



Program Proposal November 2019

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New Degree Program Proposal Cover Sheet

Program Information

Institution Name: Edmonds Community College

Degree: <u>Advanced Manufacturing and Materials Engineering Technology BAS</u> CIP Code: <u>15.0000</u>

Name(s) of the existing technical associate degree(s) that will serve as the foundation for this program:

Degree: Materials Science AAS-T CIP Code: 15.000 Year Began: 2003

Planned Implementation Date (i.e. Fall 2014): Fall 2021

Proposal Criteria: Please respond to all eight (8) areas listed in proposal criteria FORM D.

Page Limit: 30 pages

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Introduction

Edmonds Community College (Edmonds CC) is very proud to bring forward this proposal for a new Bachelor of Applied Science in Advanced Manufacturing and Materials Engineering Technology (AMMET BAS). Inspired by industry need, the educational programming gap, the sustained magnitude and volume of the manufacturing employment sector, and our success with our current BAS program established 2017, Edmonds CC presents this integrated and needed degree pathway into rewarding engineering technology careers. The program start date is slated for Fall 2021.

The labor market need for this degree was described in the Statement of Need, as was how this degree fits with and into the mission of the college. The purpose of this Program Proposal is to demonstrate Edmonds CC's commitment and readiness to offer this baccalaureate pathway. Edmonds CC has experience establishing and implementing baccalaureate pathways through our BAS degree program in Child, Youth, and Family Studies and the IT Application Development program which will start in the fall. Last January, we were approved by the accreditors (NWCCU) as a baccalaureate degree granting institution. We will leverage the work of our colleagues and their lessons learned to adopt best practices to successfully launch and implement this new BAS program.

The college faculty members involved in developing this proposed degree have taken many steps to ensure that they received appropriate feedback on the program curriculum. In creating the first draft, the faculty reviewed industry survey results, economic/employment data prepared by an external consultant, and spoke with or reviewed interview transcripts from subject matter experts in industry (particularly Boeing) to better understand the industry needs and gaps. The faculty also reviewed relevant degrees and programs at other community colleges and universities to see what was common among them and relevant for this new, interdisciplinary degree.

Next, the proposed curriculum was reviewed by the Engineering Technology (ETEC) Advisory Committee. It generated a lively discussion and enthusiastic support. A full list of Advisory Committee members can be found in Appendix 8. The ETEC Advisory Committee members voted to approve the degree on September 17, see Appendix 9 for meeting minutes. Although our Advisory Committee is small, we are currently working to develop strategies to increase the number of ETEC members as well as recruit new members who are interested in serving on the AMMET BAS Advisory Committee. The degree was also sent to the industry members who originally provided feedback on the Statement of Need for their comments and input. The faculty then met with a group of subject matter experts at The Boeing Company to verify that the curriculum would fill the gap that they first helped identify. Finally, the degree was vetted by the faculty of the other institutions for this application.

Standard 1: Curriculum Demonstrates Baccalaureate Level Rigor

Appropriate Rigor

As a basis for establishing and demonstrating baccalaureate level rigor, the AMMET BAS degree applied the Rigor/Relevance Framework model developed by the International Center for Leadership in Education (ICLE).¹ Figure 1 below illustrates the relationship between complexity of thinking and flexibility of application. The six levels on the X-axis look at increasingly deep application of knowledge through action using Bill Daggett's Application Model.² On the Y-axis, Bloom's Taxonomy shows increasingly deep assimilation of knowledge.

Figure 1: Rigor/Relevance Framework

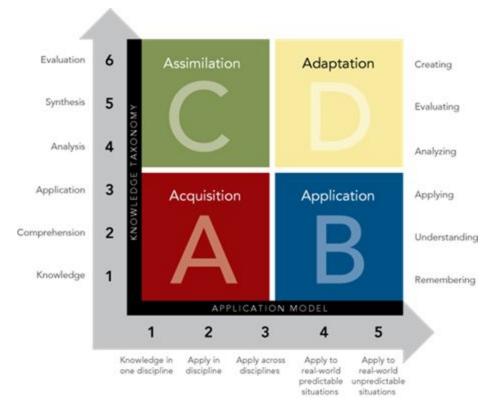


Table 1: Framework Quadrants Defined

A - Acquisition	Students gather and store bits of knowledge and information. Students are primarily
A - Acquisition	expected to remember or understand this knowledge.

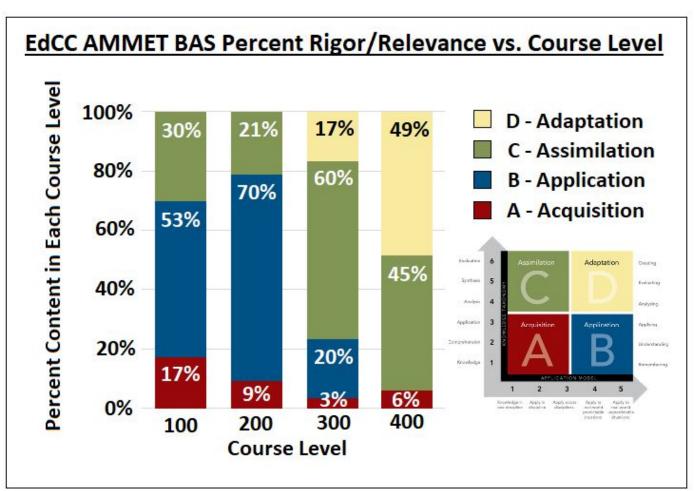
¹ International Center for Leadership in Education (2014) http://www.leadered.com/our-philosophy/rigor-relevance-framework.php

² Daggett, B., <u>If Not Common Core, Then What?</u>: <u>Rigor and Relevance</u>: <u>The Foundation of Effective Instruction</u>. International Center for Leadership in Education. (2014).

R - Application	Students use acquired knowledge to solve problems, design solutions, and complete work. The highest level of application is to apply knowledge to new and unpredictable situations.
I - Accimilation	Students extend and refine their acquired knowledge to be able to use that knowledge automatically and routinely to analyze and solve problems and create solutions.
D - Adaptation	Students have the competence to think in complex ways.

Edmonds CC borrowed the Rigor/Relevance Framework adaptation created by Pierce College to demonstrate that the upper division courses are appropriately rigorous to be numbered in the 300-400 range (Figure 2). On this framework, the faculty evaluated and mapped the course outcomes of the upper division classes, as well as outcomes from the lower division classes (100-200 range), to ensure that students would be tasked in 300 and 400 level classes with developing skills that fall in Assimilation (quadrant C) and Adaptation (quadrant D). Through Figure 2 the reader can see the lower level classes (100 and 200 level) focus on acquisition and application while the upper division classes (300 and 400 level) focus on assimilation and adaptation which require more complex thinking, flexibility of application, and increasingly deep assimilation of knowledge.

Figure 2: AMMET Course Level Outcomes Summary Breakdown by Course Level Using the Rigor Relevance Framework



Program Evaluation Criteria and Process

For the first few years the entire pathway, including this degree, will be heavily scrutinized as the program is built, tried, and adjusted to achieve the best outcomes for students. In fact, the review has already begun. The external reviews and subsequent advisory committee reviews have resulted in program updates from the original draft proposal. Once the program starts, the faculty and staff will continue to gather input from various sources including: other faculty teaching in the program, faculty who are teaching the students in general education classes, advisory committee members, local employers (once there are graduates), and they will ask for feedback of the students in the first few cohorts. After that, Edmonds CC has a Program Review process that requires each program area be looked at on a three-year cycle. In addition, an advisory committee will be set up for the program, and will meet frequently during the first three years of the program. Many members of the ETEC Advisory Committees have given input to this degree and some may wish to serve on the new BAS advisory committee.

Edmonds CC has a detailed assessment process for assessing programs and program level outcomes that can be reviewed on the college's Assessment webpage at http://www.edcc.edu/assessment/. The table below shows the enhancements that will be made to the program review process for the BAS Degree:

Table 2: Program review process for BAS

Tuble 2. Flogran	review process for BAS	
	Standard Edmonds CC Program	Enhanced Review Process for AMMET BAS Program
	Review Process	
Course Review	annually	 Will involve faculty, BAS Manager, division dean, and curriculum committee
Program Review	trends, industry standards, program learning outcomes, completion rates, and resource allocation Involves faculty, division dean, curriculum committee, and	 Will include analysis of enrollment trends, library and student services support, industry standards, program learning outcomes, completion rates, employment
Involvement of Advisory Board	Meets twice a year for input and approval	Will meet at least quarterly (or more frequently if needed) for first three years of program for input,

	detailed review, refinement of courses and degree, and
	approval

(Note: see Appendix 5 for further details on the Edmonds CC program review process)

Advanced Manufacturing and Materials Engineering Technology BAS Degree

The AMMET BAS degree is composed of three areas, 60 credits of general education, 60 credits of upper division classes, and 60 credits of technical education. Each of these areas are outlined in Table 3 and described in detail below. Edmonds CC faculty and staff started development by soliciting feedback from our ETEC Advisory Committee and local manufacturing employers to understand industry specific needs prior to building the upper division curriculum. Faculty took that feedback and created a multidisciplinary program covering topics in advanced manufacturing, material characterization, and additive manufacturing. It should be noted that the original program outcomes outlined in the Statement of Need have been updated to reflect additional feedback received through the external review process and additional discussions with the advisory committee. They are now more specific and better describe the desired skills, ability, and knowledge needed for success in the advanced manufacturing and materials engineering technology profession. Graduates from the AMMET BAS program will be prepared for roles as engineering technicians, process engineers, manufacturing engineers, and related technical positions.

The Program/Degree Outcomes

BAS Outcomes (Revised) - Students successfully completing the AMMET BAS will be able to:

- 1. Demonstrate the ability to design systems, components, and/or processes using advanced materials and current technology in a variety of different manufacturing industries.
- 2. Apply the principles of quality and safety to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes in a manufacturing environment.
- 3. Demonstrate the ability to select and apply basic scientific principles of science, mathematics, engineering and technology to solve broadly defined advanced manufacturing problems that require the application of principles and applied procedures or methodologies.
- 4. Demonstrate the ability to identify and use appropriate technical literature; and to effectively apply written, oral, and graphical communication in broadly defined technical and non-technical environments.
- 5. Demonstrate the ability to function and contribute as a member as well as a leader on technical teams in a diverse environment.

The AMMET BAS curriculum will additionally incorporate effective research strategies, appropriate research search tools and techniques, and emphasize important legal and ethical issues relating to information use to help ensure graduates have the research and information literacy skills they need to be successful in the workforce.

Table 3: AMMET BAS Degree

Category	Course	Course Title	Credits
Proficiency (60 credits from AAS-T)	100 and 200 level	Foundational Courses in Electronics Technology, Mechatronics, Materials Science, Composites, or similar program	60
General Education (30 credits from A	AS-T)		
Communication	ENGL&101	English Composition	5
Communication	ENGL 231	Technical Writing	5
Quantitative Symbolic Reasoning	MATH&141	Pre-calculus I	5
Humanities	CMST&220	Public Speaking	5
Natural Science	PHYS&114	General Physics I	5
Natural Sciences	CHEM&161	General Chemistry I	5
General Education (30 credits from B	AS)	·	l
Humanities		Any Humanities course from distribution list	5
Social Sciences	PHIL 110	Contemporary Moral Issues	5
Social Sciences		Any Social Science course from distribution list	5
General Elective	MATH&146	Intro to Stats	5
General Elective		Any course from distribution lists	5
General Elective		Any course from distribution lists	5
Upper Division (60 credits from AMM	1ET BAS)		
	AMMET 302	Calculus & Advanced Mathematics	5
	AMMET 318	Applied Statics & Mechanics of Materials	5
	AMMET 350	Additive & Subtractive Manufacturing	5
	AMMET 351	Manufacturing Systems, Automation, and Operations	5
	AMMET 383	Material Characterization	5
	AMMET 400	Product Design, Tooling, and Assembly	5
	AMMET 426	Lean Manufacturing	5
	AMMET 427	Quality and Continuous Improvement	5
	AMMET 429	Industrial Organization, Safety, and Management	5
	AMMET 440	Advanced Materials	5
	AMMET 454	Capstone I	5
	AMMET 455	Capstone II	5

Technical Associates Degree Course Preparation (Proficiency Requirements)

Staff anticipate the student pool for the AMMET BAS will come from diverse backgrounds and educational/work experiences, such as Electronics Technology, Mechatronics, Manufacturing, or other similar programs. With this in mind, the program was developed with minimal barriers for entry and opportunities for students to complete the required courses to prepare them for the content and increased rigor of upper division classes.

