Missouri Department of Higher Education

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OFF-SITE DELIVERY OF AN EXISTING PROGRAM FORM

Sponsoring Institution (s): Moberly Area Community College
Name of Institution (Campus or off-campus residential center in the case of multi-campus institutions).

Program Title: Engineering Systems with options in Mechatronics and Maintenance
Degree/Certificate: Associate of Applied Science, Certificate, Certificate of Specialization
Institution Granting Degree: Moberly Area Community College
Delivery Site(s): MACC-Hannibal Higher Education Center, MACC-Kirksville Higher Education Center, MACC-Advanced Technology Center (Mexico)
Mode of Program Delivery: Traditional, hybrid, online

Geographic Location of Student Access: Hannibal, Kirksville, Mexico, MO and surrounding areas

CIP Classification: 15.0499 (Please provide CIP code)
Implementation Date: Fall 2015
Semester and Year
Cooperative Partners: N/A

AUTHORIZATION

Dr. Jeffery C. Lashley, President	Jeffery C. Lashley	4-1-15
Name/Title of Institutional Officer	Signature	Date

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STUDENT ENROLLMENT PROJECTIONS

MACC-Hannibal Higher Education Center

Year	1	2	3	4	5
Full Time	**2**	**3**	**4**	**5**	**6**
Part Time	**4**	**4**	**6**	**6**	**8**
Total	**5**	**7**	**10**	**11**	**14**
FTE (PT = .5)	**4**	**5**	**7**	**8**	**10**

MACC-Kirksville Higher Education Center

Year	1	2	3	4	5
Full Time	**2**	**3**	**4**	**5**	**6**
Part Time	**4**	**4**	**6**	**6**	**8**
Total	**5**	**7**	**10**	**11**	**14**
FTE (PT = .5)	**4**	**5**	**7**	**8**	**10**

MACC-Advanced Technology Center (Mexico)

(Note: MACC does not plan to initially offer the Engineering Systems program at the Advanced Technology Center because Mexico is <40 miles from the Columbia site, which has been a reasonable commute for students. The development of courses into a hybrid format will further reduce commute days/time. However, if demand from Mexico-area industry and/or students increases significantly, MACC will offer courses on-site.)

Year	1	2	3	4	5
Full Time	0	0	0	0	0
Part Time	0	0	0	0	0
Total	0	0	0	0	0
FTE (PT = .5)	0	0	0	0	0

Please provide a rationale regarding how student enrollment projections were calculated:

These are conservative projections based on current enrollment at the Hannibal and Kirksville sites, current enrollment in the Industrial Technology program, and general plans to grow the program slowly.

Provide a **rationale** for proposing this program, including **evidence of market demand and societal need supported by research:**

Rationale

Student demand for classes in the Engineering Systems program has been increasing at the Moberly campus and the Columbia site, and industries in the MACC service region have expressed the need for trained technicians in the Advanced Manufacturing field. MACC's Mechatronics program, an option within Engineering Systems, was developed specifically in response to a request from Regional Economic Development Incorporated (REDI) for additional training in the industrial technology field. An advisory committee developed the curriculum, secured facilities and equipment for training purposes, and reached out to manufacturers and area high schools to recruit students. Since getting approval to offer the Mechatronics degree/certificate programs at the Columbia site in June 2013, the program has experienced significant growth--from 5 declared majors in fall 2013 to 27 majors in spring 2015. (Overall, there are 54 declared majors in Engineering Systems in spring 2015.)

Industries in the Hannibal, Kirksville, and Mexico areas have expressed interest in having technicians trained through the Mechatronics/Maintenance program, but their communities are too small to support a full program. Therefore, MACC plans to expand the Engineering Systems programs to these communities

through a mobile Mechatronics/Maintenance trailer (purchased through a Round IV Trade Adjustment Assistance Community college and Career Training grant) that will house lab equipment and that can be driven to the other sites. The required courses will be offered in a hybrid format so that students can complete the coursework through distance education on their own time while attending the hands-on lab portion when the trailer comes to their home site on a revolving schedule.

MACC is meeting a clearly defined need in the Columbia and Moberly areas. Expanding the Engineering Systems program to the Hannibal, Kirksville, and Mexico sites will allow MACC to strengthen partnerships with area industry and assist the service region with the need to develop a trained workforce.

Market Demand

In the Engineering Systems program at MACC, students may choose the Maintenance and Mechatronics options. Employment growth in these fields ranges from "average" to "faster than average." The 2012 Occupational Outlook Handbook published by the Bureau of Labor Statistics projects that job opportunities for Industrial Machinery Mechanics and Maintenance Workers are expected to grow by 19% between 2010 and 2020. Additionally, job opportunities for electricians are expected to grow by 23% creating many employment opportunities for MACC Engineering Systems graduates.

Continued growth in this field is also predicted by other independent business sources. The 2008-2018 Missouri's Hot Jobs projects that in the next decade, 1,371 industrial machinery mechanic and 6,010 general maintenance and repair positions will become available. Additionally, according to a real time labor market compiled by the Missouri Research and Information Center (MERIC) in fall 2012, there were 1,093 job openings in Advanced Manufacturing Industry. Over half of those positions were of a type requiring technical and skilled labor.

