

**New Program Proposal  
 Bachelor of Applied Science in Advanced Manufacturing Management  
 University of South Carolina Upstate**

**Summary**

The University of South Carolina Upstate requests approval to offer a program leading to the Bachelor of Applied Science (B.A.S.) in Advanced Manufacturing Management to be implemented in Fall 2017. The proposed program is to be offered through blended instruction. The following chart outlines the stages of approval for the proposal; the Advisory Committee on Academic Programs (ACAP) voted to recommend approval of the proposal. The full program proposal and support documents are attached.

<b>Stages of Consideration</b>	<b>Date</b>	<b>Comments</b>
Program Proposal Received	7/1/16	Not Applicable
Program Proposal Withdrawn	9/15/16	USC Upstate withdrew the proposal upon discussion with Academic Affairs staff about content and program objectives.
Comments and suggestions from CHE staff sent to the institution	9/16/16	Staff recommended revisions to or requested additional information about the following: CIP Code; AAS program expansion beyond Mechatronics; program objectives; assessment of student need for the program (e.g., employability, career advancement, new industry standard, or otherwise); local and state employment data; projected enrollment and time to completion; updates to the proposal curriculum chart; a timeline for developing and implementing the new courses; course fees for upper division courses and enrichment programs they support; descriptions about library resources, student support services, and facilities needed to support the program; and details about program assessment and criteria (e.g., graduate employment rates, responses to alumni surveys, etc.).
Revised Program Proposal Received	10/3/16	Not Applicable
ACAP Consideration	11/17/16	Representatives from the University of South Carolina Upstate discussed the need for the program. Members of the Advisory Committee on Academic Programs (ACAP) discussed the program, including an inquiry about the need for more collaboration with the technical colleges. Technical College representatives responded with questions about the following: <ul style="list-style-type: none"> <li>• The apparent singular focus of the degree on Mechatronics only, and the specific focus on a single company in the Upstate as a potential employer of program completers;</li> <li>• Sufficient experiential learning opportunities;</li> <li>• Coursework transferability from a technical college; and</li> <li>• Program overlap with traditional technical college programs.</li> </ul>

Stages of Consideration	Date	Comments
		<p>USC Upstate representatives responded that Mechatronics was only one field discussed among several, but that at the inception of the proposed program focus on one area was a strategy for ensuring overall program success to build upon later with additional fields. Representatives continued, noting the following: 1) the one potential employer cited is the primary company that expressed a need to hire degree completers; 2) the 2+2 program design was intended to ‘hold harmless’ students from the need to re-take coursework at Upstate that they completed previously at a two-year institution; 3) and that as a bachelor’s degree program from a four year institution the AMM major was intended to be unique and therefore avoid overlap with traditional technical college programs.</p> <p>Upon concluding discussion, ACAP members voted to approve the program proposal provided the institution finalize collaboration with potential technical college partners and provide documentation thereof.</p>
<p>Comments and suggestions from CHE staff sent to the institution</p>	<p>12/6/16</p>	<p>Staff requested the proposal be revised to:</p> <ul style="list-style-type: none"> <li>• Provide the rationale for offering the program as a B.A.S.</li> <li>• Include program objectives in addition to the student learning objectives. As requested at ACAP, compare the student learning objectives to standards of accreditation/certification for the appropriate group;</li> <li>• Indicate the number of new jobs added in Spartanburg County that were in this or related fields, as mentioned in the Employment Opportunity Section;</li> <li>• As requested at ACAP, provide specific data on workforce needs in South Carolina;</li> <li>• List the Colleges with which USC Upstate is pursuing articulation agreements;</li> <li>• Specify dedicated library resources;</li> <li>• Clarify how adjunct faculty will help deliver the curriculum off-site</li> <li>• Clarify the explanation of two new faculty, existing faculty administrative responsibilities, and the budget regarding the two new hires especially since adjunct costs grow over the five years, but program administration and faculty salaries do not;</li> <li>• Include the explanation provided at ACAP for the focus on Mechatronics in particular at the program’s inception; and</li> <li>• As requested at ACAP, provide documentation of collaboration with the technical colleges.</li> </ul>

<b>Stages of Consideration</b>	<b>Date</b>	<b>Comments</b>
Revised Program Proposal Received	12/13/16	The revised proposal satisfactorily addressed the requested revisions. The following entities provided letters of support for the proposed program: Robert Hitt, SC Department of Commerce; Ann Angermeier, Upstate Workforce Investment Board; and Johannes Trauth, BMW Manufacturing, Co., LLC. In addition, the South Carolina Technical College System relayed the collaborative support of the area technical colleges named in the proposal.