Students may apply to the program once prerequisites have been completed. Prerequisites include:

- Associate's degree (should include 60 proficiency credits)
- ENGL&101 English Composition
- Technical math (or higher)

While the Edmonds CC Materials Science AAS-T (Appendix 2) will provide a seamless transition for students applying for the AMMET BAS program, students completing an associate degree at another Community and Technical College (CTC) will be encouraged to apply but they may be required to take additional classes depending on the degree completed and prior work experience. These requisite classes include CHEM&161 (or higher) General Chemistry I, PHYS&114 (or higher) General Physics I with Lab, ETEC 110 Intro to Manufacturing, and ETEC 175 Intro to Materials Science. EdCC staff will continue to explore opportunities that facilitate and support a seamless transition such as conditional acceptance, condensed boot camp prep classes, etc. as move we move forward. A student's work history and educational experience will be reviewed during the admission process to determine which classes are needed and to create a personalized plan for completion.

Edmonds CC staff will work closely with local community and technical colleges offering manufacturing, mechatronics, engineering technology, and electronics engineering programs to promote the AMMET program and provide clear pathways for interested students, helping make the transition to our college as smooth as possible. At this time, we have reviewed potential programs from local CTC's and are in the process of scheduling meetings with the appropriate staff and administrators to discuss possible articulations.

In addition, students will need to demonstrate core abilities desired for the manufacturing industry. This can be done directly through employment or indirectly through a variety of alternative careers and/or educational experiences. A common set of foundational abilities including;

- Analytical Ability to collect information, measure dimensions, evaluate layouts, read blueprints, and compare test results to design specifications and test objectives.
- Communication Ability to effectively communicate verbally and in writing with team members.
- Problem Solving Ability to set up and conduct tests of units and parts as they would actually be used and investigate proposals for improving equipment performance.
- Teamwork Work well with others.
- Project Management Ability to manage and document procedures in the production process.

Many, if not all, of these foundational abilities can be demonstrated through a successfully completed degree and relevant coursework at the 100 and 200 level at any community or technical college.

General Education Requirements

In addition to the technical education credits, students are required to complete 60 credits of general education classes. The credits include distribution areas such as Communication, Humanities, Social Sciences, and Natural Sciences. Students completing any AAS-T in Washington will have met at least 20 of these credits. Corequisite classes, if needed, will also meet general education requirements. Edmonds CC will evaluate all transcripts a student submits for evaluation and is committed to transferring any/all general education credit whenever possible. Edmonds CC also offers a robust selection of general education classes students can choose from to complement their technical education, allowing them to complete the remaining requirements while working on upper division courses.

Upper Division Coursework

The AMMET BAS has a total of 60 credits of upper division classes. The classes were developed based on job posting analysis, our initial employer survey, ABET Accreditation curriculum standards, and follow up meetings with Boeing and the ETEC Advisory Committee. We specifically chose Boeing for feedback since we anticipate they will be hiring a majority of our graduates. The advanced classes cover a collection of topics to prepare graduates for employment in Manufacturing, Quality, and Materials Engineering. These classes include Advanced Math, Materials & Structural Analysis, Manufacturing Processes, Manufacturing Operations, Quality Sciences, Materials Properties, and Design Techniques. A full list of classes, including descriptions and course level outcomes, can be found in Appendix 6. Additionally, a sample of full-time and part-time sequence of classes can be found in Appendix 7.

Edmonds CC AMMET BAS plans to offer the new upper division courses in a hybrid, evening format. We heard directly from students, on the student survey, that they preferred hybrid courses. In addition, employers we met with stated they were more likely to send currently employees to our program, if classes were outside work hours. Although some of the coursework can be completed online through lecture, this program requires hands-on learning and experiences using equipment that can only be done in person. Edmonds CC has a state of the lab available to students, including equipment such as:

- Autoclave for composite processing
- Waterjet cutting system
- 50kN MTS Mechanical Test Frame
- 3D Printing Lab
- Robotic Arm Systems (FANUC and KUKA)
- Laser Systems using CO2 and YAG
- BabyPlast Injection Molder
- Wind Tunnel
- Thermal Analysis (DSC & DMA) for polymer/composite characterization
- Full Machine Shop Including CNC Machining Center, Lathe, CNC Router, and CNC Knee Mill

Standard 2: Qualified Faculty

Edmonds CC will open a full-time, tenure-track faculty position to lead and teach in this new degree program, with a minimum educational level of master's degree required, and doctorate strongly preferred (see Appendix 3 for the drafted job description/posting). A combination of both education and practical experience is extremely important, and the dean is optimistic that Edmonds CC can draw candidates with both a doctorate and field experience. This new faculty member will be the lead instructor teaching many of the core courses in the degree as well as further developing the new program.

The BAS faculty member will work closely with the ETEC and ENGR department faculty who first envisioned the degree and outlined the curriculum, to ensure a smooth transition for students from the AAS-T pathway and to make sure that the feedback collected during the curriculum development process is honored. The new BAS faculty member will also serve as the department head, which means he or she will assist with finding and interviewing part-time faculty, scheduling courses, and advising students. Edmonds CC provides release time for the lead faculty member to do this work.

The General Education courses listed at the 100 to 200 level will be taught by existing college faculty in the specific discipline. Edmonds CC requires that faculty teaching transfer courses hold a minimum of a master's degree. Some of our existing faculty members have earned doctorates. In addition, if any upper division general education courses are developed, the educational requirements for faculty teaching those courses will be increased to require a doctoral degree.

The initial expectation is for there to be a total of about 1.25 FTEF of teaching load needed in the program (including release time for the lead faculty member), increasing to 2.0 with the addition of a second cohort. This does not include the faculty teaching General Education courses. Students in the program will be taking these already-existing courses with the regular student population. Additional sections will be added if there are specific courses that most of the BAS students need and that are not available at a time that is convenient for them.

Edmonds CC intends to hire the one tenure-track position mentioned before, and cover the other courses with adjunct faculty who specialize in a particular curriculum-content area (for example, lean manufacturing) so that the students are taught by experts. All faculty members who teach at least 10 credits per quarter will be certified as professional-technical instructors, with a professional development plan on file. All faculty who consistently teach 10 credits per quarter or more in the Engineering Technology program, and all administrators of those programs, meet the professional-technical certification standards as required in the Washington Administrative Code.

Below is a table showing the credentials and departmental affiliation of some of the current Edmonds CC faculty (Table 5), as well as some of the faculty teaching General Education courses (Table 6).

Table 4: Credentials and Departmental Affiliation of Current Edmonds CC Faculty Who May Teach as Adjunct in AMMET BAS Program

Faculty Name	Credentials	Edmonds CC Department	Years of Professional/Teaching Experience
Ross Monroe	MS Engineering	Engineering Technology	27 years professional experience, 11 years teaching.
Tucker Howie	PhD Materials Science and Engineering	Engineering	1 year professional experience, 5 years teaching.
Chuck Mueller	EdM Math & Science Education M.S. Materials Science & Engineering	Engineering	14 years teaching experience
William Hamp	PhD Aeronautics and Astronautics Engineering	Engineering	7 years professional experience, 7 years teaching.
Haley Benjamins	MS Library Science	Library	8 years teaching experience

Table 5: Small Sample of Edmonds CC Faculty Teaching General Education Courses

Faculty Name	Credentials	Courses Teaching	Years of Teaching Experience
Rachel Wade	PhD- Education MS - Ocean Physics	Physics	20 years
Thomas Murphy	PhD - Anthropology	Anthropology	16 years
Kathleen Murphy	MA - English	English	30 years
Erin Davidson	MA - Communication	Communication	8 years
Patrick Averbeck	PhD - Math Education MS - Applied Mathematics	Math	24 years
Tom Shelly	PhD - Math MS - Math	Math	4 years
Susanne Meslans	MA - English	Humanities	38 years
Maria Kelly	MS - Hydrologic Sciences	Environmental Science	20 years
Frederick Weitz	MS - Psychology	Psychology	32 years
Jeff Owen	PhD - Chemistry	Chemistry	15 years

The Edmonds CC faculty are well-qualified to teach in their current roles, and some would be competitive for teaching individual classes within the BAS program.

Standard 3: Selective Admissions Process

Admissions Philosophy

Admission criteria have been developed to create opportunities for a broad range of applicants, consistent with the open door admissions policy of Edmonds CC, while optimizing the potential for successful completion of the AMMET BAS. The college's commitment to diversity is demonstrated in our strategic plan goals, including a long-term strategy focusing on attracting a diverse student population by:

- Creating a welcoming place for all students to thrive in our global and intercultural learning environment.
- Bolstering the Adult Basic Education and English as a Second Language infrastructure (technology, staffing, and space) to respond to increasing demand.
- Increasing access, retention, and success for all students facing cultural bias and educational opportunity gaps.
- Enhancing recruitment presence in local communities by adding a bilingual outreach specialist to work with Latinx families and creating a college microsite translated into Spanish.
- Increased promotion of ETEC I-BEST Material Science Technology certificate.
- Work with industry partners to identify targeted outreach strategies for incumbent workers.
- Develop marketing materials for the Outreach and Recruitment Team for campus and community events.

An example of our commitment to student diversity is the Center for Cultural Diversity & Inclusion, which serves all students, with a focus on ethnically diverse, homeless, female, gay, lesbian, and other gender-diverse students. In addition to promoting diverse events, the center provides resource assistance to help students understand college life; connections to a conversation partner program to help second-language speakers with English (in a friendly, casual setting); a resource library with items for loan for a full quarter; and a computer lab with Internet access for students.

Admissions Requirements

As stated previously, Edmonds CC anticipates a diverse student population applying to this program. Keeping with our open access mission, we have developed admission criteria that allows students with a variety of degrees to apply to this program. With that in mind, prospective students need to have demonstrated completion of a 90 credit associate degree, ENGL&101 English Composition, and technical math (or higher) prior to applying to the AMMET BAS program. Students completing the Edmonds CC Materials Science AAS-T (Appendix 2) will have a seamless transition into the upper division classes and will not need to take any additional classes. However, due to the advanced nature of the upper division classes, students completing a two year degree at any of the other CTC's can apply and be admitted into the program, but may be required to complete corequisite classes to help prepare them for the upper division content. These classes including CHEM&161 (General Chemistry I) or higher, PHYS&114 (General Physics I with Lab) or higher, ETEC 110 (Intro to Manufacturing) or equivalent work/education, and ETEC 175 (Intro to Materials Science) or equivalent work/education. This set of classes can be completed after the student is admitted into the program, but must be completed within one year. Edmonds CC will make every effort to review previous work and educational experience of perspective students to identify and waive or transfer in all equivalent

credits. For example, a prospective student applying with a Mechatronics ATA will have met the prerequisite requirements (by completing their degree, ENGL&101, and technical math) and they will have completed classes in manufacturing, so they would only be required to take chemistry, physics, and materials science. On the other hand, if a student completed an engineering technology degree they will have completed the prerequisite requirements and most of the corequisite classes, leaving only the materials science class to complete within the first year. If accepted, remaining corequisites needed would be built into their individualized education plan from the beginning so a clear path to completion is identified from the start. Table 7 shows a list of prerequisite and corequisite classes required for the program.

Table 6: Prerequisite and Corequisite classes

Course	Title	Credits	Prerequisite or Corequisite
Associate Degree	Any two year degree - recommend Materials Science, Manufacturing, Mechatronics, Engineering Technology, or Electronics Engineering	90+	Prerequisite
ENGL&101	English Composition	5	Prerequisite - typically part of two year degree
ETEC 150 (or higher)	Technical Math	5	Prerequisite - typically part of two year degree
CHEM&161	General Chemistry I	5	Corequisite - completed within one year of being admitted
PHYS&114	Physics I with lab	5	Corequisite - completed within one year of being admitted
ETEC 110	Intro to Manufacturing	5	Corequisite - completed within one year of being admitted
ETEC 175	Intro to Materials Science	5	Corequisite - completed within one year of being admitted

A minimum Grade Point Average (GPA) of 2.0 in the prerequisite class and a minimum overall GPA of 2.0 in an associate degree is required. Conditional admission may be considered on a case-by-case basis for students who are only one or two classes short of an applicable degree. Meeting minimum requirements will not guarantee admission, as the number of applicants may exceed the number of available enrollment spaces.

In addition, the applicants will turn in:

- A completed application for the AMMET BAS Degree Program.
- Official transcripts showing a minimum 2.0 GPA in prerequisite class and a minimum overall GPA of 2.0 in an associate degree.
- A minimum 1- to 2-page Statement of Purpose, answering the following questions:
 - 1. How does this degree fit into your long-term career goals?

- 2. Employers have identified core abilities desired in the manufacturing industry including problem solving, team work, project management, and critical/analytical thinking. Tell about a time when you demonstrated one or more of these abilities in your work or education.
- A resume that describes relevant work and skills, and includes internships, work study, and volunteering activities.

Selection Process

If the number of qualified applicants exceeds space availability, the selection committee will evaluate the individual applicants on specific criteria to determine acceptance into the BAS Program, draft process listed below. Completed applications meeting all minimum requirements submitted by the priority deadline will receive first consideration. The selection committee will be comprised of the BAS Manager, two faculty members, a representative from enrollment services, and the division dean.