Societal Need

Imperatives for Change: A Coordinated Plan for the Missouri Department of Higher Education envisions a system of postsecondary education that is of the highest quality, distinguished by a coordinated, balanced, and cost-effective system. That system will also include a range of vocational, academic, and professional programs that are affordable and accessible to all citizens and differentiated by institutional missions. MACC and the state's community colleges are in a good position to assist the state in its *Imperatives for Change* goals.

Efforts to expand services to the Hannibal, Kirksville and Mexico areas will help meet the *Imperatives for Change* objectives of increasing the percentage of Missouri residents who possess a postsecondary credential and demonstrating improvement in meeting the workforce needs of Missouri employers. The expansion of the program to include the Hannibal, Kirksville, and Mexico sites will address the needs not only of recent high school graduates interested in industrial technology professions, but also the working adult who seeks further credentials to maintain employment or those who seek new employment opportunities due to current negative economic conditions.

Offering the Engineering Systems degree, certificate, and short-term certificate programs in Hannibal, Kirksville, and Mexico will also provide increased statewide economic benefits and reduced social costs. A 2011 study conducted by Economic Modeling Specialists, Inc. found that as many as 93% of Missouri community college graduates stay in the state after graduation and become contributors to their local economy. In 2009-2010, community college graduates added over $517 million to Missouri's Gross State product (GSP) while reducing social costs by approximately 28.3 million. These cost savings are measured through reduced crime rates, increased productivity, and reduced expenditures for public assistance programs and unemployment benefits.

The improved geographic and financial access to higher education achieved through MACC's active presence at off-campus sites is in response to the state and national priority for accessibility to higher education for all citizens. Greater access to higher education combined with the economic benefits that MACC graduates bring to their communities are compelling reasons to increase MACC's current presence by offering additional degree programs.

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PROGRAM STRUCTURE

A. Total credits required for graduation: 62-66 for Maintenance Option/66-67 for Mechatronics Option

B. Residency requirements, if any: Students must complete 15 of the last 30 semester hours of college-level credit at Moberly Area Community College OR complete a minimum of 30 semester hours of college-level credit at MACC.

C. General education: Total credits: 20

Courses (specific courses OR distribution area and credits):

Course Number	Credits	Course Title
History/Government	3	
English	3	
Communications	3	
Math	3	
Humanities	3	
Physics	4	
Life skills	1	

D. Major requirements: Total credits: 20-23 core degree hours + 20-24 option hours

Course Number	Credits	Course Title
AMD110	3	Industrial Print Reading
EET100	3	DC/AC Electronics
EET111	3	Electric Motor Controls
IND100	3	Introduction to Manufacturing
IND101	3	Fundamentals of Industrial Maintenance
IND103	3	Industrial Safety and Health
IND105	3	Fluid Power Principles
SKL250	1-2	Employment Seminar or Career Technical Education Internship
TOTAL CORE HRS	22-23	
Mechatronics Option	24	(Note: 7-8 additional courses are required in the chosen emphasis area)
Maintenance Option	20-23	

E. Free elective credits:
N/A
(Sum of C, D, and E should equal A.)

F. Requirements for thesis, internship or other capstone experience:
Option for internship or employment seminar

G. Any unique features such as interdepartmental cooperation:
N/A

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PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS

Institution Name Moberly Area Community College
Program Name Engineering Systems
Date April 1, 2015

(Although all of the following guidelines may not be applicable to the proposed program, please carefully consider the elements in each area and respond as completely as possible in the format below. Quantification of performance goals should be included wherever possible.)

1. Student Preparation

- Any special admissions procedures or student qualifications required for this program which exceed regular university admissions, standards, e.g., ACT score, completion of core curriculum, portfolio, personal interview, etc. Please note if no special preparation will be required.
  The open-door admission policy at Moberly Area Community College allows students admission in college programs based on aptitude, interest, abilities, and specific program entrance requirements. No special preparation or qualifications which exceed regular college admissions policies will be required for entry into the Engineering Systems program. It is anticipated that the program will serve both traditional and non-traditional college students who reside in the Hannibal, Kirksville, and Mexico areas. Additionally, MACC offers a full sequence of developmental coursework to assist students with deficient math and English skills. These courses, designed to increase student success, are available to all students at all sites.

- Characteristics of a specific population to be served, if applicable.
  N/A

2. Faculty Characteristics

- Any special requirements (degree status, training, etc.) for assignment of teaching for this degree/certificate.
  MACC employs faculty who have earned degrees from accredited institutions. These degrees must also be the degree appropriate to the level of instruction offered by the institution and program. Faculty members who teach in the Engineering Systems program must have, at minimum, an Associate of Applied Science degree in their specific discipline plus extensive work experience in the engineering systems/industrial technology field. A full-time Mechatroincs instructor was hired in 2013 to develop the program at the Columbia location and teach the on-site courses. This instructor has a master's degree in Political Science, an associate's degree in electronics, and over 36

years of experience in electronics, industrial controls, and industrial technology. By fall 2015, he will have also earned the full Certified Production Technician Certification.

