plan. Students will also perform the EDM operation on the 2-Axis Wire EDM given a print and process plan.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Interpret a print/process plan and select proper electrode material and produce electrode; workholding devices, EDM fluids, and plunge EDM machine and perform the EDM operation requested.
- Interpret a print/process plan, an appropriate selection of wire electrodes, workholding devices, EDM fluids, and 2 axis wire EDM machine, perform the EDM operation requested.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level II – EDM Plunge
- NIMS Machining Level II – EDM 2-Axis Wire

ENGT215: Abrasive Machining and Heat Treatment (3 credits)

This course will provide the theory and application of precision abrasive machining, including surface, form, cylindrical (ID/OD), and cutter grinding. Heat treating processes such as carburizing, hardening, tempering, and annealing will be performed on carbon and tool steels. Aluminum oxide, silicon carbide, cubic boron nitride, and diamond wheels are all used to finish projects. Topics will include Math -Pythagorean Theorem, Right Angle Trig, use of scientific calculator, Cutting Tools –Grinding Wheel Applications, features/Attributes and Nomenclature, Cutting Tool selection, GD&T-Datum Reference Frame, Degrees of Freedom, Feature Control Frame, Geometric Control Symbols, Geometric Tolerancing, Categories, characteristics, and zone shapes, Inspection- Angularity, Feature with and without Size, Perpendicularity, Position, Profile of a Surface, and Surface Finish Verification, Machine Maintenance- Coolants, Oils and Lubrications, Refractometer Readings, Safety, and Applications- Side and Surface Grinding, Operations – Part Loading and Wheel Dressing, Print Reading – Block Tolerance, Line Types and Conventions, Orthographic Projection, Surface Finish Requirements, Title Blocks and Revisions, Setup – Balancing and Mounting Grinding Wheels, and Mounting/Dressing Magnetic Chucks, and shop safety.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Demonstrate understanding of common heat treatment process and heat-treating equipment.
- Demonstrate understanding of Rockwell and Brinell hardness scales and compare and contrast testing methods.
- Demonstrate the skills and knowledge to successfully complete process planning, basic surface grinding applications, machine set ups, operations, inspection techniques and safety standards.

Students will be eligible to earn the following industry-recognized credential(s):

- NIMS Machining Level I – Grinding Skills
- NIMS Machining Level I – Certificate of Special Merit

ENGT110: Introduction to Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) (3 credits)

This course will provide the creation and interpretation of basic mechanical drawings using computer aided design (CAD) software. Emphasis on standard and geometric dimensioning and tolerancing (GD&T) drawing styles based on American Society of Mechanical Engineers (ASME) standards. Coursework includes use of

computer aided manufacturing (CAM) software to generate programs for computer numerical control (CNC) machine tools.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Model the different dies/cutting tools using solid modelling software.
- Understand the basic principles of CAD analysis.
- Create 2D and 3D computer drawings and models for manufacturing and prototyping.
- Evaluate computer aided design models and assemblies based on critical thinking and problem solving skills.
- Create prototypes using 3D printer.

Students will be eligible to earn the following industry-recognized credential(s):

- Autodesk – Certificate Associate in CAM 2.5 Axis Milling and Turning for Machinist

ENGT210: Advanced Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) (3 credits)

This course will provide the study of the design of part geometry and the generation of computer numerical control (CNC) code. Translation of part geometry to and from computer aided design (CAD)/computer aided manufacturing (CAM) systems. Manufacturing applications using CAM software to generate part programs for manufacturing. Applications include two-, three- and four-axis machining on vertical machining centers. Multi-axis turning, electrical discharge machining (EDM), and fabrication machinery are also studied.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Demonstrate proficiency in Autodesk software and the advanced features of CAD/CAM.
- Construct solid models, assemblies, and detail drawings using CAD program such as SolidWorks.
- Solve design problems in parts and assemblies at the intermediate level.
- Apply dimensioning and tolerancing techniques in order to complete technical drawings.
- Design and create 3D Solid Models using standard AutoCAD features.