Prior to selection of the first cohort, the selection committee will develop specific criteria for use in a scoring rubric that will quantify a final numeric score for each candidate. These criteria will be consistent with the intentions of the AMMET BAS program, with consideration of professional career goals, strength of transcripts, relevance of work experience, and the substance of the statement of purpose. Edmonds CC has a strong commitment to increasing equity and inclusion competencies across campus. With this in mind, all members of the selection committee will be required to complete an EdCC equity and inclusion training. Topics to be covered in the training include some combination of the following: Equity Mindedness, Implicit Bias, Cognitive Errors, and Microaggressions. The training will be held no more than three weeks prior to reviewing student applications, ensuring concepts are fresh in committee members minds.

The selection process is drafted as follows:

- 1. Review of each application, and application materials.
- 2. Committee members will rate each applicant based on the scoring rubric that has been developed.
- 3. Review and discussion of each applicant by the committee. Should disagreement regarding ratings for an applicant occur, the committee will review the application in question and reach a consensus on the rating.
- 4. Identification of the top candidates, based on ratings, sufficient to fill the available spaces. A waiting list will be developed, should not all of the selected candidates subsequently become enrolled in the program.

Standard 4: Appropriate Student Services Plan

In spring 2016, a BAS Implementation Team (I-Team) was convened as a task force to make sure that the college hit all the milestones and was well-prepared to offer the new BAS programs when the curriculums and programs have been approved. This team consists of:

- VP of Workforce Development and Training (lead)
- Faculty Representatives from Relevant Instruction Departments
- VP of Finance and Operations

- Exec. VP for Instruction
- VP for Student Services
- Dean of Health and Human Services

- Dean of Student Success Entry and Enrollment
- Dean of Student Success Retention and Completion
- Director of Reporting and Records Management
- Director of Financial Aid
- Director of Advising
- Dean of Library Services

- Director of Institutional Research
- Public Information Officer
- Exec. Director of Grants
- BAS Manager(s)
- Staff from the Workforce Development and Training, Instruction, Credentials, and Divisional Offices

This team was charged with sorting out all the details of how to bring bachelor's students on board, and how to best serve them when they arrive. The I-Team continued to meet after Edmonds CC's first BAS cohort began classes until all the policies and procedures related to this new population of students were solidified. The team was reconvened in November of 2019 in preparation for the AMMET BAS and will continue to review and add support services for new and continuing BAS programs.

Edmonds CC will hire a BAS Manager as soon as the approval process is complete, specifically to help with the forming of the first cohort and to support the students in this program. The AMMET BAS Manager will provide pre-advising for students who might be interested in the program but are still in their associate degree program, advise students who have completed an associate degree, and do a preliminary review of their transcript(s) to ensure the most seamless transition for the student. The full job description for the BAS Manager position is included in Appendix 4.

The AMMET BAS Manager will be in charge of marketing the program, recruiting students, and helping to facilitate agreements with master's degree programs. Further responsibilities of the AMMET BAS Manager including meeting with prospective, new, and ongoing BAS students for academic planning, helping with financial aid and scholarship opportunities, assisting with registration procedures, and serving as a resource regarding student services at Edmonds CC. The manager will collaborate primarily with the Engineering Technology and Engineering faculty to maintain consistency of quality and relevance of the career pathway in this BAS degree. The AMMET BAS Manager is not a faculty member.

The students in the AMMET BAS program will have access to all Edmonds CC student services, resources, and activities. Examples of student services and resources are described below.

Advising

Advising is available in partnership with the students at each step of their academic experience. Pre-advising and orientation to college procedures and support services are carried out by the BAS Manager. The Edmonds CC full-time faculty load includes 10 hours/quarter of advising to students. Enrolled students will meet regularly for advising and career planning with faculty advisors in the BAS program. This maintains individualized support and guidance for furthering professional goals and opportunities in the AMMET BAS program. As a matter of best practice, advising is an ongoing process in the early childhood education and social and human services programs.

Enrollment Services

In addition to the individualized support of the BAS Manager, the Enrollment Services staff members assist students with information about college resources and procedures in Registration, Assessment, and Enrollment processes.

Financial Aid

The financial support of the BAS students will be facilitated with the BAS Manager, and specific opportunities for support of the bachelor's degree will be explored in an individualized manner. Part of a Financial Aid specialist position (.25 FTE) will be supported by the BAS. Students have access to the Financial Aid in the form of scholarships, Worker Retraining funds, grants, and loans. Each new BAS budget supports a quarter of an FTE, over time allowing for a dedicated staff person just for BAS students.

Learning Support Center

The Learning Support Center provides supplementary academic support to students in strengthening their college-wide abilities in math, the sciences, the humanities, and social sciences. Assistance is available in three ways: drop-in at the Learning Support Center, enrollment in WRITE, a learning support class, and through e-tutoring, available 24/7. Tutors will be hired to help students in the BAS pathway and the tutoring will be offered either just before or after classes or as part of the e-tutoring services, depending on the wishes of the cohort.

Library

The library has multiple resources that include: books, eBooks, academic searches, and extensive databases that provide access to articles and periodicals in a large range of subjects that would be appropriate for the BAS students' research and learning process. BAS funds will be used to enhance the collection on an ongoing basis, and to help pay the salary of a librarian (.25 FTE). The designated library faculty member will be available for student support throughout the bachelor's program, and will also serve as a research guide for the capstone project of the BAS students. Desktop computers are provided in the library, and laptop computers can be checked out. All students have access to the wireless network in the library and throughout the campus. Rooms are available in the library for group projects, video-taping, and study sessions.

STEM Study Room

The STEM Division has a dedicated STEM study space (STEM Study Room) where EdCC students can get free drop-in academic support from tutors and STEM faculty. The space is open 5 days a week and staffed at all times with any of the following: STEM faculty, staff, and/or student tutors. The tutors are current Edmonds CC students who have taken advanced coursework in Math, Biology, Chemistry, Physics, Computer Science, and Engineering. The study room is a great place for students to connect and collaborate with one another and with STEM faculty and staff. In addition to the free tutoring, the STEM Study Room is equipped with whiteboard tables, LCD screens, textbooks, headphones, Engineering laptops, and Chromebooks for in-room use. Free snacks and drinks are also provided for students using the study room.

Credentials and Evaluation

The BAS Manager and BAS faculty will work with the credentials evaluators to determine appropriate course equivalencies for students coming from other institutions. The Registrar's Office staff will conduct degree evaluations for incoming students where needed.

Other Student Service Offices

Several other service areas will be available to BAS students. These offices include the Diversity Student Center; the Services for Students with Disabilities office (SSD); the Center for Student Engagement & Leadership; the Veterans Resource Center; the Counseling Center, and Academic Computer Services. Each of these offices is robust enough to offer their services to this new population of students without needing additional support, and their service offerings are appropriate for baccalaureate students. As the program proceeds, if a specific need is identified to increase the services in one of these areas to better support baccalaureate-level students and learning, the college is committed to providing the service level needed.

Standard 5: Commitment to Build and Sustain a High Quality Program

The college is committed to resourcing this degree appropriately so that the program will be successful. This includes significant investment to date and continuing through until the program becomes self-sustaining. The expected demand for this program, and for program graduates, is high but the college expects that this program could be slower to fill since it is generally difficult to get students into manufacturing programs. It will take time to advertise and promote the program to the community and workforce. Estimated revenues show that it could reach sustainability in Year 3.

To estimate revenues, we started by defining how many we expect in each cohort, and when we expect them to finish:

Estimated Number of Students per Cohort						
	Year 1	Year 5				
	2020-21	2021-22	2022-23	2023-24	2024-25	
Cohort 1 - 2021	20	*16	**4			
Cohort 2 - 2022		24	19	5		
Cohort 3 - 2023			24	19	5	
Cohort 4 - 2024				24	19	
Cohort 5 - 2025					25	
	20	40	47	48	49	

^{*} Assumes 80% retention rate

Next, we estimated how many students are expected to be taking a full load of 15 credits, how many might be part-time, and how many international students we expect in the program:

 $^{^{**}}$ Assumes some students will take into the 3rd year to complete their degree

Estimated Number of Students at Each Credit Load (annual average)							
	Year 1	Year 2	Year 3	Year 4	Year 5		
	2020-21	2021-22	2022-23	2023-24	2024-25		
# of students taking 10-15 credits/qtr	18	37	40	40	40		
# of students at FT non-resident tuition		2	2	2	2		
# of students at 5 upper division credits/qtr	2	2	2	2	2		

Using the Tuition Calculator on the State Board's website, the annual tuition revenue for each type of student is recorded. Students pay for upper division credits 1-10, but after that the credits are free. So students taking 10 or more credits pay the same tuition. An assumption was made that tuition will increase once in the five year period, by 3%.

Tuition at Differing Credit Loads (excluding fees; based on SBCTC 2019-20 tuition table)							
	Year 1	Year 2	Year 3	Year 4	Year 5		
	2020-21	2021-22	2022-23	2023-24	2024-25		
Annual Tuition - Student taking 10-15 credits/qtr	\$5,757	\$5,757	\$5,757	\$5,930	\$5,930		
Annual Tuition - FT non-resident (15 cr/qtr)	\$17,302	\$17,302	\$17,302	\$17,821	\$17,821		
Annual Tuition - PT student (5 cr/qtr)	\$2,879	\$2,879	\$2,879	\$2,965	\$2,965		

Finally, we can take the number of expected students of each type and multiply that by the expected annual tuition rate, to get an estimate of the tuition revenue for the program in each year:

Total Revenue Estimate					
Calculation (#students *	Year 1	Year 2	Year 3	Year 4	Year 5
tuition rate)	2020-21	2021-22	2022-23	2023-24	2024-25
10-15 credits resident	\$103,626	\$213,009	\$230,280	\$237,200	\$237,200
FT non-resident	\$ O	\$ 34,604	\$ 34,604	\$35,642	\$35,642
resident 5 credits	\$ 5,758	\$ 5,758	\$ 5,758	\$ 5,930	\$5,930
TOTALS	\$109,384	\$253,371	\$270,642	\$278,772	\$278,772

Note that this revenue projection is only including tuition revenue. While it is likely that the college will also receive state funding for the enhanced FTEs (Full Time Equivalent Students), that money will be absorbed into the college's operating budget. Estimating revenues in this manner allows the college to look at the additional revenue associated with the program that will come to the college, so it can be compared to incremental expenses. The chart below is a good estimate of the additional expenses the college is prepared to bear related to this program:

Projected Expenses						
Expense	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
FT Faculty (Instruction - 1.0 FTE after Year 1)	\$ -	\$20,460	\$62,000	\$63,860	\$65,776	\$67,749
PT Faculty (Instruction66 FTE after Year 1)	\$ -	\$4,303	\$23,839	\$24,554	\$25,291	\$26,050
Curriculum/ Program Development	\$20,000	\$ 10,000	\$10,000	\$ -	\$ -	\$ -
BAS Manager (1 FTE)		\$ 28,000	\$56,000	\$57,680	\$59,410	\$61,192
Librarian (.25 FTE)		\$15,500	\$15,500	\$15,965	\$16,444	\$16,937
Financial Aid (.25 FTE)		\$5,000	\$10,000	\$10,300	\$10,300	\$10,615
Credentials (.25)		\$10,000	\$10,000	\$10,300	\$10,300	10,615
Personnel (wages)		\$93,263	\$187,339	\$182,659	\$187,521	\$193,158
Benefits (30%)		\$27,989	\$56,201	\$54,797	\$56,256	\$57,947
Total personnel		\$121,252	\$243,540	\$237,456	\$243,777	\$251,105
Library Resources	\$ -	\$20,000	\$20,000	\$15,000	\$15,000	\$15,000
Goods and Services*		\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
Professional Development, Research, and Travel		\$ 3,000	\$3,000	\$4,000	\$4,000	\$4,000
Projected Expenses	\$20,000	\$146,252	\$268,540	\$258,456	\$264,777	\$272,105
*Marketing dollars will be allocated from Workforce funds at \$4,000 per year for this program.						
Salaries are assumed to increase by 3% in years 3, 4, and 5						

Projected Revenue vs Projected Expenses						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	2019-2020	2020-21	2021-22	2022-23	2023-24	2024-25
Projected Revenue	\$0	\$109,384	\$253,371	\$270,642	\$278,772	\$278,772
Projected Expenses	\$20,000	\$146,252	\$268,540	\$258,456	\$264,777	\$272,105
Total	(\$20,000)	(\$36,868)	(\$15,149)	\$12,186	\$13,995	\$6,667

As was stated previously, the college will hire new personnel for the program; two full time positions will be funded as soon as the program is approved - a tenure-track faculty member, and a BAS Manager. Part-time faculty (presumably several people with specific areas of expertise) will be added as needed depending upon the expertise of the FT faculty member, but for sure by Year 2 when the second cohort comes on board. Other areas heavily impacted by the additional program will also be given extra funds to hire more personnel (financial aid, the library, and the credentials office). Funds and staffing will be leveraged in other areas, such as in the Career Action Center, where the Internship Coordinator will help with the AMMET students' practicums.

The college is prepared to continue to operate this program for the first three years even if the enrollment is not as high as anticipated. The expectation is that the college will need to work to draw students into this program; manufacturing programs tend to be harder to draw students into than some other pathways. However, the strong employer demand will be leveraged to develop partnerships that

will support the program and boost enrollment. If, after three years, the program is not yet self-supporting, the College will review the program to see if the expenses can be aligned with the revenues, or if industry partners could help support the program.