**Recommendation**

The staff recommends that the Committee on Academic Affairs and Licensing approve the program leading to the Bachelor of Applied Science in Advanced Manufacturing Management to be implemented in Fall 2017.

Name of Institution

**University of South Carolina Upstate**

Name of Program (include concentrations, options, and tracks)

**Bachelor of Applied Science – Advanced Manufacturing Management**

Program Designation

- Associate's Degree                       Master's Degree  
 Bachelor's Degree: 4 Year             Specialist  
 Bachelor's Degree: 5 Year             Doctoral Degree: Research/Scholarship (e.g., Ph.D. and DMA)  
 Doctoral Degree: Professional Practice (e.g., Ed.D., D.N.P., J.D., Pharm.D., and M.D.)

Does the program qualify for supplemental Palmetto Fellows and LIFE Scholarship awards?

- Yes  
 No

Proposed Date of Implementation

Fall, 2017

CIP Code

14.4201

Delivery Site(s)

The BMW Training and Development Center in Greer, SC will be the primary site with the option for delivery of some courses on other USC Upstate campuses including the University Center of Greenville.

Delivery Mode

- Traditional/face-to-face\*  
\*select if less than 50% online
- Distance Education  
 100% online  
 Blended (more than 50% online)  
 Other distance education

Program Contact Information (name, title, telephone number, and email address)

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Institutional Approvals and Dates of Approval

1. Division of Natural Sciences and Engineering	<u>Jeannie Chapman 3-22-16</u>
2. Academic Affairs Committee	<u>George Williams 4-01-16</u>
3. Faculty Senate	<u>Paul Grady 5-12-16</u>
4. Senior Vice Chancellor for Academic Affairs	<u>Clif Flynn 5-12-16</u>
5. Chancellor	<u>Thomas F. Moore 5-12-16</u>
6. President	<u>//s// 6-23-16</u>
7. Board of Trustees	<u>Approved 6-24-16</u>

## **Background Information**

State the nature and purpose of the proposed program, including target audience and centrality to institutional mission. (1500 characters)

The Department of Natural Sciences and Engineering (NSE) at the University of South Carolina Upstate is proposing the establishment of a Bachelor of Applied Science (BAS) in Advanced Manufacturing Management (AMM) in the College of Arts and Sciences. The BAS in AMM degree, complementary with Engineering Technology Management, is different from traditional degree programs at USC Upstate in that it is a technology-focused program that is crafted to meet the needs of the manufacturing base in the Upstate and beyond. The 2+2 degree would allow students with an Associate of Applied Science (AAS) in Mechatronics to pursue a four year degree. The Bachelor of Applied Science denotation reflects the more applied nature of the degree. It is a highly specialized professional technical degree that complements and builds on a student's expertise from a technical associate degree, thereby developing managerial skills and meeting the workforce demand for leaders in highly technical areas— i.e., an applied baccalaureate. Universities offering four-year programs requiring an AAS degree (e.g., Boise State University, Arkansas State University, University of Nebraska-Lincoln) typically award a Bachelor of Applied Science degree.

The initial target audience for AMM is those students who hold an AAS in Mechatronics degree from Spartanburg Community College, Piedmont Technical College, and Tri-County Technical College.

Mechatronics is an interdisciplinary field involving analysis and troubleshooting on advanced automated equipment and machinery found in modern manufacturing facilities. The program combines electronic, mechanical, robotics and control systems technologies.

The degree is named Advanced Manufacturing Management to reflect the ongoing change in manufacturing from the need for supervision of labor intensive assembly work to automated work supported by uniquely qualified technical managers. The Advanced Manufacturing Manager will need a base technical skill such as mechatronics and also management skills to manage both people and processes.

Inspired by state-wide initiatives such as South Carolina Work Ready Communities, the major is a unique cooperative effort between USC Upstate, technical colleges, BMW and other manufacturers to provide technology-based education to workers who have completed an AAS in Mechatronics. Degree recipients will position themselves for leadership posts in manufacturing. USC Upstate, working closely with BMW and the local technical colleges, will be educating the manufacturing leaders of today and tomorrow.

This program fits well within USC Upstate's mission as a metropolitan university focusing on the needs of the expanding population along the I-85 corridor.

List the program objectives. (2000 characters)

The Objective is for AMM graduates to be employed as industrial production managers with the following job titles once they have three to five years of manufacturing work experience: Manufacturing Section Leader, Manufacturing Section Manager, or Team leader. It is becoming increasingly common for these roles to be filled with persons holding a bachelor degree.