Students will be eligible to earn the following industry-recognized credential(s):

- Autodesk – Certified Associate in AutoCAD for Design and Drafting

ENGT225: Robotics Material Handling and Automation or Manufacturing Capstone) (4 credits)

As more companies incorporate robotics into their operations, the demand for workers that can design, implement, and utilize industrial robots is increasing. This course will expose students to the latest automation technology while applying Science, Technology, Engineering and Math. This hands-on course will supply a basic understanding of robot operations and programming, material handling and its components. Students will become proficient in Robot Operations, frame setup, writing, modifying and executing basic programs, program offset, backup, restorations, creating and modifying simulations.

Students will be able to demonstrate proficiency at in each of the following goals and learning outcomes:

- Identify, formulate, and solve complex manufacturing engineering problems by applying principles of engineering, science, and mathematics.
- Apply manufacturing engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use manufacturing engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Demonstrate a basic understanding of robot operations and programming, material handling and its components, and introduction to Roboguide simulation software.
- Demonstrate how to write, modify, and execute basic programs, program offset, backup, and restorations.
- Create and modify simulations.
- Demonstrate an ability to set up, record and /or troubleshoot programs on a FANUC Robot using Handling Tool Software.

Students will be eligible to earn the following industry-recognized credential(s):

- FANUC – Certified Robot Operator 1
- FANUC – Certified Robot Operator 2

5. Discuss how general education requirements will be met, if applicable.

An Associate of Applied Science (AAS) degree program shall include not less than 20 semester hours of required General Education arts and sciences courses, with at least one three-credit course from each of the following five areas: arts and humanities, English composition, social and behavioral sciences, mathematics, and biological and physical sciences.

The Engineering in Automated Manufacturing Technology will include the following General Education courses:

Course	Description	Credits
COMP103: Computer Logic	Computer Science requirement, prerequisite for CNC programming (ENGT 120 & ENGT 220)	4
ENG101: Freshman English Composition	English requirement, prerequisite for ENG112: Business and Technical Communication	3
ENG112: Business and Technical Writing	English requirement	3
MATH120: Pre-Calculus II	Mathematics requirement, prerequisite for MATH201 Calculus I	4
MATH201: Calculus I	Mathematics requirement	4
PHYS101: Introductory Physics I	Biological Physical Science requirement	4
HUM110: Interdisciplinary Leadership I	Art and Humanities requirement	3
Or SPCH101: Speech Communication	Art and Humanities requirement	3
PSYC101: General Psychology	Social and Behavioral Science requirement	3
Or SOC101: Introduction to Sociology	Social and Behavioral Science requirement	3

6. Identify any specialized accreditation or graduate certification requirements for this program and its students.

Allegany College of Maryland is already an accredited National Institute of Metalworking Skills (NIMS) assessment and evaluation institute. ACM will be seeking accreditation in Autodesk CAD/CAM and Fanuc robotics to support this program. Students will be eligible for National certification based on industry-written, industry-approved standards through the National Institute of Metalworking Skills (NIMS). Rigorous and highly disciplined, NIMS credentials have been vetted in partnership with the American National Standards Institute (ANSI). NIMS credentialing opportunities throughout the coursework will include fourteen skill specific credentials and a special merit certificate. These credentials will include the following: (1) Measurement, Materials, and Safety, (2) Job Planning, Benchwork, and Layout, (3) Drill Press Skills I, (4) Manual Milling Skills I, (5) Turning Operations: Between Centers I, (6) Turning Operations: Chucking Skills I, (7) CNC Milling: Programming Setup & Operations, (8) CNC Milling: Operator, (9) CNC Turning: Programming Setup & Operations, (10) CNC Turning: Operator, (11) Metalforming, (12) Electrical Discharge Machining (EDM): Plunge, (13) Electrical Discharge Machining (EDM): 2-Axis Wire, (14) Grinding Skills I, and (15) NIMS Machining Certificate of Special Merit. Through coursework in computer-aided design/computer-aided manufacturing, students will be prepared to test for two additional industry credentials. Credentials include (1) the Associate in CAM 2.5 Axis Milling and Turning for Machinist and (2) the Associate in AutoCAD for Design and Drafting (150 hours of relevant Autodesk software experience is required for the Associate in AutoCAD). Students will be eligible for three additional certifications in automation and additive