Standard 6: Program Specific Accreditation

In January 2019, Edmonds CC was granted accreditation to offer bachelor level programming by the Northwest Commision on Colleges and Universities (NWCCU) accreditation board. If approved to move forward, the college will pursue substantive change with the addition of the AMMET BAS.

In addition, Edmonds CC has decided to build the program based on curricular requirements outlined by the Accreditation Board for Engineering and Technology (ABET), specifically Engineering Technology Programs. The decision to pursue this accreditation was based on follow up conversations with employers, which supported our findings on the original employer survey. Employers recognize this accreditation and understand that students graduating from a program with this designation have met rigorous standards essential to produce quality graduates. Faculty started the process by reviewing the student outcomes outlined on the ABET Engineering Technology website for guidance. They were then able to discuss updating program outcomes with the advisory committee, develop upper division courses, review faculty requirements, and facilities requirements. This 18 month intense, multi-step process is overseen by the Engineering Technology Accreditation Commission (ETAC). Edmonds CC plans to pursue ABET Accreditation in conjunction with the first graduating AMMET BAS class.

Standard 7: Pathways Options Beyond Baccalaureate Degree

Edmonds CC faculty and staff discussed career advancement for students completing the AMMET BAS degree with local employers. Throughout conversations, employers stated that students would be well prepared to continue into master's level education in either business administration or engineering technology. Armed with that information, Edmonds CC administrators sent information about the proposed degree to directors/deans of graduate programs at local universities. We look forward to hearing back from these graduate programs to discuss possible pathways for our graduates.

Additionally, Edmonds CC has reached out to Steve Addison, Site Director - Oregon Tech Seattle Campus. He stated that the MS Manufacturing Engineering Technology degree would be a good fit for AMMET students looking to further their education. We will continue to discuss opportunities for our AMMET BAS graduates, if they choose to further their education with Oregon Tech.

Finally, we have the specific statewide articulation with WGU, which allows all BAS degrees to articulate to their Master's programs, and their Master's degree in Business Administration or Management and Leadership could be a great option for our placebound students.

Standard 8: External Expert Evaluation of the Program

Expert evaluations were provided by two representatives from two different universities, Western Washington University and Oregon Institute of Technology - Seattle Campus. They offered valuable commentary and ideas and we truly appreciate their input. Their comments will be taken under consideration as we move forward, come of the suggestions have already been implemented. We know

that the new faculty member that Edmonds CC hires for this pathway will have a tremendous amount of development work to do to get this program up and running. These insights will be extremely helpful during that final development. The college has responded back to the reviewers with responses to their inquiries and concerns, as shown in Appendix 1.

Reviewer	Biography
Western Washington University Jeff Newcomer	Dr. Jeffrey L. Newcomer is a Professor of Manufacturing Engineering and Chair of the Engineering & Design Department at Western Washington University (WWU). He has been at WWU for over 20 years and is in his eighth year as Department Chair. As Chair he led the WWU Engineering Technology programs through a successful ABET ETAC re-accreditation visit, led the transition of the Engineering Technology programs to Engineering programs, and led the new Engineering programs through a successful ABET EAC initial accreditation visit. He has a Ph.D. in Mechanical Engineering from Rensselaer Polytechnic Institute (RPI), and previously taught at RPI, University of Wisconsin – Platteville, and New England Institute of Technology.
Oregon Institute of Technology - Seattle Campus Steve Addison	Steve started his career as an Engineering Apprentice at British Aerospace before studying for his BA in Engineering at Cambridge University. He worked for several years as a Project Manager for British Aerospace before returning to Cambridge to study for his PhD in Gas Turbine Aerodynamics during which time he published a number of academic papers in ASME and other journals. This was followed by a short period of postdoctoral research at Imperial College, London where he studied Aeroelastic Effects in Gas Turbines before he returned to industry. He worked as an Engineering Consultant for Frazer Nash Consultancy on projects including design review of the heat exchanger for a combined heat and power plant, simulation of nuclear power station coolant releases, design of a diesel exhaust emissions sensor, fire suppression systems for aircraft cabins, design guidelines for vacuum cleaner fans, and system design for electrothermal guns. He then moved to Silicon Valley with a CFD software company where he worked extensively with electronics companies through North America on thermal analysis of electronic systems and components. During this time, he published academic papers in IEEE journals and other engineering publications, was a representative on the EIA JEDEC JC15 standardization committee, and developed a commercial online engineering tool for the thermal analysis of electronic components (FLOPACK). Steve then took a break from the engineering industry and worked in the e-learning and information security industries in Boston and Seattle before returning to engineering and academia when he was asked to work

on program development projects for Lake Washington Tech. At LWTech, he designed and launched an AAS Engineering Technology degree, and also developed the curriculum and proposal for LWTech's BAS Transportation and Logistics Management. He then moved to Clover Park Tech where he developed and launched CPTC's BAS in Manufacturing Operations (later renamed Operations Management). He also designed and launched CPTC's AAS-T Mechatronics, and was instrumental in securing \$2.5M in DOL TAACCCT funding for the program. On moving to Bellingham Technical College, he developed the curricula and proposals for two BAS degrees – Operations Management and Engineering Technology.

For the last 3½ years, Steve has been the Site Director for Oregon Tech's Seattle campus which delivers ABET-accredited BS Mechanical Engineering and BS Manufacturing Engineering Technology degrees to Boeing employees in the Puget Sound area. He also acts as the Program Director for Oregon Tech's MS Manufacturing Engineering Technology degree and, last year, served as the Department Chair for Mechanical and Manufacturing Engineering and Technology at all 3 Oregon Tech campuses (Klamath Falls, Portland-Metro and Seattle).

Appendices

- 1. External Evaluator Reviews
- 2. Materials Science AAS-T Degree
- 3. Tenure-Track Faculty Announcement
- 4. BAS Manager Job Description
- 5. Program Review Template
- 6. BAS Course Descriptions and Course Level Objectives
- 7. AMMET BAS Sample Curriculum Sequence
- 8. Advisory Committee Membership
- 9. Advisory Committee Meeting Minutes

Appendix 1:

External Evaluator Review

Appendix 1: External Evaluator Review

Applied Baccalaureate External Review Rubric

College Name:	Edmonds Community College	BAS Degree Title:	Advanced Manufacturing & Materials Engineering Technology		
Reviewer Name/	Jeffrey L. Newcomer	Institutional or Professional	Engineering & Design Department,		
Team Name:	,	Affiliation:	Western Washington University		
Professional License or	None	Relationship to Program,	none		
Qualification, if any:		if any:			
Please evaluate the follow	ring Specific Elements				
a) Concept and	Is the overall concept of the degree	ee program relevant and appropria	te to current employer demands as well as to		
overview	accepted academic standards? W	ill the program lead to job placeme	ent?		
	- I		not believe that the curriculum that is		
	' '		at should be addressed both in terms of the		
	• •	_	en in the Statement of Needs (SoN) and the		
	content of some of the courses. The proposed program is titled Engineering Technology, but as it is proposed it				
	will create students who are prepared to be technicians without the preparation to cross over into engineering.				
	EdCC Response: Jeff is absolutely correct, the proposed program title includes engineering technology. Program				
	graduates will be prepared to be technicians but not engineers. The program is being developed to meet an unmet				
	·	dvanced technical skills without the	e extensive math and physics requirements of (
	traditional engineering degree.				
	-	•	the need for a program that "would need to		
	have an emphasis on material science in the context of manufacturing; include chemistry and metal-based composites, and incorporate additive manufacturing technologies." I do not see that reflected in the upper-division course balance, especially at the senior (400) level. Based on the titles and learning outcomes provided, in the upper division there are two materials-focused classes (AMMET 383 & AMMET 440), and one entirely manufacturing-focused classes (AMMET 350) plus two courses mostly devoted to manufacturing (AMMET 351 & AMMET 400), while there are three classes focused on lean/6σ/QCI (AMMET 426, AMMET 427, & AMMET 429).				
		nce in the context of manufacturing	-		
			ne SoN also specifically references an		
	engineering degree at Winona Stat		•		
	composites in any of the upper-div	rision course descriptions or learnir	ng outcomes in the proposed program.		

In terms of the second issue, content of courses, the issues are varied. Some courses are trying to cover so much material that the students will only get a superficial introduction, which will then make it difficult to impossible to build off of that material in later courses. The worst offender is AMMET 302, which appears to be trying to introduce material from four traditional classes, Calculus I, Calculus II, Linear Algebra, and Numerical Computing – often a total of 18 credits – into one 5 credit course. Another is the AMMET 318, which is combining what is often 9 or 10 credits of material into one 5 credit course (that has an odd set of learning outcomes), but what is even more disturbing about that class is that it is not a pre-requisite for any course that follows it. What is the point of introducing students to fundamental engineering science content if they do not make use of itlater?

EdCC Response: We initially proposed a 'Composites/Materials Science' degree but it has morphed into more of a 'Manufacturing' degree and that is reflected in your comments. There are a couple of reasons for this.

First, when the idea for a BAS was proposed, Boeing was the only industry partner at the table. We discussed many different ideas and focused on a variety of topics that composites, manufacturing, 3D printing, and material science, etc. specific to Boeing's needs. However, we were unable to identify a specific job title associated with this position as it does not yet exist. Consequently, we began to look at employer needs outside of Boeing. The manufacturing industry is one of the largest regional employers and Boeing is a valued industry partner but they are not the only employer so we refocused our research and reached out to other industry partners to ensure we were building a program that would support allow these companies to hire our graduates.

Second, during our industry discussions we discovered that there were not very many 'Composites' nor 'Materials Science' jobs outside of Boeing. More importantly, we discovered there were many, many positions open for Manufacturing Engineering. We lumped the Manufacturing into the Materials (and appropriately so as there is a strong connection) for the SoN. The study shows that employers are more interested in a Manufacturing Engineer over a Materials Engineer and the job openings support this.

This is reflected in the curriculum, it is much stronger in Manufacturing and Quality over Materials and that should have been better reflected in the program outcomes as well as the curriculum which does need to be modified to reflect the shifted focus. We have updated the program outcomes and will continue to work on the curriculum updates.

When we look at the curriculum, it is important to remember that this is not an engineering degree and we are not trying to produce engineering graduates. We are developing a program that prepares graduates to be engineering technicians and we are developing and contextualizing the curriculum to reflect the broad (not deep) knowledge, skills, and abilities associated with industry needs.

As I mentioned above, I see the graduates of this program as employable as technicians or assistants to engineers, but I do not see the graduates of this program being prepared to do engineering work. Given the proposed content, I see this as being an Industrial Technology program rather than an Engineering Technology program, and I do not see a strong focus on "material science in the context of manufacturing", so I suggest that the content be strengthened or the title changed to reflect the content.

EdCC Response: The program title involved a lengthy and sustained discussion among the faculty, administrators, and the ETEC advisory committee members. We reviewed our industry partner needs and the ABET accreditation standards to better differentiate the requirements for engineers and engineering technicians. The curriculum we proposed in the draft proposal that was reviewed is well aligned with the ABET engineering technology requirements. The engineering technology ABET requirements are broad and this is reflected in your comments. We are working on updating the content and the program outcomes to better reflect the manufacturing focus.

b) Degree Learning Outcomes

Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?

Comment: The learning outcomes that are stated are good, but they seem incomplete. I recommend using the ABET ETAC Student Outcomes or modified versions of them rather than the proposed learning outcomes. Proposed learning outcomes 1 and 4 are essentially the same thing. Proposed learning outcome 1 is somewhat specific while proposed learning outcome 4 is general, but they both map onto ABET ETAC SO1. Proposed learning outcome 2 maps onto ABET ETAC SO3 and proposed learning outcome 3 maps onto ABET ETAC SO4, but there are no proposed learning outcomes that reflect ABET ETAC SO2 (ability to design) or ABET ETAC SO5 (ability to work on a team). Assuming that ABET ETAC accreditation is a goal, and it should be if it is not, a much better approach would be to simply adopt the ABET ETAC Student Outcomes as the program learning outcomes.

In addition to program learning outcomes that at least cover, if not match, the ABET ETAC Student Outcomes, it would be wise to develop an explicit outcomes-assessment-based continuous improvement plan that can satisfy ABET ETAC Criterion 4, for that is the criterion that has the most incidents of non-compliance during program reviews.