The program objectives include

- Graduates will be prepared to assume organizational leadership roles
- Graduates will be prepared to communicate with all levels of an organization
- Graduates will be prepared to solve complex problems that combine technical and non-technical factors such as economics and societal impacts.

To be prepared for these roles the graduates will meet the following Student Learning Outcomes:

- An ability to function effectively as a leader on a manufacturing team.
- An ability to identify, analyze, and solve broadly-defined manufacturing problems.
- An ability to apply written, oral, and graphical communication appropriate to manufacturing management.
- An understanding of the principles of manufacturing quality and continuous improvement.
- An understanding of professional and ethical responsibilities and knowledge of the societal and global impact of manufacturing.

### **Assessment of Need**

Provide an assessment of the need for the program for the institution, the state, the region, and beyond, if applicable. (1500 characters)

Students with an AAS in Mechatronics currently have a very limited path to a four year degree. The AMM degree will create a new path for mechatronics students and thereby increase the number of adults with four year degrees in the Upstate region that will meet a need for industrial production managers in the growing manufacturing sector. According to the Bureau of Labor and Statistics a bachelor's degree and five years of work experience is typically required to become an industrial production manager.

According to the SC Appalachian Council of Governments the Upstate region is growing faster than the nation and nineteen percent of Upstate jobs are in manufacturing compared to nine percent nationwide. The council also identified a "technical skills gap" between the supply of available labor and the skills required in modern advanced manufacturing. According to the Metropolitan Studies Institute from 2010 to 2020, manufacturing is expected to grow in the Spartanburg Workforce Investment Area (WIA) by 3,401 jobs. This constitutes a 1.10% annual increase in manufacturing jobs. An additional problem with meeting the needs of manufacturing leadership is the result of the region being 4.5 percentage points below the national average of 38.7 percent of adults holding 2 or 4 year degrees.

In support of the need for technical skills nearly 200 Associate of Applied Science degrees in Mechatronics have been awarded in the last three years by Spartanburg Community College and Tri-Technical College. Spartanburg Community College awarded 21 AAS in Mechatronics degrees in 2013-14, and Tri-County Technical College 160 from 2012-2015. These students are in high demand with local manufacturing companies. Additionally, BMW and other area manufacturers have indicated a need for industrial production managers with both technical capability and leadership skills. This need complements the tremendous growth in the AAS programs in Mechatronics at the Upstate technical colleges. There is also evidence of interest in a four-year degree by students with an AAS in Mechatronics. Of the 62 students in our data base of students who have asked about Engineering Technology Management (ETM) or Advanced Manufacturing Management that were not qualified for ETM, 42 had AAS degrees in Mechatronics. If the students with an AAS in Mechatronics are provided a path to a four year degree they will fill much of the need for industrial production managers.

### Employment Opportunities

Is specific employment/workforce data available to support the proposed program?

- Yes  
 No

If yes, complete the table and the component that follows the table on page 4. If no, complete the single narrative response component on page 5 beginning with "Provide supporting evidence."

<b>Employment Opportunities</b>			
<b>Occupation</b>	<b>Expected Number of Jobs</b>	<b>Employment Projection</b>	<b>Data Source</b>
Industrial Production Managers	49,100 job openings nationwide between 2014 and 2024	-3.7% in total positions nationwide	Bureau of Labor and Statistics
Managers, all other	255,400 job openings nationwide between 2014 and 2024	3.9% in total positions nationwide	Bureau of Labor and Statistics

Provide additional information regarding anticipated employment opportunities for graduates. (1000 characters)

Even though the national trend is slightly lower for industrial production managers the Upstate region of South Carolina has experienced steady growth in this category. According to BLS data the number of Industrial Production Managers in Greenville and Spartanburg counties has increased each year over the past four years:

- 2012 730 jobs
- 2013 950 jobs
- 2104 1,030 jobs
- 2015 1,090 jobs

In fact, as of May 2015, the Spartanburg metropolitan area had the sixth highest concentration of these jobs in the country. Data from US Bureau of Labor Statistics show that in Spartanburg County, manufacturing accounts for 19.3% of all jobs compared to a national average of 8.0 %. Average earnings in the manufacturing sector were \$58,711 in Spartanburg in 2015 – nearly \$18,000 more than the average earnings for all business sectors in Spartanburg County - \$40,969. Employers such as BMW have expressed a need to hire and promote individuals with bachelor's degrees into positions such as Team Leader, Section Leader, and Section Manager. These positions require individuals with both technical and leadership skills.