manufacturing. These include the following: (1) FANUC Certified Robot Operator I, (2) FANUC Certified Robot Operator II, and (3) Stratasys Additive Manufacturing Certification. Successful completion of this career program of study qualifies a student to apply for an Associate of Applied Science in Engineering-Automated Manufacturing Technology.

7. **If contracting with another institution or non-collegiate organization, provide a copy of the written contract.** There are no contracts with other institutions associated with this program. ACM is accredited with NIMS and will be seeking accreditation with Autodesk and Stratasys in near future.

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.**

Allegany College of Maryland regards faculty interactions with the student body as paramount to academic success. All full-time faculty maintain designated office hours while courses are in session. Office hours are posted in the syllabus, on office doors and in the learning management system. Additionally, the Workforce Development and Continuing Education Department Advanced works closely with students to assist in designing individualized career pathways.

Assumptions about technology competence and skills and technical equipment requirements are identified in the course catalog, programs of study outline, and course descriptions.

All credit courses are required to use the integrated learning management system (LMS) to provide links to academic support services, financial aid resources, and college policies regarding tuition costs and payment options.

9. **Provide assurance and any appropriate evidence that advertising, recruiting, and admissions materials will clearly and accurately represent the proposed program and the services available.**

The Public Relations, Marketing, and Recruitment Offices generates promotional materials for academic and workforce development programs that are used in advertising, recruiting, and admission. The Marketing staff work closely with faculty and staff to ensure the accuracy of promotional materials. An annual review process of program brochures has been established to coincide with the release of each academic catalog, as well as a line of communication for any programmatic changes that may occur outside of the annual review cycle.

H. Adequacy of Articulation

1. **If applicable, discuss how the program supports articulation with programs at partner institutions. Provide all relevant articulation agreements.**

At this time, the Engineering in Automated Manufacturing Technology degree does not articulate. However, ACM will be seeking articulation to various regional colleges and universities.

I. Adequacy of Faculty Resources (as outlined in COMAR 13B.02.03.11).

1. **Provide a brief narrative demonstrating the quality of program faculty. Include a summary list of faculty with appointment type, terminal degree title and field, academic title/rank, status (full-time, part-time, adjunct) and the course(s) each faulty member will teach in the proposed program.**

Allegany College of Maryland employs highly qualified faculty and staff in all disciplines. Additionally, through the Center for Excellence in Teaching and Learning (CETL), the College offers comprehensive professional development and training for all who are engaged in the teaching and learning process.

"The Center for Excellence in Teaching and Learning (CETL) promotes research based pedagogies that foster student academic engagement, learning, and success. CETL supports the integrated professional development of students, faculty, and administrators throughout their careers. Rooted in learning science and assessment theory, CETL cultivates a data-driven campus-wide culture of ongoing academic program enhancement."

Faculty Member	Credentials	Status	Course Taught
Robert Prosser	NTMA Tool, Die, & Gauge Maker Advanced Teaching Certificate with Allegany County Public Schools as an Engineering and Industrial Manufacturing Instructor. Various Specialized Manufacturing Certifications from Industry, UMBC, RCBI, etc.	Part-Time	ENGT101 Machine Tool Applications, Material Handling/Fluid Power & Metallurgy ENGT102 Quality Control with GD&T ENGT110 Intro to CAM/CAM ENGT103 Mill Applications ENGT104 Lathe Applications ENGT120 Intro to CNC ENGT210 ADV CAD/CAM ENGT201 Fixture Design & Fab ENGT 220 ADV CNC ENGT212 Elec. Discharge Mach. ENGT225 Robotics Material Handling
John Bone	BIT; MED, Associate Professor, Program Director-MultiMedia Technology	Full-Time	ENGT201 Fixture Design & Fabrication (3D Printing)
David Smarik	MEd; BS Physics/Mathematics	FT	MATH 120 Pre-Calculus MATH201 Calculus PHYS101 Introductory Physics
Various FT/Adjuncts	Appropriate credentials	FT/PT	General Education