 $EdCC\ Response$: During October, the ETEC advisory committee met to review and discuss the program proposal and review external feedback. The committee agreed that the learning outcomes were incomplete and a robust discussion ensued. The comments Jeff provided were reviewed and discussed during the meeting. The committee and faculty have updated the outcomes as follows:

Applied Baccalaureate External Review Rubric BAS Outcomes (Revised) - Students successfully completing the AMMET BAS will be able to: 1. Demonstrate the ability to design systems, components, and/or processes using advanced materials and current technology in a variety of different manufacturing industries. 2. Apply the principles of quality, safety, and organizational skills to conduct standard tests, measurements, and/or experients and to analyze and interpret the results to improve processes in a manufacturing environment. 3. Demonstrate the ability to utilize and apply basic scientific principles of science (chemistry and physics), mathematics, engineering and technology to solve broadly defined advanced manufacturing problems in a manner that is appropriate to the discipline and complies with industry standards. 4. Demonstrate the ability to identify and use appropriate technical literature; and to effectively apply written, oral, and graphical communication in broadly defined technical and non technical environments. 5. Demonstrate the ability to function and contribute as a member as well as a leader on technical teams in a diverse environment. The AMMET BAS curriculum will additionally incorporate effective research strategies, appropriate research search tools and techniques, and emphasize important legal and ethical issues relating to information use to help ensure graduates have the research and information literacy skills they need to be successful in the workforce. c) Curriculum Does the curriculum align with the program's Statement of Needs Document?

Comment: I do not believe that the proposed curriculum is well aligned with the Statement of Needs (SoN)

document. As mentioned above, the SoN cites the need for "material science in the context of manufacturing",

Alignment

but the proposed upper-division curriculum has 10 credits on the former and 11-13 credits on the latter while it has 15 credits on lean/ 6σ /QCI topics. That balance seems inconsistent with the stated need. The SoN also references the program a Winona State University, which I agree is the only composites-focused B.S. degree in engineering in the U.S., as being what Boeing needs, or at least closest to it, but the proposed curriculum looks much more like the old PET option in MET that WWU used to offer with Additive Manufacturing in place of some of the thermoplastics topics. I understand, given the level of math in the proposed program, that the thermo, fluids, and heat transfer portions of the Winona State program are not feasible in the proposed program, but the composites focus is not explicit in the course titles or learning outcomes, so the alignment is not apparent.

EdCC Response: Thank you for your observation. We have taken note and will be working with our Advisory Committee and industry partners to ensure we are covering the appropriate topics. We will review the course outcomes and update as needed to more accurately reflect what the students will be learning.

d) Academic Relevance and Rigor Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees?

Comment: As mentioned above, the balance of courses does not seem to match the stated needs or the program title. There is also nothing specific to composites in the upper division courses, and I do not think that having three courses at the sophomore level with only a materials course and a polymers course as prerequisites is sufficient, especially since only one of the three composites courses, ETEC 200, is required, so a student might not take ETEC 250 or ETEC 260. In addition, I find it odd that two of the 300-level courses, AMMET 318 and AMMET 350, are not prerequisites for any of the 400-level courses, for both of them should be important building blocks. Based upon their titles and learning outcomes, the upper-division courses could all be useful, but they almost all appear to be broad survey classes covering many topics quickly; given the program's stated need and title I would expect much more focused courses and less time spent on lean/ 6σ /QCI topics. It is impossible for me to determine the academic rigor of the courses from their titles and learning objectives, but from that information I can conclude that most of the courses are intended for breadth rather than depth. I also think that the program would be stronger if there were some kind of thermal systems course that covered the basics of thermo, fluids, and heat transfer. In essence, the pieces may all have relevance, but they could be stronger and a different combination of courses with more focus would make for a stronger program.

EdCC Response: The curriculum meets the ABET requirements for an Engineering Technology program. This is also a BAS program and it is important to remember the intent of a BAS is to fill the gaps that are between a 2-year college and a University. Hence the Algebra-based physics and the reduction in Math requirements as opposed to the Calculus-based Physics and extensive Math that are the hallmark of a standard Engineering Program. These requirements are also the reason that the vast majority of students who start in engineering do not finish. There are

Applied Baccalaurea	ate External Review Rubric
	many schools in the area (including Jeff's) that support a classic Engineering program. We are not trying to produce a degree that competes with 4 year engineering programs.
	We appreciate Jeff's comment that this is really an 'Industrial Technology' program and that they would not be able to find engineering positions but the input we received from industry provides a different perspective. Our industry partners have manufacturing positions and they have trouble finding qualified employees with the broad set of skills, knowledge, and abilities needed for these positions. When grouped together, the most common job title associated with this skill set was an engineering degree but they acknowledged the jobs they are trying to fill don't require or use many of the skills associated with a BS in engineering. In fact, many of the skills we have included in this degree are skills that an employer must teach a new engineer because they are missing from the university curriculum.
	Are the general educations requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?
e) General	Comment: The general education content appears to meet the requirements for ABET ETAC accreditation. The
Education	one possible exception is that ABET ETAC criteria require that the curriculum: "Include topics related to
Requirements	professional responsibilities, ethical responsibilities, respect for diversity, and quality and continuous improvement." Quality and continuous improvement are the subject of AMMET 427, and ethics is explicitly included in AMMET 429, but it is not clear if or where the other two topics are covered.
	EdCC Response: Each of our upper division classes should have topics related to professional responsibilities. We will look at updating our class outcomes to ensure this is clearly demonstrated. As for respect for diversity, topics are covered in the two-year degree. All technical degrees are required to have cultural diversity and human relations courses. These topics will also be an underlying current throughout all of the upper division classes.
f) Preparation for Graduate	Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs?

Program	Comment: Possibly in Engineering Technology, but not in Engineering. Graduates of the proposed program might
Acceptance	be prepared to enter a graduate program in Engineering Technology, such as the one at CWU (though the one at CWU is not currently accepting students), but they will not be prepared to enter a graduate program in Engineering. The lack of math, the algebra-based physics, and the combined statics and mechanics of materials courses are all going to be unacceptable for most, if not all, engineering graduate programs. That said, this may not be a concern, for few graduates of Engineering Technology programs are interested in graduate programs in Engineering. When the programs at WWU were Engineering Technology programs <10% of the graduates applied to graduate programs in Engineering.
	EdCC Response: We do not anticipate our graduates pursuing graduate degrees in Engineering. Based on feedback from employers, our students will most likely pursue advanced degrees in business administration. We have reached out to various MBA programs in our area to discuss articulation agreement. The only exception is Oregon Tech Seattle Campus. EdCC has been in direct communication with their program director regarding the MS Manufacturing Engineering Technology degree.
g) Faculty	Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?
	Comment: The qualifications appear adequate, though it is common for Engineering Technology programs to expect at least three years of recent, relevant industry experience. What does not appear adequate is the salary. Looking to hire someone with both "a doctorate and field experience" at a salary that is at or below the starting salaries of program graduates does not seem to be realistic. EdCC Respose: We do realize it could be difficult to find a faculty member with the desired industry and teaching
	experience. As you noted, indiduals make significantly more money working in industry as we will need to think strategically about how and where the position is advertised.
h) Resources	Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities?
	Comment: I do not believe that the faculty resources devoted to the program are adequate. First and foremost, I worry that the program will be difficult or impossible to accredit with the faculty level at 2.0 FTE. The ABET ETAC standard for faculty is: "The faculty serving in the program must be of sufficient number to maintain continuity, stability, oversight, student interaction, and advising." Based upon our experiences with ETAC I am skeptical that a Program Evaluator will find 2.0 faculty FTE to be sufficient. Second, I think that the ratio of 12 graduates per faculty FTE is too high for maintaining program quality even if the program can maintain continuity and stability. I recommend devoting 3.0 faculty FTE to the program. I cannot speak to the other resources, for I have not toured the facilities in many years, and I am not familiar with EdCC's student support services. The equipment listed in the proposal seems sufficient as long as there is sufficient student access to it either through having enough equipment to allow students to work in parallel or having enough hours of access to allow them all enough time on it in series.

EdCC Response: Noted. We will review the budget and ABET ETAC standard for faculty. Adjustments will be made, if necessary.

i) Membership and Advisory Committee

Has the program received approval from an Advisory Committee? Has the program responded appropriately to it Advisory Committee's recommendations?

Comment: Based upon the minutes of the Advisory Committee (AC) meeting of 9/17/19 the AC is supportive of the program as it has been proposed. One topic from the AC meeting minutes that I think is very important is ABET accreditation. Having guided new programs through a first ABET accreditation, I think that it is important to design and implement a new program with ABET accreditation as a primary goal, not an eventual or long-term goal. The program must have graduates before ABET will consider it for accreditation, but the plan should be to submit the request for accreditation as the first group is nearing graduation so that they end up with accredited degrees (assuming that everything meets expectations for accreditation). Graduates with Engineering Technology degrees have fewer job options and more difficulty with career advancement than graduates with Engineering degrees, and students with unaccredited Engineering Technology degrees will be even further disadvantaged.

EdCC Response: The program has been designed and will be implemented with ABET Accreditation as a primary goal. The faculty have reviewed the student outcomes and curricular standards for Engineering Technology ABET Accreditation. We understand that the process is long and intensive and will plan accordingly.

Three quick observations about the AC: 1) it is too small, 2) it does not have enough companies represented, and 3) it should have a number of members who would be in the position to hire program graduates. Ask Boeing to provide some engineering managers, or equivalent, and reach out to other companies like Safran, Electroimpact, and Janicki who work with composites in the region and ask them to provide an AC member who is an engineering manager, or equivalent. If you really want good feedback on program content, you need to get it from people who could make hiring decisions regarding program graduates.

EdCC Response: We are currently developing strategies to increase Advisory Committee Membership. We are working with our Workforce Development and Training Department to reach out to additional companies. We recently connected with someone from Electroimpact, who is interested in reviewing our proposed degree. We hope to strength this partnership and will invite that person to serve on our advisory committee.

j) Overall assessment and recommendations Please summarize your overall assessment of the program.

Comment: Engineering Technology programs span a wide range from being virtually Engineering programs to being virtually Industrial Technology programs. Sadly, I see the proposed program as being on the weaker side, much more like an Industrial Technology program than an Engineering program. It is broad and unfocused, and it has a weak math, physics, and engineering science foundation. If the impetus for this program really is developing something to support composites operations and to create graduates that understand both the materials aspects of composites, including chemistry and characterization, and manufacturing aspects of composites, including tooling and machining, then focus on those things and make them explicit. If Winona State's program is the model, then mimic the parts that are relevant to local industry and fit within the Engineering Technology context. I also recommend making ABET ETAC accreditation a primary goal, devoting at least 3.0 faculty FTE to the program, and increasing the size of and diversifying the Advisory Committee.

EdCC Response: Thank you for taking the time to review our proposed program and the comments you have provided. The feedback you have provided has been valuable and has already lead to updates, helping us develop a high quality program.

Reviewer Bio or Resume

Dr. Jeffrey L. Newcomer is a Professor of Manufacturing Engineering and Chair of the Engineering & Design Department at Western Washington University (WWU). He has been at WWU for over 20 years and is in his eighth year as Department Chair. As Chair he led the WWU Engineering Technology programs through a successful ABET ETAC reaccreditation visit, led the transition of the Engineering Technology programs to Engineering programs, and led the new Engineering programs through a successful ABET EAC initial accreditation visit. He has a Ph.D. in Mechanical Engineering from Rensselaer Polytechnic Institute (RPI), and previously taught at RPI, University of Wisconsin – Platteville, and New England Institute of Technology.

College Name:	Edmonds Community College	BAS Degree Title:	Advanced Manufacturing and Materials Engineering Technology		
Reviewer Name/ Team Name:	Dr. Steve Addison	Institutional or Professional Affiliation:	Oregon Institute of Technology (Oregon Tech)		
Professional License or Qualification, if any:		Relationship to Program, if any:			
Please evaluate the followi	ng Specific Elements				
a) Concept and overview	Is the overall concept of the degree accepted academic standards? Will		te to current employer demands as well as to ent?		
	The shortage of qualified manufacturing employees in the Puget Sound area is well-documented, and the emergence of new technologies (composites, robotics and automation, IIOT) and production challenges (supply chain globalization, competition from emerging markets) means that the time available in a traditional Associate's degree is insufficient to prepare students. A degree such as the proposed BAS AMMET is the perfect way for students to be able to acquire more of the knowledge, skills and abilities that they will need to be successful. Students who successfully complete this program are certain to be in high demand by employers. The proposed BAS AMMET degree also addresses the (often ignored) challenge of upskilling employees with existing Associate's degrees or apprenticeships as the nature of modern manufacturing changes. By providing a pathway whereby a working adult can acquire additional knowledge, skills and abilities, both employees and employers will benefit. EdCC Response: This is great to hear, certainly validates our findings.				
b) Degree Learning Outcomes	Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor? Comment				
	Yes. This is clearly demonstrated by the alignment of the BAS AMMET program learning outcomes with the ABET ETAC General Criteria for baccalaureate level degree programs. EdCC Response: Great!				
c) Curriculum Alignment	Does the curriculum align with the Comment	program's Statement of Needs D	Oocument?		