According to Market Street Services between 2010 and 2015, 17,492 new jobs were added in Spartanburg County, a 14.2% growth rate that far exceeded the state (9.6%) and national (8.1%) figures. BMW is currently investing in a \$1 Billion expansion in the Upstate that will add another 800 jobs (Collins). Toray, an advanced material supplier, is also investing \$1 Billion in Spartanburg County in a manufacturing plant that will employ 500 people (SC Department of Commerce). We estimate one industrial production manager position will be created for every 30 new jobs created in a manufacturing organization. Therefore these 1,300 positions will create a need for more than 40 new industrial production managers. Hiring by BMW will also lead to proportional increases throughout the local supply chain. BMW, the S. C. Department of Commerce, and the Upstate Workforce Investment Board all have recognized the need and expressed strong support for this program (see appended letters of support from Johannes Trauth, Bobby Hitt, Ann Angermeier).

Provide supporting evidence of anticipated employment opportunities for graduates, including a statement that clearly articulates what the program prepares graduates to do, any documented citations that suggests a correlation between this program and future employment, and other relevant information. Please cite specific resources, as appropriate. (3000 characters)

**Note: Only complete this if the Employment Opportunities table and the section that follows the table on page 4 have not previously been completed.**

See the table.

Will the proposed program impact any existing degree programs and services at the institution (e.g., course offerings or enrollment)?

Yes

No

If yes, explain. (500 characters)

AMM will complement the existing 2+2 Engineering Technology Management (ETM) degree. The ETM degree (accredited by the Engineering Technology Accreditation Commission of ABET) requires students to complete an AAS in Engineering Technology while the AMM degree will require students to complete an AAS in Mechatronics.

AMM and ETM will coordinate marketing that delineates the career paths. The AMM degree will lead to careers in operations management while the ETM degree will lead to careers in engineering and technology management. ETM graduates will also qualify for manufacturing and process engineering positions.

**List of Similar Programs in South Carolina**

<b>Program Name</b>	<b>Institution</b>	<b>Similarities</b>	<b>Differences</b>
None			

**Description of the Program**

Projected Enrollment*						
Year	Fall		Spring		Summer	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
17/18	20	120	20	120	20	120
18/19	40	240	40	240	40	240
19/20	60	360	60	360	60	360
20/21	60	360	60	360	60	360
21/22	60	360	60	360	60	360

\*Total students per semester, credit hours based on cohorts of 20 students completing six hours per semester. Estimates based on a new cohort of twenty students starting each fall. The initial cohort of students will be part-time students as the target audience of students is working full time. There may be an opportunity to offer the program to full-time students once the early cohorts have completed the program. Each cohort will complete 18 hours per year (19 during the year including the science course). Each cohort will require 10 semesters to complete the program. The cohort's plan of study will include summer semesters.

Besides the general institutional admission requirements, are there any separate or additional admission requirements for the proposed program?

- Yes
- No

If yes, explain. (1000 characters)

This program will require students to attend a regionally accredited technical college and complete an AAS in Mechatronics before being fully admitted into the AMM program at USC Upstate. Students may apply during their final semester at technical college, but must prove AAS completion before enrolling for a second semester at USC Upstate.

Are there any special articulation agreements for the proposed program?

- Yes
- No

If yes, identify. (1000 characters)

Articulation agreements will be pursued with Spartanburg Community College, Tri-County Technical College, Piedmont Technical College, and York Technical College.

**Curriculum**

<b>Curriculum by Category</b>			
<b>Courses Transferred</b>	<b>Credit Hours</b>	<b>Courses at USC Upstate</b>	<b>Credit Hours</b>
<b>Technical Courses</b>		<b>General Education*</b>	
Technical courses in discipline	42	ENGL 101 Composition I	3
		ENGL 102 Composition II	3
<b>General Education*</b>		MATH 121 College Algebra	3
CPT101/CPT170/EGR 130 – Computer Basics Course	3	MATH 102 Probability and Statistics	3
ENG 165/SPC205 – Professional Communications/Speech	3	Natural Science w/ Lab	4
Humanities Elective	3	Foreign Language 101 level	3
Social Science Elective	3	Fine Art	3
Gen Ed Elective	6	History	3
		<b>Major</b>	
*General Education Courses may Be completed at technical college Or USC Upstate		AMMG 300 Manufacturing Leadership I	3
		AMMG 330 Manufacturing Work Practices	3
		AMMG 410 Manufacturing Leadership II	3
		AMMG 415 Manufacturing Quality	3
		AMMG 420 Manufacturing Project Management	3
		AMMG 450 Operational Excellence	3
		AMMG 500 Senior Seminar	3
		<b>Cognate (related 300 level courses)</b>	12
		<b>Elective</b>	3