2. Demonstrate how the institution will provide ongoing pedagogy training for faculty in evidenced-based best practices, including training in:

a) Pedagogy that meets the needs of the students

Allegany College of Maryland provides professional development for faculty and staff in evidence-based teaching and learning practices. Professional development is provided in a variety of formats including face-to-face workshops, online and/or hybrid courses, and focused professional workshops.

Allegany College of Maryland faculty development is designed to deepen the faculty member's understanding of instructional strategies that lead to evidence-based learning experiences for all students. Faculty are provided with formal and informal opportunities to collaborate with colleagues and learn in job embedded contexts for both discipline and course specific curriculum and content.

b) The learning management system

ACM has recently adapted the D2L Brightspace learning management system for all courses. ACM further provides detailed training for learning management system use. When ACM switched from Blackboard to D2L Brightspace. The College provided near seamless transition to the new LMS. This included in person trainings, online training, appointment of faculty learning ambassadors, one of which was assigned to each faculty member. Additionally, our onsite LMS technical support service, eLets, provides concierge service tailored to each individual's needs. Finally,

ACM offers training through eLets for distance education courses. Any course that is offered through distance education is required to go through training and regular review.

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

All coursework in the proposal are face-to-face classroom/lab instruction. Instructional staff will work in collaboration to develop courses and instructional strategies that adhere to best practices for distance learning if/when applicable.

J. Adequacy of Library Resources (as outlined in COMAR 13B.02.03.12)**.**

1. Describe the library resources available and/or the measures to be taken to ensure resources are adequate to support the proposed program.

The current library holdings are appropriate to meet the needs of the Engineering – Automated Manufacturing program and are consistent with COMAR 13B.02.02.18. The resources include on-site collections as well as computerized access to holding in other libraries. The ACM Learning Commons (nee Library) is a wonderful learning institution and the Engineering – Automated Manufacturing will be able to develop a close-working relationship with the librarians.

K. Adequacy of Physical Facilities, Infrastructure and Instructional Equipment (as outlined in COMAR 13B.02.03.13)

1. Provide an assurance that physical facilities, infrastructure and instruction equipment are adequate to initiate the program, particularly as related to spaces for classrooms, staff and faculty offices, and laboratories for studies in the technologies and sciences.

The proposed degree program will be implemented using existing institutional resources which are adequate to meet the program's needs. In 2018, Allegany College of Maryland partnered with Allegany County Government to establish Western Maryland Works (WMW). WMW is a full service higher-education training facility and makerspace. With approximately 33,000 square feet of classrooms, training rooms, offices, and open floor. WMW will offer state of the art training and educational services to a diverse group of students, employers, and educational staff. The facility will house approximately 6 full and part-time faculty and staff.

The facility has expanded to include 12 Clausing mills, 12 Clausing lathes, 5 Clausing surface grinders, 2 Trak Mills, 1 CMM, 1 Haas Lathe, 1 Haas Mill, 1 Trak CNC Mill, 1 Trak CNC Lathe, Cylindrical Grinder, Wire EDM, and Plunge EDM. The lab is also equipped with several complete computer labs as well as a lab of 10 Mobile Precision 5550 Laptops for CAD instruction. ACM is also equipped with two FANUC Fenceless Robotic Arms trainers, 2 full size robotic arms, and 6 Touch screen Robotics iPendants. Additional equipment related to this degree, ACM also purchased a large 3D printing lab including a Stratasys F370 3D printer and a Stratasys J55 3D printers.