	Whereas the Statement of Need placed a very heavy emphasis on the requirements for engineers and technologists with expertise in working with composite materials, the proposed curriculum presents a well-rounded set of courses that will equip students to work in a broader range of manufacturing companies. This is a wery wise move since not every manufacturing company in the Puget Sound is involved in composites manufacturing. EdCC Response: Thank you!
d) Academic Relevance and Rigor	Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees? Comment
	 Based on: The survey findings documented in the Statement of Need ABET ETAC criteria for Manufacturing Engineering Technology Personal discussions with manufacturers in the Puget Sound region I consider the courses described in Appendix 6 to align well with employer needs and demands. Based on the course outcomes presented in Appendix 6, the courses would appear to have been designed with appropriate rigor for a baccalaureate degree. The quality and rigor of the teaching cannot be assessed at this time.
	Are the general educations requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?
e) General Education Requirements	Comment Yes — they appear to meet both the SBCTC requirements, and also the ABET ETAC requirements.
a) Preparation for Graduate Program	Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs? Comment
Acceptance	There are relatively few graduate programs in Engineering Technology at this time. However, I can certainly say

	that successful completion of the proposed BAS degree, ideally coupled with some industry experience, would be
	good preparation for Oregon Tech's MS Manufacturing Engineering Technology.
	EdCC Response: Great! We would be happy to talk more about this option for our graduates.
f) Faculty	Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?
	Comment
	The faculty identified in Table 5 appear to be well-qualified to teach in the program.
	With regard to the requirements for the Full-Time faculty position:
	 I do not believe that a Masters or PhD degree in Physics is an appropriate qualification for an Engineerin Technology position unless the candidate has a very significant amount of manufacturing engineering an technology experience.
	2) The 9-month contract for this position means that there will be no program faculty available during the critical summer term when many new students would be applying to the program and/or taking preparatory courses.
	EdCC Response: Physics has been removed from the job description. The contact will be reviewed and adjusted if needed. Our BAS Manager will be available during the summer to assist students with general admission requirements and initial course waivers. If we find that more specific assistant is needed, such as waiving requirements based on previous work experience, we will consider having the faculty available.
g) Resources	Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities?
	Comment
	I am unable to comment on EdCC's library or student services. However, I can say that the engineering laborato and workshop facilities available to students in the program are certainly adequate to support the proposed program, and would be the envy of many 4-year engineering schools.
	EdCC Response: Thank you!
h) Membership and Advisory	Has the program received approval from an Advisory Committee? Has the program responded appropriately to Advisory Committee's recommendations?

1	plica baccalac	
	Committee	Comment
		I am unable to comment on this.
		EdCC Response: Advisory Committee approval is in the meeting minutes. We had a follow up meeting with the
		advisory committee to discuss the program outcomes, which were adjusted from the original outcomes.
i)	Overall	Please summarize your overall assessment of the program.
	assessment and	Comment
	recommendations	
		The overall concept behind the degree is very solid. It includes all of the major components that I would
		expect to see in an Engineering Technology degree and, based on the course learning outcomes listed
		in Appendix 6, broadly complies with the requirements of the ABET ETAC Program Criteria for
		"Manufacturing Engineering Technology and Similarly Named Programs". It also provides a well-
		rounded set of skills that will be useful in a wide range of manufacturing sub-sectors.
		I strongly recommend approval of this degree.
		5 5 7 7 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
		EdCC Response: Thank you for your feedback! We really appreciate your review.
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Other Comments/Suggestions

- 1) The approach to admissions described in "Standard 3: Selective Admissions Process" and Table 7 is to be applauded for the way that it combines a program admission policy consistent with open access, with the stricter requirements for admission to the upper-division which are needed for academic rigor and to meet ABET ETAC requirements. However, a little more clarity would be helpful in explaining how this might work in practice perhaps showing examples of how it might apply to a student entering from a Machining AAS program, a student entering from an AST-2 pre-engineering program, a student with a degree from another state ...
 - EdCC Response: Thank you! We plan to work with our local CTC's to develop pathways for as smooth of a transition as possible. We are currently looking at programs that may feed our AMMET BAS program and will schedule meetings with the appropriate people on each campus to discuss articulations.
- 2) I was a little surprised that there was no communication requirement for program admission. Most BAS programs seem to require ENGL&101 for entry.
 - EdCC Response: Good catch. We have updated this in the proposal. Thank you!
- 3) It might be advisable to require an Ethics course as one of the Humanities Gen Eds, and (Micro) Economics as one of the Social Science Gen Eds. This would make it easier when the time comes for ABET ETAC accreditation.
 - EdCC Response: Great suggestion. We will take this back to our curriculum committee, advisory committee, and local employers for feedback.
- 4) The use of the term "Co-requisite" when discussing admissions requirements is very confusing since there is no indication of which other course(s) require these co-requisites
 - EdCC Response: In this case, the classes are a co-requisite of the program which must be completed within the first year.
- 5) Appendix 7 indicates that a 3-quarter teaching schedule is planned for this program. Experience suggest that, if a large number of students are working adults, 4-quarter teaching will become a necessity since most working adults seem to prefer to complete as quickly as possible.
 - EdCC Response: This is something we will need to consider moving forward, especially in the light of the ABET Accreditation requirements. Students can easily complete general education requirements during summer quarter but we may need to look at

introducing a summer schedule that includes one or two upper division classes.

- 6) If some of the students are, as expected, adults working in manufacturing companies, it is possible that they will be working 2nd or 3rd shift. It would be helpful to understand how this would be accommodated by the program.
 - EdCC Response: We will be working with local employers and students to find the best solution for this. We are open to offering classes on the weekends, if student demand is sufficient.
- 7) Currently, 50% of the advisory board is from one company Boeing. Although Boeing is a critically important voice to be heard, more representation from companies and other areas of manufacturing would be advisable.

EdCC Response: We are currently developing strategies to increase our advisory committee members. We are working with our Workforce Development and Training Department to reach out to additional companies. We recently connected with someone from Electroimpact, who is interested in reviewing our proposed degree. We also recently added a new member from ElectroImpact to our Advisory Committee.

Reviewer Bio or Resume

Evaluator, please insert a short bio here

Steve started his career as an Engineering Apprentice at British Aerospace before studying for his BA in Engineering at Cambridge University. He worked for several years as a Project Manager for British Aerospace before returning to Cambridge to study for his PhD in Gas Turbine Aerodynamics during which time he published a number of academic papers in ASME and other journals. This was followed by a short period of postdoctoral research at Imperial College, London where he studied Aeroelastic Effects in Gas Turbines before he returned to industry.

He worked as an Engineering Consultant for Frazer Nash Consultancy on projects including design review of the heat exchanger for a combined heat and power plant, simulation of nuclear power station coolant releases, design of a diesel exhaust emissions sensor, fire suppression systems for aircraft cabins, design guidelines for vacuum cleaner fans, and system design for electrothermal guns. He then moved to Silicon Valley with a CFD software company where he worked extensively with electronics companies through North America on thermal analysis of electronic systems and components. During this time, he published academic papers in IEEE journals and other engineering publications, was a representative on the EIA JEDEC JC15 standardization committee, and developed a commercial online engineering tool for the thermal analysis of electronic components (FLOPACK).

Steve then took a break from the engineering industry and worked in the e-learning and information security industries in Boston and Seattle before returning to engineering and academia when he was asked to work on program development projects for Lake Washington Tech. At LWTech, he designed and launched an AAS Engineering Technology degree, and also developed the curriculum and proposal for LWTech's BAS Transportation and Logistics Management. He then moved to Clover Park Tech where he developed and launched CPTC's BAS in Manufacturing Operations (later renamed Operations Management). He also designed and launched CPTC's AAS-T Mechatronics, and was instrumental in securing \$2.5M in DOL TAACCCT funding for the program. On moving to Bellingham Technical College, he developed the curricula and proposals for two BAS degrees — Operations Management and Engineering Technology.

For the last 3½ years, Steve has been the Site Director for Oregon Tech's Seattle campus which delivers ABET-accredited BS Mechanical Engineering and BS Manufacturing Engineering Technology degrees to Boeing employees in the Puget Sound area. He also acts as the Program Director for Oregon Tech's MS Manufacturing Engineering Technology degree and, last year, served as the Department Chair for Mechanical and Manufacturing Engineering and Technology at all 3 Oregon Tech campuses (Klamath Falls, Portland-Metro and Seattle.

Applied Baccalaureate External Review Rubric		

Appendix 2:

Materials Science AAS-T

Communication (10 credits)		
ENGL&101	English Composition	5
ENGR 231	Technical Writing	5
Quantitative/Symbolic Reasoning (5 credits)		
MATH&142	Precalculus II	5
Humanities (5 credits)		
CMST&220	Public Speaking	5
Natural Sciences (10 credits)		
CHEM&139 or higher	General Chemistry Prep	5
PHYS&114 or higher	General Physics I	5
Program Requirements (60 credits)		
ENGR&114	Engineering Graphics	5
ETEC 175	Intro to Materials Science	5
ETEC 180	Polymer Technology	5
ETEC 200	Intro to Composites	5
ETEC 215	Applied Statics	5
ETEC 220	Applied Strengths of Materials	5
ETEC 250	Composites Engineering Design	5
ETEC 260	Composites Manufacturing	5
MGMT 100	Human Relations in Organizations	5
ETEC 292	Career Planning	2
STEM 101 or ENGR 100	Career and College Success in STEM or Career and College Success in Engineering	3
Technical Elective	See Advisor for Technical Elective Courses	10
	Total Credits	90

Appendix 3:

Full Time Faculty - Engineering Technology - Advanced Manufacturing and Materials Applied Baccalaureate Degree Program (Draft Position Announcement)

Salary: ~\$62,500 Annually (Will need to be updated depending on posting date and contract negotiations)

Location: Lynnwood, WA

Job Type: Full-Time Faculty

Department: STEM (Science, Technology, Engineering, and Math)

Closing: TBD (Will be updated when posting date is determined)

Edmonds Community College is committed to diversity, equity and social justice. The college values its talented, diverse workforce and seeks to attract, hire, and support employees who consistently and actively embrace diversity and equity. We are intentional about social justice – the active engagement toward equity and inclusion that addresses issues of institutional, structural, and environmental inequity, power and privilege.

Full Time Faculty - Engineering Technology - Advanced Manufacturing and Materials Engineering Technology BAS Degree Program

DESCRIPTION: Edmonds Community College is recruiting for a full-time, tenure-track faculty to teach in the interdisciplinary Bachelor of Applied Science program in Advanced Manufacturing and Materials Engineering Technology (AMMET). This individual will take a leadership role in building a new program within the college and the community and will serve as department head for this degree. This instructor will teach upper division courses that integrate and build on the skills and knowledge developed from both the computer information systems and computer science disciplines.

The teaching load for this position will include coursework in the AMMET program such as: Materials Characterization, Lean Manufacturing, Quality and Continuous Control, and Product Design, Tooling, and Assembly. This instructor may also teach core courses in the Engineering Technology and/or Engineering(?), as required.

Candidates with an interest and/or experience in developing programs focusing on growing the advanced manufacturing workforce pipeline, increasing diversity and minimizing the equity gap within the aerospace and manufacturing community are especially encouraged to apply.

Full-time faculty are responsible for supporting student learning by teaching assigned classes to a diverse student body in on-campus, hybrid and lab environments; developing and revising curriculum and researching new trends in application development; assisting with program approval, articulation and accreditation processes; preparing teaching materials; developing and assessing student learning outcomes to evaluate student work; assigning grades and maintaining required records; assisting with the development of practicum sites, working with members, and providing academic and career advising to prospective and current students to support their success.

For information on how to apply, please see **Application Procedures and Required Documents**, below.

This is a full-time, tenure track position reporting to the Dean of STEM (Science, Technology, Engineering and Math).

QUALIFICATIONS:

MINIMUM QUALIFICATIONS:

- Master's degree in Engineering, Material Science, Composites, or a closely related field.
- One year experience in program management, including program development, budgeting and tracking of program outcomes.
- Two years of relevant manufacturing industry experience related to engineering, material science, advanced manufacturing, composite manufacturing, or a closely related field.
- One year of leadership experience in a professional capacity that may include: work experience, work with professional and community organizations, grant research and writing, or applied academic research.
- One year of recent full-time or equivalent part-time college teaching experience in a related field of advanced manufacturing, composites, physical sciences, or engineering or a similar field in IT.
- Excellent writing and critical thinking skills as demonstrated in application material.

DESIRED QUALIFICATIONS:

- Doctorate degree in Engineering, Material Science, Composites, or a closely related field.
- Two years of administrative or supervisory experience with a leadership role in an advanced manufacturing field, composites, material science, engineering, or a closely related field.
- Demonstrated ability to form active industry partnerships that support program development, recruitment and collaboration to provide internship and student employment opportunities.
- Demonstrated expertise through applied academic research in an area related to Engineering, Material Science, Composites, Physics(?), or a closely related field.
- Two years of equivalent full-time teaching in a community college or university setting that demonstrate understanding and implementation of current, student-centered pedagogy focused on active learning and effective assessment of teaching methods to support student engagement and success.
- Demonstrated instructional experience with online learning management systems, such as Canvas or Blackboard, and skills that support student use of eLearning technologies.
- Knowledge of and current affiliation with industry associations and/or professional organizations that support innovation, recruitment, and diversity in the IT industry sector.
- Demonstrated commitment to inclusivity and respect for a diverse community college environment comprised of students, faculty, and staff of varying social, economic, cultural, ideological and ethnic backgrounds.