Total Credit Hours Required

121

120

**Course Descriptions for New Courses**

<b>Course Name</b>	<b>Description</b>
<b>AMMG U300. Manufacturing Leadership I (3).</b>	Manufacturing leadership including business communication, business presentations, spreadsheet basics, financial reports, supervisory skills, and leadership roles. Prerequisites: Admission into the AMM Cohort and MATH 121 or consent of instructor.
<b>AMMG U330. Manufacturing Work Practices (3).</b>	Manufacturing work practices including safety topics, lean manufacturing, training, and operational efficiency. Prerequisites: AMMG U300 or consent of instructor.
<b>AMMG U410. Manufacturing Leadership II (3).</b>	Manufacturing leadership including budgeting, project selection, supervision, and leadership roles. Prerequisites: AMMG U300 or consent of instructor.
<b>AMMG U415. Manufacturing Quality (3).</b>	Manufacturing quality practices including statistical process control, quality management systems, and problem solving methodology. Prerequisites: AMMG U300 or consent of instructor.
<b>AMMG U420. Manufacturing Project Management (3).</b>	Tools and techniques for planning, and scheduling manufacturing projects. Prerequisites: AMMG U300 or consent of instructor.
<b>AMMG U450. Operational Excellence (3).</b>	Advanced operational excellence. This course will build on concepts taught in AMMG 330 and 415 including value stream mapping, supply chain management, and change management. Prerequisites: AMMG U330 and U415 or consent of instructor.
<b>AMMG U500 Senior Seminar (3)</b>	Manufacturing management concepts including an exploration of manufacturing’s effect on the local community and global society. Prerequisites: AMMG 410 and 450 or consent of instructor.

**Faculty**

<b>Faculty and Administrative Personnel</b>				
<b>Rank</b>	<b>Full- or Part-time</b>	<b>Courses Taught or To be Taught, Including Term, Course Number &amp; Title, Credit Hours</b>	<b>Academic Degrees and Coursework Relevant to Courses Taught, Including Institution and Major</b>	<b>Other Qualifications and Comments (i.e., explain role and/or changes in assignment)</b>
Program Coordinator/ Instructor*	FT	AMMG 300, 330, 415, 450	MS or MBA business, engineering, or related field	Prior experience in manufacturing leadership and operational excellence
Assistant Professor*	FT	AMMG 300, 410, 420, 500	PhD in business, leadership, engineering, or related field	Prior experience in manufacturing leadership and project management
<p>The Program Coordinator will be hired to begin in August 2018 and will develop AMMG 300, AMMG 330, AMMG 415, and AMMG 415 for delivery during the 18/19 school year.</p> <p>The Assistant Professor will be hired to begin in August 2019 and will develop AMMG 410, AMMG 420, and AMMG 500 for delivery during the 19/20 school year.</p>				

Note: Individuals should be listed with program supervisor positions listed first. Identify any new faculty with an asterisk next to their rank.

Total FTE needed to support the proposed program (i.e., the total FTE devoted just to the new program for all faculty, staff, and program administrators):

Faculty	1.5	Staff	0.0	Administration	0.5
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### **Faculty /Administrative Personnel Changes**

Provide a brief explanation of any additional institutional changes in faculty and/or administrative assignment that may result from implementing the proposed program. (1000 characters)

The AMM program will require two new full-time faculty members with one acting as the program coordinator. The program will initially launch in the fall of 2017 with the first cohort of students taking only general education courses for the first year. An existing faculty member will need to cover program coordinator duties during the 17/18 academic year. The first AMM faculty member/program coordinator will be hired to begin in August of 2018 and the second faculty member will begin in Aug 2019. There may be an opportunity to share one or more faculty lines between AMM and ETM allowing faculty to specialize.

### **Library and Learning Resources**

Identify current library/learning collections, resources, and services necessary to support the proposed program and any additional library resources needed. (1000 characters)

The current library collection meets the needs of the AMM program. The current library materials related to the Johnson College of Business and Economics and the Engineering Technology Program will meet the needs of the AMM program. The faculty will regularly consult with the assigned library liaison to develop collections as needs evolve.

The USC Upstate Library has 12 library faculty positions. The physical structure of the library with its collections and computers is open a total of 82.5 hours per week. Reference services online through texting and chat are available 24/7. In addition, one library computer lab is available 24/7.

The library has 240,943 volumes in its collection. In addition to the library's online catalog, there is electronic access to more than 250 databases, 489,000 electronic books, and more than 235,000 full-text electronic journals. These resources are available via remote access through a campus proxy server.