2. Provide assurance and any appropriate evidence that the institution will ensure students enrolled in and faculty teaching in distance education will have adequate access to:
a) An institutional electronic mailing system, and

All students are provided with an institutional e-mail account that fully integrates with the D2L Brightspace learning management system. Open-access, comprehensive student support for the learning management system is provided in module format and includes “how to” video and print tutorials, an eLearning Help Desk, links to student services, and tips for success in an online learning environment.

b) A learning management system that provides the necessary technological support for distance education

ACM provides comprehensive student support for the learning management system multimedia module format. A Help Desk links to student services, and provides support services for all ACM students. ACM is piloting Navigate which is a Student Success Software System that assists students and advisers with the most up-to-date about students' progress in their classes.

L. Adequacy of Financial Resources with Documentation (as outlined in COMAR 13B.02.03.14)

1. **Complete Table 1: Resources and Narrative Rationale. Provide finance data for the first five years of program implementation. Enter figures into each cell and provide a total for each year. Also provide a narrative rationale for each resource category. If resources have been or will be reallocated to support the proposed program, briefly discuss the sources of those funds.**

TABLE 1: PROGRAM RESOURCES

Resources 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 below)	157,728	321,720	361,332	402,672	410,856
a. #F.T Students	12	24	24	24	24
b. Annual Tuition/Fee Rate	10,475	10,685	10,899	11,117	11,339
c. Annual Full Time Revenue (a x b)	125,700	256,440	261,576	266,808	272,136
d. # Part Time Students	6	12	18	24	24
e. Credit Hour Rate	314	320	326	333	340
f. Annual Credit Hours	17	17	17	17	17
g. Total P/T Revenue (d x e x f)	32,028	65,280	99,756	135,864	138,720
3. Grants, Contracts, & Other External Sources[3]	0	0	0	0	0
4. Other Sources	0	0	0	0	0
TOTAL (Add 1 – 4)	157,728	321,720	361,332	402,672	410,856

2. **Complete Table 2: Program Expenditures and Narrative Rationale. Provide finance data for the first five years of program implementation. Enter figures into each cell and provide a total for each year. Also provide a narrative rationale for each expenditure category.**

TABLE 2: PROGRAM EXPENDITURES:					
Expenditure Categories	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1. Faculty (b + c below)	68,259	70,307	72,416	74,589	76,827
a. Number of FTE	1.30	1.30	1.30	1.30	1.30
b. Total Salary	56,552	58,249	59,996	61,796	63,650
c. Total Benefits	11,707	12,058	12,420	12,793	13,177
2. Admin. Staff (b+ c below)	11,157	11,492	11,837	12,192	12,558
a. Number of FTE	0.20	0.20	0.20	0.20	0.20
b. Total Salary	9,000	9,270	9,548	9,834	10,129
c. Total Benefits	2,157	2,222	2,289	2,358	2,429
3. Support Staff (b + c below)	0	0	0	0	0
a. Number of FTE	0.00	0.00	0.00	0.00	0.00
b. Total Salary	0	0	0	0	0
c. Total Benefits	0	0	0	0	0
4. Technical Support and 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	19,220	38,441	42,285	46,129	46,129
8. TOTAL (Add 1 – 7)	98,636	120,240	126,538	132,910	135,514

M. Adequacy of Provisions for Evaluation of Program (as outlined in COMAR 13B.02.03.15).

1. Discuss procedures for evaluating courses, faculty and student learning outcomes.

ACM has a systematic plan for evaluation of degree programs and supports the review of curriculum as a significant component of an overall educational effectiveness plan. Empirical data and evidenced-based evaluations are analyzed to support curriculum modifications and enhancements. Annual program reviews assess how well the program has achieved its goals and objectives and suggests potential approaches to enhance this effort and address and fulfill accreditation requirements as prescribed by Middle States.