ADDITIONAL INFORMATION: COMPENSATION:

The starting salary will be \$_____ annually for a 172-day appointment. The college provides an excellent benefits package which includes medical, dental, life insurance, and a retirement plan.

PHYSICAL WORK ENVIRONMENT:

Work is typically performed in a classroom and office and requires standing and/or sitting for extended periods of time. The ability to speak clearly and fully comprehend written and spoken English is essential. Instructors are required to use a computer in the work environment.

CONDITIONS OF EMPLOYMENT:

- You must document your citizenship or employment authorization within three days of hire.
- Criminal background check. Prior to a new hire, a background check including criminal history will be conducted. Information from the background check will not necessarily preclude employment but will be considered in determining the applicant's suitability and competence to perform in the position.
- All new positions are contingent upon funding.
- At this time, Edmonds Community College does not sponsor H1-B Visas.

APPLICATION PROCEDURES AND REQUIRED DOCUMENTS:

All applicants must apply online. No paper submissions or emailed materials will be accepted. Your online application must include the following documents in order to be complete:

- 1. Cover letter that addresses the required and preferred qualifications (Please provide thorough responses detailing how your experience relates to the position.)
- 2. Current resume.
- 3. Names and contact information for three references.
- 4. For veterans' preference, please scan and attach your DD214, Member-4 Form.
- 5. Response to the supplemental questions below.

If you are selected for an interview, we will ask that you bring one copy of the following with you:

- Two current letters of recommendation.
- Transcripts(s) of your collegiate courses. Examples of your instructing resources (lectures, quizzes, projects, exams, etc.) from a course that you feel best reflects your instructional style.

Important, if this posting is on an external website other than www.governmentjobs.com/careers/edcc please select one of these links to apply. Applying via an external webpage will not enter our application system.

ABOUT THE COLLEGE:

Established in 1967, Edmonds Community College is a public, two-year, state community college. It focuses on academic excellence, student success, and community engagement, which reflect the three aspects of its mission: Teaching | Learning | Community. It serves about 20,000 students annually, including more than 1,000 international students from more than 60 countries. The college offers nearly 70 associate degrees and 60 professional certificates in about 30 programs of study. Its highest enrolled programs are the Associate of Arts/Associate of Science degrees, Paralegal, Allied Health (pre-nursing degree), Business/Accounting, Construction Management, and Culinary Arts. The college is located in the center of the growing south Snohomish County communities of Edmonds, Lynnwood, Mountlake Terrace, Brier, Mill Creek, Mukilteo, and Woodway. For more information, visit www.edcc.edu.

EEO/AFFIRMATIVE ACTION STATEMENT:

Edmonds Community College is an equal op portunity employer and assures equality of treatment in educational and employment opportunities without regard to race, color, religion, national origin, sex (gender), disability, sexual orientation, age, citizenship status, marital status, veteran status, or genetic information. Applicants with disabilities who require assistance with the recruitment process may call 425-640-1470 or 425-640-1832, and accommodations will be made to the extent reasonably possible. The Human Resources Office is accessible to persons with disabilities.

Instructor - AMMET BAS Degree Program - Supplemental Questions

- 1. The position will teach in an integrated, interdisciplinary program that focuses on the knowledge and acquisition of skills within the Advanced Manufacturing and Materials Program. How has your professional and academic experience prepared you to develop, build, and teach in an applied bachelor program focused on advanced Manufacturing and Materials.
- 2. Describe how your background and experience reflect your commitment to equity and inclusion. How will you apply this in the classroom, in the development of curriculum, and in program development and recruitment to ensure you are creating an inclusive environment that supports EdCC's diverse student body, the campus community, and beyond.
- 3. Describe your pedagogy for supporting adult learners. Since instruction will be both online and on-campus, give specific examples of how you have engaged and assessed students in both modalities.
- 4. As the department head of an interdisciplinary Advanced Manufacturing Bachelor of Applied Science (BAS) program at the college, please provide examples of how you will encourage and support departmental collaboration and student success within our college community and with local industry and state partners.

Appendix 4:

BAS Manager - Advanced Manufacturing and Materials Engineering Technology Degree Program (Draft Position Announcement)

Salary: \$56,000 Annually (Estimated - will be updated closer to hire date)

Location: Lynnwood, WA

Job Type: Full-Time

Department: STEM (Science, Technology, Engineering, and Math)

Job Number: Exempt (Specific number will be determined when posted)

Closing: TBD (Will be updated when posting date is determined)

Edmonds Community College is committed to diversity, equity and social justice. The college values its talented, diverse workforce and seeks to attract, hire, and support employees who consistently and actively embrace diversity and equity. We are intentional about social justice – the active engagement toward equity and inclusion that addresses issues of institutional, structural, and environmental inequity, power and privilege.

BAS Manager - Advanced Manufacturing and Materials Engineering Technology Degree Program

DESCRIPTION: The BAS Manager works to support the college mission and goals, and to recruit and retain students into the applied baccalaureate program. As the first point of contact for students and community members, this position promotes excellence, facilitates student recruitment and success, and helps to maintain a cooperative and inclusive learning community. This position will be the liaison and primary point of contact for all students, employers, alumni, campus departments, faculty and staff for the BAS in Advanced Manufacturing and Materials Program. It requires some evening and occasional weekend commitments.

For information on how to apply, please see **Application Procedures and Required Documents**, below.

Responsibilities of the BAS Manager include:

- Engaging in recruitment and outreach of students
- Coordinating student information sessions; developing and managing the application process for the program, coordinating and managing program admissions, student orientation and student intake
- Tracking program outcomes
- Developing and maintaining marketing and web site materials Working closely with faculty to advise students for registration
- Tracking budgets and enrollment reports
- Supervising work-study and program interns
- Coordinating quarterly class schedules with faculty
- Working closely with faculty to monitor practicums
- Performing outreach to the campus at large and to the general community Managing the BAS graduation process
- Attending local, college and state meetings
- Performing general office and program operations in support of the BAS program

This is an exempt position, reporting to the Dean of STEM (Science, Technology, Engineering and Math).

QUALIFICATIONS:

MINIMUM QUALIFICATIONS:

- At least one year experience in a student support position that works directly with students at a community college or university.
- Bachelor's degree in a STEM field or alternative field with training experience or interest in engineering, composites, and/or advanced manufacturing.
- One year experience in program management, including program development, budgeting and tracking of program outcomes.
- Demonstrated commitment to inclusivity and respect for a diverse community college environment comprised of students, faculty, and staff of varying social, economic, cultural, ideological and ethnic backgrounds.

DESIRED QUALIFICATIONS:

- Master's degree in a STEM field, higher education, or alternative field with industry or training experience related to engineering, composites, or manufacturing.
- Excellent English speaking, listening, problem-solving, critical thinking, research, editing and writing skills.
- Two years experience working within the community college environment or higher education, particularly in advising, enrollment services or instruction.
- Collaborative experience working with departments and agencies to meet program goals, and with community members in an advisory board capacity.
- Successful student recruitment and outreach experience, tracking of program outcomes, and development of appropriate marketing materials, application process, etc.; experience with employer engagement and outreach for internship and student employment.
- Familiarity with Bachelor of Applied Science program development either in Washington state or nationally.
- Knowledge of and current affiliation with industry associations and/or professional organizations that support programming and recruitment in application development, manufacturing, composites, aerospace, etc.
- Experience with budget development, tracking and management.
- Evidence of ability to use technologies, including web development, social media, word processing, spreadsheet and presentation software, email, and learning management systems, and to incorporate and assess the efficacy of new technologies in work-flow assessment and daily practice.

Additional Information PHYSICAL WORK ENVIRONMENT:

Work is typically performed in an office setting, and requires the use of a personal computer. The ability to use a telephone, personal computer, and other electronic technology is required. The ability to make sound judgments is essential. The ability to speak, hear, and write effectively is required. The ability to effectively communicate with multiple agencies, stakeholders, and program participants is essential.

COMPENSATION:

Salary is \$55,887- \$ 61,703 per year and is based on the Edmonds CC administrative/exempt salary schedule, plus a full state benefits package, which includes tuition waivers for college classes, medical, dental, retirement

options and more. Vacation and leave package includes 12 sick days per year, 10 scheduled holidays, 1 personal holiday, and 24 vacation leave days per year.

CONDITIONS OF EMPLOYMENT:

- You must document your citizenship or employment authorization within three days of hire.
- Criminal background check. Prior to a new hire, a background check including criminal history will be conducted. Information from the background check will not necessarily preclude employment but will be considered in determining the applicant's suitability and competence to perform in the position.
- All new positions are contingent upon funding.
- At this time, Edmonds Community College does not sponsor H1-B Visas.

APPLICATION PROCEDURES AND REQUIRED DOCUMENTS:

All applicants must apply online. No paper submissions or emailed materials will be accepted. Your online application must include the following documents in order to be complete:

- 1. Cover letter that addresses the required and preferred qualifications (Please provide thorough responses detailing how your experience relates to the position.)
- 2. Current resume.
- 3. Names and contact information for three references.
- 4. For veterans' preference, please scan and attach your DD214, Member-4 Form.

Important, if this posting is on an external website other than <u>www.edcc.edu/hr</u> or <u>https://www.governmentjobs.com/careers/edcc</u> please select one of these links to apply. Applying via an external webpage will not enter our application system.

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Appendix 5:

Program Review Template

Name of Program:

Program Goals

- 1. What were your program goals last year?
- 2. How were these goals met or why were they not met?
- 3. How do program goals align with or relate to the College Mission and/or to the college's Strategic Plan or other relevant goals?

Review and Assessment of Student Learning

- 1. List program learning outcomes (PLOs) and other relevant standards and indicators.
- 2. Describe areas where students are doing well and where improvements are needed. Please provide evidence.

Student Enrollment and Persistence

- 1. Review and analyze data to identify any trends or patterns in student enrollment, retention, completion, demographics, etc. that might affect your program.
- 2. Describe how educational and employment trends might affect the program.
- 3. What additional data would the program like to review to evaluate student success?

Action and Summary Plan

- 1. Identify changes in your program and curriculum based on assessment of student learning outcomes or other factors.
- 2. What are your program goals for the next year?
- 3. Identify next steps, set a timeline, and include resource needs. Indicate if resource needs are tied to the college's mission, strategic plans, and/or other factors.

Appendix 6:

BAS Course Descriptions and Course Level Objectives

Course Title

AMMET 302 Calculus and Advanced Mathematics

Catalogue Description

An overview of Differential Calculus, Integral Calculus, and Linear Algebra as well as an introduction to other advanced math concepts. Computer modeling will be utilized to solve complex problems in Advanced Manufacturing.

Learning Outcomes

- 1) Solve problems involving the concept of the derivative and integral using symbolic, graphical, and numerical techniques.
- 2) Evaluate technical application problems using advanced mathematical principles.
- 3) Perform the matrix operations of addition, scalar multiplication, and matrix multiplication
- 4) Evaluate advanced applications of vectors.
- 5) Utilize computer modeling to determine solutions for mathematical problems.

Prerequisites

ETEC 150 or higher

Credits

5

Course Title

AMMET 318 Applied Statics and Mechanics of Materials

Catalogue Description

Study of forces acting on structures at rest: free body diagrams (FBDs), trusses, and friction. Analysis of tension, compression, shear, deformation, and stress acting on members. Includes both external and internal forces. Students will use mechanical test equipment to verify their calculations.

Learning Outcomes

- 1) Explain the physical meaning of force and momentum equilibrium.
- 2) Draw a correct and complete FBD of forces and moments for a structure.
- 3) Evaluate trusses using method of joints and method of sections.
- 4) Explain the concept of friction and apply it to structural analysis.
- 5) Select, combine, and apply tools to analyze tension, compression, shear, deformation, torsion, and stress of members.
- 6) Use materials testing procedures and equipment to measure mechanical properties.

Prerequisites

AMMET 302

Credits

5

Course Title

AMMET 327 Statistics and Applications

Catalogue Description

Introduction to Statistics used in industry for evaluating quantitative variables. Also includes an introduction to statistical applications such as Statistical Process Control, Sampling Plans, and Design of Experiments.

Learning Outcomes

- 1) Compute appropriate summary statistics for quantitative variables.
- 2) Employ statistical decision making by constructing and evaluating a confidence interval and performing a hypothesis test.
- 3) Track and evaluate the performance of a production line using Statistical Process Control.
- 4) Create a Design of Experiments (DOE) and analyze the results.
- 5) Compute the probability of locating an issue using sampling plans.
- 6) Apply linear regression techniques.
- 7) Utilize process and performance capability.

Prerequisites

AMMET 302

Credits

5

Course Title

AMMET 350 Additive and Subtractive Manufacturing

Catalogue Description

Topics include traditional manufacturing techniques, such as CNC machining, etc. as well as newer developing technologies such as 3D printing. Students will use these systems to create parts and assemblies.