USC Upstate students and faculty have access to the resources beyond the physical boundaries of the campus through the statewide consortia known as PASCAL (Partnership Among South Carolina Academic Libraries).

### **Student Support Services**

Identify academic support services needed for the proposed program and any additional estimated costs associated with these services. (500 characters)

USC Upstate provides student support services via the Student Success Center. The student Success Center provides Academic Support, Advising Services, Career Services, and the Opportunity Network. These programs include services such as tutoring, supplemental instruction, transfer advising, and mock interviews. The Opportunity Network supports traditionally underrepresented students such as first generation college students with resources to be successful at USC Upstate. USC upstate also offers targeted support for Non-Traditional students including a Non-Traditional student handbook. The current level of academic support services meets the needs of the program.

### **Physical Resources**

Identify any new instructional equipment needed for the proposed program. (500 characters)

None.

Will any extraordinary physical facilities be needed to support the proposed program?

Yes

No

Identify the physical facilities needed to support the program and the institution's plan for meeting the requirements, including new facilities or modifications to existing facilities. (1000 characters)

The courses for the initial cohorts will be delivered at the BMW Training and Development Center to accommodate the students working 8 to 12 hours shifts. Future cohorts may be offered at the University Center of Greenville for those students not already employed in manufacturing. New facilities will not be required for the program.

**Financial Support**

<b>Estimated New Costs by Year</b>						
<b>Category</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup></b>	<b>5<sup>th</sup></b>	<b>Total</b>
Program Administration (Program Coordinator and Instructor)	\$10,000	106,460 (Includes fringe)	106,460	106,460	106,460	532,300
Faculty and Staff Salaries (Tenure Track Faculty)	--		106,460 Includes fringe	106,460	106,460	425,840
Adjunct Instructors**	30,000	45,000	90,000	90,000	90,000	345,000
Equipment	0	0	0	0	0	0
Supplies and Materials	3,000	3,000	3,000	3,000	3,000	15,000
Library Resources	0	0	0	0	0	0
Other	0	0	0	0	0	0
<b>Total</b>	43,000	260,920	305,920	305,920	305,920	1,221,680
<b>Sources of Financing</b>						
<b>Category</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup></b>	<b>5<sup>th</sup></b>	<b>Total</b>
Tuition Funding	149,640	308,280	476, 280	496,800	505,170	1,936,170
Program-Specific Fees	2,700	5,400	6,300	6,300	6,300	27,000
State Funding (i.e., Special State Appropriation)	0	0	0	0	0	0
Reallocation of Existing Funds	0	0	0	0	0	0
Federal Funding	0	0	0	0	0	0
Other Funding	0	0	0	0	0	0
<b>Total</b>	152,340	313,680	482,580	503,100	511,470	1,963,170
<b>Net Total</b> (i.e., Sources of Financing Minus Estimated New Costs)	109,340	52,760	176,660	197,180	205,550	<b>741,490</b>

\*\*The adjunct instructors will teach non-AMM course sections delivered off-site and dedicated to AMM students in the cohort. This could include any or all of the General Education to be taught by USC Upstate listed in the Curriculum table on page 11.

### **Budget Justification**

Provide a brief explanation for the other new costs and any special sources of financing (state funding, reallocation of existing funds, federal funding, or other funding) identified in the Financial Support table. (1000 characters)

**Note: Institutions need to complete this budget justification *only* if any other new costs, state funding, reallocation of existing funds, federal funding, or other funding are included in the Financial Support table.**

The AMM program will generate tuition from the students and a new upper division course fee.

The tuition numbers are based on each cohort containing twenty students and each student completing eighteen credit hours per year. Of the eighteen credit hours six would be at the summer tuition rate of \$311.25 per credit hour and twelve would be at the regular tuition rate of \$432.00 per credit hour. It is very unlikely that there will be any non-resident students in the program. For each 20 students in the program the revenue by semester will be - fall \$51,840, spring \$51,840, and summer \$37,350. Once three cohorts are in rotation the program will generate tuition of \$423,090 per year.

The upper division course fee of \$45 per course will generate \$2,700 per year once the program is in full operation. This fee would support student enrichment programs beyond the classroom. These programs will be modeled after the existing Johnson College of Business and Economics Professional Series with programs on professionalism, presentation skills, and business etiquette.

Additional financial data may be found in Appendix A.