2. **Explain how the institution will evaluate the proposed program's educational effectiveness, including assessments of student learning outcomes, student retention, student and faculty satisfaction, and cost-effectiveness.**

Program evaluation provides a consistent framework for evaluating a program's educational effectiveness and includes the use learning management system data to systematically analyze learning outcomes, assessment, retention, satisfaction, and cost-effectiveness.
Program evaluation provides a consistent framework for evaluating a program's educational effectiveness and includes the use learning management system data to systematically analyze learning outcomes, assessment, retention, satisfaction, and cost-effectiveness.

N. Consistency with the State's Minority Student Achievement Goals (as outlined in COMAR 13B.02.03.05).

1. **Discuss how the proposed program addresses minority student access & success, and the institution's cultural diversity goals and initiatives.**

ACM promotes diversity and creates an environment that is open and inclusive for all students, visitors, and employees. ACM embraces differences, respects intellectual and academic freedom, promotes critical discourse, and encourages socio-cultural and global awareness.

A key feature to Allegany College of Maryland Strategic Plan (2015-2020) is diversity; Priority Two, "Allegany College of Maryland enhances the learning and working environment by valuing, supporting, and recognizing a diverse and highly qualified faculty and staff" and Goal Five, to "increase cultural competency within the College community." Multiple tactics have been implemented and the work continues to recruit underrepresented student populations, recruiting staff attends multiple local and regional college and career fairs, with the goal of recruiting students, including underrepresented students.

ACM implements the *Pathways for Success* funded through the *TRIO Student Support Services Project* to improve GPA and increase retention, graduation, and transfer rates. The program provides a supportive environment on campus for underrepresented students with low-income or first-generation status and students with disabilities.

O. Relationship to Low Productivity Programs Identified by the Commission:

1. **If the proposed program is directly related to an identified low productivity program, discuss how the fiscal resources (including faculty, administration, library resources and general operating expenses) may be redistributed to this program.**

This proposed program is not directly related to an identified low productivity program.

P. Adequacy of Distance Education Programs (as outlined in COMAR 13B.02.03.22)

This is not a distance education program.

References

1. Allegany College of Maryland Strategic Plan (FY 2015-20) https://www.allegany.edu/strategic-plan/documents/20152020StrategicPlan.pdf#search=Strategic%20plan

2. Maryland State Plan for Postsecondary Education (FY2017-2021) https://mhec.maryland.gov/.../2017.2021%20Maryland%20State%20**Plan**%20for%20Higher%20**Education**.pdf

3. 2021-2025 Maryland State Plan for High Education Kick-Off Webinar https://mhec.maryland.gov/Documents/21-25%20State%20Plan%20Kickoff%20Meeting%20Slides%20(April%2020,%202020).pdf

4. Allegany College of Maryland Course Catalog (2019-20)
https://www.allegany.edu/college-catalog/documents/ACM_Catalog_2019_20.PDF#search=20192020%20ACM%20Catalog

5. Allegany College of Maryland Diversity Report (FY2019)
https://www.allegany.edu/documents-policies/documents/Diversity-Report-FY2019.pdf

6. Allegany College of Maryland Tuition and Fees (FY2021)
https://www.allegany.edu/tuition-and-fees/

ALLEGANY COLLEGE of MARYLAND
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BOARD OF TRUSTEES

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June 21, 2021

Dr. James D. Fielder Jr.
Secretary of Higher Education
Maryland Higher Education Commission
6 North Liberty Street
Baltimore, MD 21201

Dear Dr. Fielder:

On behalf of the Board of Trustees at Allegany College of Maryland, we respectfully request approval of the following academic program action:

Creation of the new Engineering – Automated Manufacturing Technology, Associate of Applied Sciences, HEGIS XXXXXX, CIP 15.0613, effective fall, 2022.