- Estimated percentage of credit hours that will be assigned to full time faculty. Please use the term "full time faculty" (and not FTE) in your descriptions here.
  A full-time Engineering Systems faculty member will teach 60% of the Engineering Systems-specific courses in the program with the remaining percentage being taught by adjuncts. Approximately 55% of the general education coursework at the Hannibal and Kirksville sites will be taught by full-time instructors. The remaining percentage will be taught by adjuncts.

- Expectations for professional activities, special student contact, teaching/learning innovation.
  MACC strongly supports professional growth, service and leadership activities among faculty members and participation in these activities is an integral part of the faculty evaluation process. All full-time faculty members have the same professional growth opportunities, including membership in professional associations, travel to state and national conferences, participation in the MACC staff development program, and attendance at orientation/topical workshops at the beginning of each semester. Adjunct faculty members are invited to participate in all faculty workshops as well as sessions geared specifically to their instructional needs. All new faculty members are provided orientation sessions prior to their first semester of teaching at the College. A combination of traditional, hybrid, online and virtual classroom instruction and laboratory instruction methodologies are incorporated in delivering the courses in this program. Full-time faculty maintain a minimum of ten office hours per week. Part-time faculty who teach nine hours or more maintain a minimum of three office hours per week. To increase accessibility, students may meet with instructors in either their physical offices at each location site or in their virtual offices via Blackboard Collaborate. Students also have access to the campus email system and an internet portal, which allow additional means of communication with faculty.

3. Enrollment Projections

- Student FTE majoring in program by the end of five years.
  It is anticipated that the Engineering Systems AAS degree will enroll 10 FTEs in Hannibal and Kirksville by the end of 5 years.

- Percent of full time and part time enrollment by the end of five years.
  It is anticipated that by the end of five years 43% will be full-time students and 57% will be part-time students.

4. Student and Program Outcomes

- Number of graduates per annum at three and five years after implementation.
  Based on enrollment projections, it is estimated that four students in Hannibal and four students in Kirksville will earn the AAS degree in the third year of implementation and that the number of graduates will increase to eight by year five.

- Special skills specific to the program.
  N/A

- Proportion of students who will achieve licensing, certification, or registration.
  N/A

- Performance on national and/or local assessments, e.g., percent of students scoring above the 50th percentile on normed tests; percent of students achieving minimal cut-scores on criterion-referenced tests. Include expected results on assessments of general education and on exit assessments in a particular discipline as well as the name of any nationally recognized assessments used.
  MACC's Expected Results: 1) At least 80% of program completers achieve proficiency in at least 80% of the essential skills, and 2) at least 90% of completers meet the career standard identified within the WorkKeys test. MACC's Actual Results in 2013-2014: 1) 100% of degree and certificate comleters met their essential skills, and 2) 100% exceeded the target score.

- Placement rates in related fields, in other fields, unemployed.
  Graduates of MACC career and technical programs are highly successful in finding employment. Approximately 86% of Industrial Technology graduates find employment within one year of graduation. Students at the Hannibal, Kirksville, and Mexico sites will be provided the same services by the MACC placement office. After consultation with industry partners, it is anticipated that industrial technology graduates with an AAS degree in the mid-Missouri area will earn an average starting wage of $18.25/hour. Statewide salaries for graduates in industrial technology fields range from $35,422 for entry-level positions to $62,467 for experienced workers in the field.

- Transfer rates, continuous study.
  The Associate of Applied Science degree is a workforce preparation degree. It is not intended as a transfer degree into a four-year program; however, students may transfer to a bachelor's program in Engineering Systems or a related area.

5. Program Accreditation

- Institutional plans for accreditation, if applicable, including accrediting agency and timeline. **If there are no plans to seek specialized accreditation, please provide a rationale.**
  Moberly Area Community College is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools.

6. Alumni and Employer Survey

- Expected satisfaction rates for alumni, *including timing and method of surveys.*
  The Office of Institutional Effectiveness and Planning administers a Graduate Satisfaction Survey to all students completing a degree or certificate program at MACC. The survey is part of the packet of graduation materials given to students each semester. Survey results indicate graduates' level of satisfaction with MACC's advising and instruction, as well as overall satisfaction with their educational experience. MACC's Career & Placement Services also conducts an annual 180-day follow-up survey of all career and technical education completers. The survey is designed to gauge graduates' level of satisfaction with MACC services and level of preparation for the workplace. The survey can be completed online or mailed to the Moberly campus. In the most recent survey, graduates rated the quality of their instructional experience 3 on a 4-point scale, with 4 being considered excellent. MACC has participated in alumni and employer surveys sponsored by the CBHE. Students at all MACC campuses will be included as additional survey tools are implemented.

- Expected satisfaction rates for employers, including timing and method of surveys.
  N/A

7. Institutional Characteristics

- Characteristics demonstrating why your institution is particularly well-equipped to support the program.
  MACC is particularly well-equipped to support the expansion of the Engineering Systems program because of its strong partnerships with business and industry, the high level of expertise of the program developer/lead instructor, and the advantageous timing of MACC receiving MoSTEM grant funding to purchase a mobile mechatronics/maintenance lab.