## Evaluation and Assessment

**Programmatic Assessment:** Provide an outline of how the proposed program will be evaluated, including any plans to track employment. Identify assessment tools or software used in the evaluation. Explain how assessment data will be used. (3000 characters)

The AMM program will assess and evaluate each Student Learning Outcome (SLO) annually. Each SLO will be assessed by at least one direct measure and a graduate survey. The direct measures will include test questions and selected assignments in the AMM program. The graduate survey will be administered to a sample of graduates two to four years after completing the AMM program.

Each test question that is directly linked to a Student Outcome will be administered in either AMMG Course Exams or the AMM Assessment Exam. The AMM Assessment Exam will be a comprehensive end of program exam with target questions developed in conjunction with an industrial advisory committee. The targeted questions will assess student's retention and understanding of the key program material. The AMM Assessment Exam will be administered in AMMG 500. There will also be selected assignments and test questions embedded in other AMMG courses. The plan for assessment questions, assignments, and survey questions is listed in the table below.

The annual assessment data will be collected by the AMM Assessment Coordinator and shared with the AMM faculty each year. The AMM faculty will meet to evaluate the assessment data and determine any continuous improvement actions based on the results. The faculty will also review the results of actions. The data and the action plans will be summarized and reported to the University through the existing USC Upstate University Assessment Committee.

**Student Learning Assessment**

<b>Expected Student Learning Outcomes</b>	<b>Methods of/Criteria for Assessment</b>
An ability to function effectively as a leader on a manufacturing team.	Assessment exam questions in AMMG 410 and the AMM assessment Exam Graduate Survey Questions
An ability to identify, analyze, and solve broadly-defined manufacturing problems.	Assessment exam questions in AMMG 500 and the AMM assessment Exam Graduate Survey Questions
An ability to apply written, oral, and graphical communication appropriate to manufacturing management.	Capstone assignment in AMMG 500 and the AMM assessment Exam Graduate Survey Questions
An understanding of the principles of manufacturing quality and continuous improvement.	Assessment exam questions in AMMG 450 and the AMM assessment Exam Graduate Survey Questions
An understanding of professional and ethical responsibilities and knowledge of the societal and global impact of manufacturing.	Assessment exam questions in AMMG 500 and the AMM assessment Exam Graduate Survey Questions

Will the proposed program seek program-specific accreditation?

Yes

No

If yes, provide the institution's plans to seek accreditation, including the expected timeline for accreditation. (500 characters)

Will the proposed program lead to licensure or certification?

Yes

No

If yes, explain how the program will prepare students for licensure or certification. (500 characters)

### **Teacher or School Professional Preparation Programs**

Is the proposed program a teacher or school professional preparation program?

Yes

No

If yes, complete the following components.

Area of Certification

Please attach a document addressing the South Carolina Department of Education Requirements and SPA or Other National Specialized and/or Professional Association Standards.

CAAL  
1/12/2017  
Agenda Item 2d

## REFERENCES

SC Appalachian Council of Governments and County Economic Development Office, Annual Update of the Comprehensive Economic Development Strategy for the Appalachian Region of South Carolina. Sept 2015

Collins, Jeffrey; AP Story; [http://news.yahoo.com/bmw-plans-1-billion-expansion-south-carolina-170149332.html;\\_ylt=A0LEVr0icuIWMsMAVlonnIIQ;\\_ylu=X3oDMTByMHZ0NG9yBGNvbG8DYmYxBHBvcwM3BHZ0aWQDBHNIYwNzcg--](http://news.yahoo.com/bmw-plans-1-billion-expansion-south-carolina-170149332.html;_ylt=A0LEVr0icuIWMsMAVlonnIIQ;_ylu=X3oDMTByMHZ0NG9yBGNvbG8DYmYxBHBvcwM3BHZ0aWQDBHNIYwNzcg--)

South Carolina Department of Commerce, <http://sccommerce.com/news/press-releases/toray-selects-spartanburg-county-its-business-expansion-us>

APPENDIX A. Financial Information by cohort.

AMM Revenue	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Fall and Spring Tuition Rates	458.50	472.25	486.50	501.00	516.00
Summer Tuition Rates	330.00	340.00	350.00	360.50	371.25
# Credit hours per student per semester	6	6	6	6	6
Fall and Spring Semester	2	2	2	2	2
# students per year	20	20	20	20	20
Cohort 1	149,640.00	154,140.00	158,760.00		
Cohort 2		154,140.00	158,760.00	163,500.00	
Cohort 3			158,760.00	163,500.00	168,390.00
Cohort 4				163,500.00	168,390.00
Cohort 5					168,390.00
	149,640.00	308,280.00	476,280.00	490,500.00	505,170.00

Program fees for 7 courses @ \$45 per course	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Cohort 1	2,700.00	2,700.00	900.00		
Cohort 2		2,700.00	2,700.00	900.00	
Cohort 3			2,700.00	2,700.00	900.00
Cohort 4				2,700.00	2,700.00
Cohort 5					2,700.00
	2,700.00	5,400.00	6,300.00	6,300.00	6,300.00



November 28, 2016

State Commission on Higher Education  
1122 Lady Street, Suite 300  
Columbia, SC 29201

Dear Commission on Higher Education Members,

BMW and the University of South Carolina Upstate are committed to enhancing the educational and career opportunities for manufacturing associates at BMW. Both understand that highly-skilled employees are necessary to manage the automated and technology-based manufacturing of today and the future.