Learning Outcomes

- 1) Determine effective methods of setting up additive manufacturing systems.
- 2) Create parts by programming and using CNC machines.
- Evaluate the different techniques of additive and subtractive manufacturing.
- 4) Work in teams to design and build complex structures using a combination of additive and subtractive manufacturing techniques.

Prerequisites

AMMET 231

Credits

5

Course Title

AMMET 351 Manufacturing Systems, Automation, and Operations

Catalogue Description

This class covers a variety of manufacturing systems and how to determine their best application to a given situation. Students will learn about automation and how it can be used effectively in a manufacturing environment. Techniques to build and maintain a production operation will be covered.

Learning Outcomes

- 1) Evaluate the role of project management in a variety of contemporary organizational structures.
- 2) Define different manufacturing operations and determine the optimal system for a given production need.
- 3) Apply the theories of manufacturing operations to real world situations.
- 4) Design and operate an automation system to accomplish in production operation.

Prerequisites

AMMET 302

Credits

5

Course Title

AMMET 383 Materials Characterization

Catalogue Description

Principles and applications of materials characterization methods and results analysis. Students will learn to use NDI systems and how they relate to material properties. Extensive use of material crystal structure and microstructure will be emphasized to better understand materials.

Learning Outcomes

- 1) Evaluate the results of Non Destructive Inspection techniques.
- 2) Apply sample preparation techniques for materials characterization.
- 3) Analyze the characterization of materials phases and crystal structures.
- 4) Evaluate the properties of materials based on their microstructure.

Prerequisites

AMMET 302

Credits

5

Course Title

AMMET 400 Product Design, Tooling, and Assembly

Catalogue Description

Introduction to the design and production process. Students will work on all aspects of product design from idea to production release. Alternative process will be presented for students to determine the optimum solutions to various design/production issues.

Learning Outcomes

- 1) Evaluate the difference between part design and tooling design.
- 2) Evaluate the common design methodologies, including Design Build Teams.
- 3) Utilize project management techniques to create an assembly using design, tooling, and assembly techniques.
- 4) Evaluate different assembly techniques.

Prerequisites

AMMET 351

Credits

5

Course Title

AMMET 426 Lean Manufacturing

Catalogue Description

Introduction to lean manufacturing using the six sigma process improvement structure. Manage the value stream of processes with techniques such as identifying waste, transition to pull, use of Kanban's, 5S, and supply chain management.

Learning Outcomes

- 1) Create a continuous improvement processes including lean, six-sigma, and total quality management.
- 2) Combine the techniques of Lean Manufacturing to create a replenishment pull system.
- 3) Calculate and evaluate the process cycle time, process cycle efficiency, critical work in process, and inventory turns.
- 4) Create a 5S system.

Prerequisites

Credits

5

Course Title

AMMET 427 Quality and Continuous Improvement

Catalogue Description

This class covers the quality sciences. Quality standards and systems will be covered in depth as well as document control systems. Continuous improvement will be covered using practice audits and six-sigma projects.

Learning Outcomes

- 1) Compare different document control processes.
- 2) Analyze different Quality Standards, including FDA CFRs, and FAA regulations.
- 3) Create, perform, and evaluate a quality audit.
- 4) Create a calibration program.
- 5) Create a six-sigma process improvement project.
- 6) Analyze different Quality Management Systems, including ISO9001.
- 7) Apply and evaluate the Tools of Quality.

Prerequisites

AMMET 327

Credits

5

Course Title

AMMET 429 Industrial Organization, Safety, and Management

Catalogue Description

This course covers the management of production operations in a manufacturing environment. Management of both people and processes will be covered. A special emphasis on Safety and Risk Management is included. This class will also help students to make good ethical decisions in production operations.

Learning Outcomes

- 1) Evaluate, assess, and control risk using risk management techniques.
- 2) Evaluate different project management techniques by creating a manufacturing based project.
- 3) Plan for the use of safety equipment and systems, including LOTO and PPE.
- 4) Evaluate complex situations in an organization using good ethics.

<u>Prerequisites</u>

AMMET 327

Credits

5

Course Title

AMMET 440 Advanced Materials Science

Catalogue Description

A more in-depth view of materials science, focusing on metals, ceramics, polymers, and composites. Includes their properties and processing. A special focus will be given to the electrical, thermal, and optical properties of materials.

Learning Outcomes

1) Predict and evaluate the electrical properties of materials and select appropriate materials for given applications.

- 2) Analyze the failure types of different materials and select appropriate materials for given applications.
- 3) Predict and evaluate the thermal properties of materials and select appropriate materials for given applications.
- 4) Predict and evaluate the optical properties of materials and select appropriate materials for given applications.

Prerequisites

AMET 383

Credits

5

Course Title

AMMET 454 Capstone I

Catalogue Description

This course is the first of a two-part capstone practicum series. Students will work in teams to implement their acquired knowledge through the creation of defined projects in order to master their materials and manufacturing skills.

Learning Outcomes

- 1) Work together effectively in teams.
- 2) Clearly define a problem and utilize appropriate research methods to identify viable solutions.
- 3) Develop a solution to a manufacturing and/or materials problem using the skills developed in the program.
- 4) Utilize project management techniques to design and build a project.
- 5) Develop a written and oral presentation that evaluates the effectiveness of the project.

Prerequisites

AMMET 400, AMMET 426, and AMMET 440

Credits

5

Course Title

AMMET 455 Capstone II

Catalogue Description

This course is the second of a two-part capstone practicum series. Students will work in teams to implement their acquired knowledge through the creation of defined projects in order to demonstrate mastery materials and manufacturing skills.

Learning Outcomes

- 1) Work together effectively in teams.
- 2) Clearly define a problem and utilize appropriate research methods to identify viable solutions.
- 3) Develop a solution to a manufacturing and/or materials problem using the skills developed in the program.
- 4) Utilize project management techniques to design and build a project.
- 5) Develop a written and oral presentation that evaluates the effectiveness of the project.

<u>Prerequisites</u>

AMMET 454

Credits

5

Appendix 7:

AMMET BAS Sample Curriculum Sequence

Full-Time Sequence

Year 3

Summer	Fall	Winter	Spring
	AMMET 302 (5 credits)	MATH&146 (5 credits)	AMMET 383 (5 credits)
	ETEC 230 (4 credits)	ETEC 231 (4 credits)	AMMET 350 (5 credits)
	PHIL 110 (5 credits)	AMMET 318 (5 credits)	AMMET 351 (5 credits)

Year 4

Summer	Fall	Winter	Spring
General Elective	AMMET 400 (5 credits)	AMMET 454 (5 credits)	AMMET 455 (5 credits)
	AMMET 426 (5 credits)	AMMET 427 (5 credits)	AMMET 429 (5 credits)
	AMMET 440 (5 credits)	General Elective (5 credits)	Humanities (5 credits)

Part-Time Sequence

Year 3

Summer	Fall	Winter	Spring
	AMMET 302 (5 credits)	MATH&146 (5 credits)	AMMET 350 (5 credits)
	ETEC 230 (4 credits)	ETEC 231 (4 credits)	AMMET 351 (5 credits)

Year 4

Summer	Fall	Winter	Spring
General Elective	AMMET 400 (5 credits)	AMMET 318 (5 credits)	AMMET 383 (5 credits)
	General Elective (5 credits)	PHIL 110 (5 credits)	Humanities (5 credits)

Year 5

Summer	Fall	Winter	Spring
	AMMET 426 (5 credits)	AMMET 454 (5 credits)	AMMET 455 (5 credits)
	AMMET 440 (5 credits)	AMMET 427 (5 credits)	AMMET 429 (5 credits)

Appendix 8:Advisory Committee Membership

Name	Title	Company
Yonas Behbound	MP&P Technical Analyst	Boeing
Steven Duce	Manufacturing Tech II	Philips Healthcare
Zach Forland	Sales Consultant/CAD Drafter	ACS
Luan Hoang	Automation Engineer	Boeing
George Parker	Senior Chemist	Boeing
Bill Karman	Account Manager	Airtech International
Levi Blakeway	Electrical Engineering Technician	Formost Fuji
James Gunn	Electronic Equipment Maintenance Apprentice	Boeing
Will Roozen	Controls Engineer	Electroimpact

Appendix 9:

Advisory Committee Meeting Minutes

Engineering Technology Advisory Committee Meeting

September 17, 2019 – 5:30-7:30 pm

Attendees:

Members	Staff
Levi Blakeway	Kay Latimer
Steven Duce	Ross Monroe
Zach Forland	Su Nelson
Luan Hoang	Carey Schroyer
Bill Karman	Guest:
George Parker	Joe Walters (alumni)

• Absent: Yonas Behboud, who sent his regrets.

The meeting was called to order at 5:36 pm. Introductions were made. Levi introduced himself as a new member of this committee; he works at Formost Fuji as an Electrical Engineering Technician. It was noted that Matt Adkins completed his term as labor representative; Su is working with the State Labor Council to find a new labor rep. Luan shared the sad news that Craig Beckmann passed away recently.

Minutes: Upon a motion made by Bill Karman, seconded and passed unanimously, **the minutes from May were approved as submitted.** Bill did note that the anticipated email vote on the name of the mechatronics program never happened. Carey and Ross explained that the program revision was delayed for a year and that instead of a revision of the existing Robotics and Electronics program, there will be a new program submitted. That will be a main topic of this committee's October meeting.

AAS-T in Materials Science Technology: Carey began by giving an overview of the process steps to approval of a BAS; she then stated that our statement of need has been approved by the SBCTC. She also noted the ambitious timeline we are hoping to meet. This meeting was one result of that timeline. When asked what the jobs were, Carey replied that it isn't just one job, and we are "creating dust" here by working to provide a skill set that doesn't quite exist anywhere else. The closest occupational title that could be found is "Manufacturing Engineer" though positions by that title might have varying requirements.

Ross passed out a side-by-side comparison of the existing AAS-T curriculum, along with the proposed changes to the curriculum. The changes are a result of looking at BAS requirements, industry input collected by an external review, what ABET requires for Engineering Technology (as opposed to full on engineering), what similar BAS programs are asking for and input from Dr. Tucker Howie who has a PhD in Materials Engineering. Ross asked for input and questions. Discussion ensued. It was acknowledged that this is a

unique program; there are two BAS programs (one at Bellingham Tech and one at Wenatchee Valley College) in Engineering Technology, but neither focus on materials. Ross has talked with both of those colleges and they are thinking of applying for ABET accreditation as a consortium down the road. ABET is something many employers felt strongly about; Ross stated that it is now his hoped for long term goal to gain that accreditation, but that it has to come after the program is running.

One suggested ratio from Boeing is that for every engineer, they may need an engineering technician with advanced skills like the degree we are proposing. Bill suggested that may not be the same outside of Boeing. When asked about the cost of a BAS, Carey said that tuition is more than our associates degrees, but it will be significantly less than 4-year state universities.

Upon review of the proposed BAS courses, discussions took place around calculus vs. non-calculus based applications. The proposed BAS would include more focus on applications and less on conceptual math and theory. George asked whether organic chemistry should be included or not, noting it wasn't in the draft. Ross addressed that by talking about how he imbeds the organic chemistry concepts of materials into his existing classes and proposed to continue that, rather than adding a full-on organic chemistry class that doesn't tie directly to materials manufacturing. The group looked at the course learning outcomes for the Chemistry and Physics series proposed for inclusion in the AAS-T. The CHEM series is the same as in an engineering degree; the PHYS series is non-calculus based and not what is required in an engineering degree. The AAS-T if amended as proposed will still prepare students for work, but with the option of continuing on to the BAS. It was noticed that ETEC 290 was not included in the proposed AAS-T revisions; Ross guickly added that in, stating he had meant to do so. Luan asked if we could include some machining into tooling or instead of 3rd CAD class; Ross responded that there already is some in that 3rd CAD class (ETEC 231). Bill asked if an AAS-T grad could set up and test samples per ASTM. Everyone agreed that an internship is critical, while acknowledging that we cannot make it a requirement as Boeing won't allow a student who is not a US Citizen participate in our current internship program with them. Ross then committed to continuing to integrate the statics and strengths material into the existing ETEC 250 and 260 classes; this then allows us to drop ETEC 215 and 220 from the existing degree. Luan asked if we could include mechatronics into the curriculum; Ross felt that we probably couldn't. The working title of the BAS is "Advanced Materials and Manufacturing Engineering Technology" or AMMET for short. Following further discussion and a request for recommendations, Bill Karman made a:

Motion to approve the suggested changes to the AAS-T degree as discussed; the motion was seconded and passed unanimously.

Upon a motion made by George Parker, seconded and passed unanimously the committee:

Approved the outline of the AMMET BAS courses to move forward.

Carey then confirmed that this committee will have an opportunity to see the curriculum again after the next phase of external review. To that end, the group set the next meeting date for **Tuesday**, **October 29**th. Agenda items will include discussion of the BAS and the new Mechatronics program.

Su noted in closing that we are hosting a Manufacturing Day event here on Friday, October 4th. Zach then mentioned he had one or two spare tickets for an ACS event in Kirkland coming up soon.

The meeting adjourned at 7:34 pm.