According to SB 740, COMAR 13B.02.03.24 and MACC's summary of SB 740, academic programs greater than 60 credits need to meet the following criteria:

An institution may award an Associate of Applied Science (A.A.S.) degree for successful completion of not less than 60 and not more than 70 credit hours in vocational-technical occupational skills, including law enforcement, computer technology, and ***engineering technology****. (COMAR 13B.02.03.24B.1)*

The standard number of credits required for an associate's degree (i.e., 60) does not apply if

- *the degree program is defined as more than a two-year associate's degree;*
- *professional accreditation requires a higher number of credit hours or requires course work that cannot be completed in 60 credits; or*
- *certification requirements result in a need for credit hours in excess of 60.*

The governing boards (local BOT) in consultation with MHEC may approve additional exceptions to the credit hour requirements. (MACC Summary of SB 740)

Thank you in advance for your time and consideration of this request. Please contact Dr. Bill Rocks, Dean, Career Education at 301-784-5567 or brocks@allegany.edu if you have any questions.

Sincerely,

Mr. Kim B. Leonard
Chairman, Board of Trustees

Northrop Grumman
Weapon Systems
ABL Operations
210 State Route 956
Rocket Center, WV 26726

northropgrumman.com

June 14, 2021

Dr. Cynthia Bambara, President
Allegany College of Maryland
12401 Willowbrook Road, SE
Cumberland, MD 21502

Dear Dr. Bambara,

Northrop Grumman is committed to providing excellent service and competitive products as well as contributing to growth and economic development of our service region. Economic development and the revitalization of the region is more reliant on state-of-the-art workforce training now than ever before, and the supply of educated engineers is critical to our growth.

Please accept this letter of support for Allegany College of Maryland's Developing an Associate of Applied Science Degree in Engineering -Automated Manufacturing.

Northrop Grumman Rocket Center continues to be at the forefront of advanced manufacturing hiring approximately 25 engineers annually. ACM has been a longstanding partner in providing machinists to local manufacturers including Northrop Grumman. The development of the AAS is needed to address issues in our area including economic development, the outmigration of our local students, and the provision of affordable education for our local students.

The AAS is designed to prepare students with the opportunity for hands-on experience that will prepare them for the manufacturing processes used at Northrop Grumman including Manual and CNC Machining, Robotics Certifications, 3D Printing Certifications and AutoCad Certifications.

We are pleased to not only provide support, but will also be the beneficiary of a trained workforce. Based on previous statistics, we estimate that dozens of current and future employees will receive training over the next several years to serve our organization in a variety of roles. Please understand that these numbers are only estimates based on our best guess of our current and future needs. We are in no way bound by these estimates.

Thank you for your commitment to providing quality workforce development training throughout our region. If you have any questions, feel free to contact me at 304-726-7501.

Sincerely,

Eddie Canfield
Director of Engineering

Committed to pushing the limitations of micro-hole manufacturing and precision machining to exceed customer demands and industry expectations. Accomplished by establishing a one team, one goal culture believing in continuous improvement of person and process, honoring the National Jet Company legacy as the International Micro-Hole Experts since 1937, and infusing the newest technologies into decades of niche expertise to produce new outcomes.

July 6, 2021

Dr. Cynthia Bambara, President
Allegany College of Maryland
12401 Willowbrook Road, SE
Cumberland, MD 21502

Dear Dr. Bambara,

National Jet Company, INC. is a steadfast manufacturer in Allegany County providing specialized and custom products in a competitive market. National Jet recognizes the value of developing authentic leadership and team building and are major contributors to the economic development within the Appalachian region.

Economic growth in the region is increasingly reliant on state-of-the-art workforce training and education now more than ever before. Please accept this letter of support and commitment for Allegany College of Maryland's Associate of Applied Science (AAS) in Automated Manufacturing Engineering. ACM has been a longstanding education partner with National Jet. The development of the AAS degree was a collaboration to address issues in economic development, the out mitigation of local students, and the provision of affordable education in our region.

The Automated Manufacturing Engineering degree is designed to prepare students with the opportunity for hands-on experience that will prepare them for the gainful employment in advanced manufacturing. Processes including Computer-Aided Design/Manufacturing, Manual and CNC Machining, Automation, Robotics, and Additive Manufacturing.

Sincerely,

Samuel B. Griffith, President

National Jet Company
Tel 301-729-2300
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10 Cupler Drive
Lavale, MD 21502