In the automotive industry and related businesses, Mechatronics, a dynamic field that blends mechanical knowledge with electronics, information technology, and robotics, is essential to modern manufacturing. The collaboration between BMW and USC Upstate is designed to provide associates who hold an Associate of Applied Science in Mechatronics Technology the opportunity to complete a Bachelor of Applied Science (BAS) in Advanced Manufacturing Management. This new and innovative degree is needed to address manufacturing leadership needs not only at BMW but also many other manufacturing companies in the Upstate and throughout the state. BMW is committed to providing educational access for associates wishing to complete a degree in Advanced Manufacturing Management.

BMW is excited about this new opportunity and appreciates the consideration given by the CHE towards this degree program.

Sincerely,

A handwritten signature in black ink, appearing to read 'Johannes Trauth', written over a white background.

Johannes Trauth  
Vice President, Human Resources  
BMW Manufacturing Co., LLC

**Company**  
BMW Manufacturing  
Co., LLC  
BMW Group Company

**Mailing address**  
PO Box 11000  
Spartanburg, SC  
29304-4100

**Office address**  
1400 Highway 101 South  
Greer, SC 29651

**Telephone**  
+1 864 802-6000

**Internet**  
[www.bmwusfactory.com](http://www.bmwusfactory.com)



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DEC 08 2016

Nikki R. Haley  
Governor

**SOUTH CAROLINA**  
DEPARTMENT OF COMMERCE

Office of the Executive Director  
SC Comm. On Higher Education  
**Robert M. Hitt III**  
Secretary

December 5, 2016

State Commission on Higher Education  
1122 Lady Street, Suite 300  
Columbia, SC 29201

Dear Commission on Higher Education Members,

Mechatronics, a field that melds mechanical and electronics knowledge with information technology and robotics, is essential in modern manufacturing. South Carolina's growth in the Automotive and Aerospace sectors creates a demand (present and future) for highly-skilled employees.

The University of South Carolina Upstate has developed an innovative degree, Bachelor of Applied Science in Advanced Manufacturing Management, which offers an educational pathway for existing Associate of Applied Science in Mechatronics Technology degree holders and provides a career pathway for movement into industry leadership positions.

The Department of Commerce appreciates the Commission on Higher Education's consideration of this degree program.

Sincerely,



Robert M. Hitt III

RMH/mm/vw

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DEC 12 2016

South Carolina Commission  
on Higher Education  
Academic Affairs Division

December 9, 2016



State Commission on Higher Education  
1122 Lady Street, Suite 300  
Columbia, SC 29201

**Re: Bachelor of Applied Science in Advanced Manufacturing Management**

Dear Commission on Higher Education Members:

The Upstate Workforce Board's mission is to build and maintain a workforce development system to meet the needs of employers in Cherokee, Spartanburg and Union Counties. Manufacturing is the primary industry in our area. Many of our residents earn two year technological degrees from Spartanburg Community College or Greenville Technical College and then go to work in our manufacturing companies.

We recognize the need to create a Bachelor of Applied Science in Advanced Manufacturing Management at USC Upstate in order to provide a means for these residents to take their mechanical knowledge and enhance it with management skills so that they may gain the necessary knowledge to become managers and advance both the companies' levels of expertise and the employees' leadership skills and advancement possibilities.

USC Upstate is well-known and respected for its business courses in the Johnson College of Business and Economics. This region also has access to many state-of-the-art international manufacturing facilities like BMW and their many suppliers. We continue to bring companies to our area like Toray and these companies are making huge investments by building here. We need a pipeline of leaders from which they may choose for the higher level jobs.

For the above-noted reasons, the Upstate Workforce Board whole-heartedly supports USC Upstate in their goal of creating a Bachelor of Applied Science in Advanced Manufacturing Management. This is critical to the future of our manufacturing sector.

Sincerely,

A handwritten signature in black ink, appearing to read "Ann Angermeier", with a long horizontal line extending to the right.

Ann Angermeier  
Executive Director