

TO: Fort Wayne Senate  
FROM: Kate White, Acting Chair, Curriculum Review Subcommittee  
DATE: November 11, 2016  
SUBJECT: Proposal for ME Certificate

Curriculum Review Subcommittee members support the proposal for the Advanced Manufacturing Engineering Certificate program and find that it requires no Senate review.

Approving

Not Approving

Absent

S. Baddam  
R. Duchovic  
C. Duncan  
D. Lui  
S. Skekloff  
J. Smith  
K. White  
M. Yamanda



### Undergraduate Academic Program Memo

Date: September 19, 2016

From: Dr. Nashwan T. Younis, Chair of Civil and Mechanical Engineering Department

To: Dr. Carl N. Drummond, Vice Chancellor for Academic Affairs

Re: Proposal for Advanced Manufacturing Engineering Certificate program

**Brief description of the program:**

The proposed Advanced Manufacturing Engineering Certificate program provide mechanical engineering students a credential to prepare for a career in advanced manufacturing, to update manufacturing expertise, or to move into manufacturing management

**Brief rationale for program request:**

- This certificate is the first step in sustainably enhancing our existing programs, better aligning with specific needs of Northeast Indiana, and better serving our students.
- Manufacturing is Northeast Indiana’s largest sector, involving over 70,000 jobs in 2013. Over time, the manufacturing sector has undegone significant changes with a current emphasis on “advanced manufacturing” stressing innovation and employing state-of-the-art technologies.

*Nashwan T. Younis* \_\_\_\_\_ *9/19/2016*  
 Department Chair Signature Date

*M. Zoghbi* \_\_\_\_\_ *9/20/16*  
 School Dean Signature Date

\_\_\_\_\_  
 Vice Chancellor for Academic Affairs Signature Date

\_\_\_\_\_  
 Indiana University-Purdue University Chancellor Signature Date

**IPFW**  
**Request for a New Credit Certificate Program**

Campus: IPFW

Proposed Title of Certificate Program: Advanced Manufacturing Engineering Certificate

Projected Date of Implementation: Spring 2017

TYPE OF CERTIFICATE: (check one)

UNDERGRADUATE CERTIFICATES – These programs generally require 12-29 credits of undergraduate-level academic work.

GRADUATE CERTIFICATES – These programs generally require 12-29 credits of graduate-level academic work or undergraduate academic work carrying graduate credit.

POST-BACCALAUREATE CERTIFICATES – These programs generally require 12-29 credits of undergraduate-level academic work, although students enrolling in these programs must have completed their baccalaureate degrees.

I. Why is this certificate needed? (Rationale)

- Input from the Department of Civil and Mechanical Engineering's continuous improvement process, e.g. advisory board, numerous interviews and meetings with local industry, meetings with Northeast Indiana Industry Leaders, and local economic development reports, has been used to develop this certificate program.
- This certificate is the first step in sustainably enhancing our existing programs, better aligning with specific needs of Northeast Indiana, and better serving our students.
- Manufacturing is Northeast Indiana's largest sector, involving over 70,000 jobs in 2013. Over time, the manufacturing sector has undergone significant changes with a current emphasis on "advanced manufacturing" stressing innovation and employing state-of-the-art technologies.

II. List the major topics and curriculum of the certificate.

- Six courses (18-credit hour) are required for the certificate in advanced manufacturing engineering comprised of the following four required courses:
  - IET 20400 – Techniques of Maintaining Quality
  - ME 43200 – Manufacturing Processes
  - ME 48000 – Finite Element Analysis
  - MET 33500 – Basic Machining

and two of the following elective courses<sup>1</sup>

- IET 47800 – Lean Manufacturing and Design
- ME 54600 – CAD/CAM Theory and Advanced Applications
- SE 55000 – Advanced Manufacturing Systems and Processes
- STAT 51100 – Statistical Methods
- TECH 57400 – Advanced Quality Engineering Methods

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<sup>1</sup> With approval of the mechanical engineering curriculum committee, course substitution may be permitted.

This curriculum provides students broad foundation in fundamental manufacturing processes, techniques, and principles as well as exposing students to advanced technologies and stressing the integration of new tools into manufacturing processes to raise productivity and enhance value.

- III. What are the admission requirements?
- Students must have finished at least 60 credit hours in the BSME degree program.
  - Students must have achieved a grade point average (GPA) of at least 2.5 at the time of application.
  - Having proper course pre-requisites
- IV. List the major student outcomes (or set of performance based standards) for the proposed certificate.
- The major student outcomes are:
- Ability to design manufacturing processes that result in products that meet specific materials and other requirements.
  - Ability to design products and equipment, tooling necessary for their manufacture
  - Ability to analyze, synthesize, and control manufacturing operations using statistical methods.
- V. Explain how student learning outcomes will be assessed (student portfolios, graduate follow up, employer survey, standardized test, etc.) and describe the structure/process for reviewing assessment findings for the purpose of ensuring continuous improvement of the certificate.
- The mechanical engineering program has a well-established continuous improvement assessment plan in which the learning outcomes are assessed every semester using direct and indirect measures.
- VI. Describe student population to be served.
- The Advanced Manufacturing Engineering Certificate program will be open to:
- Students pursuing BSME degree in the mechanical engineering program in the Civil and Mechanical Engineering Department at IPFW.
  - Students pursuing BSME degree in the mechanical engineering programs at colleges and universities in Northeastern Indiana.
  - Practicing engineers at companies in Northeastern Indiana.
- VII. How does this certificate complement the campus or departmental mission?
- This certificate is designed to meet the specific demands of Northeast Indiana industries, while complementing our existing, accredited bachelor of science in mechanical engineering degree.
- VIII. Describe any relationship to existing programs on the campus or within the university.
- Students graduating with B.S. degree in mechanical engineering at IPFW would need only two extra courses to get this certificate. The other four courses could count for the four technical elective courses required for the BSME degree.
- IX. List and indicate the resources required to implement the proposed program. Indicate sources (e.g., reallocations or any new resources such as personnel, library holdings, equipment, etc.) \*
- It is expected that any other resources to implement the Advanced Manufacturing Engineering Certificate will not be needed.

X. A Liaison Library Memo

- See attachment.

XI. Describe any innovative features of the program (e.g., involvement with local or regional agencies, or offices, cooperative efforts with other institutions, etc).

The library resource questionnaire available at:

<http://www.ipfw.edu/offices/oaaprograms/curriculumdev.html>



## Liaison Librarian Memo

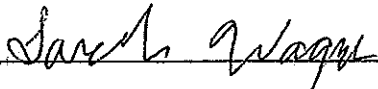
Date: 8/5/16  
From: Sarah Wagner, Information Services and Instruction Librarian  
To: Dr. Carl N. Drummond, Vice Chancellor for Academic Affairs  
Re: New Certificate in Advanced Manufacturing Engineering

Describe availability of library resources to support proposed new program:

Currently, the library possesses the resources necessary to support this program, as it is based on already existing courses. The collection has met ABET accreditation standards in past accreditation of mechanical engineering. In the case of books and other one-time purchases, Special Needs Grants are available should a gap or under-served area of the library collection become apparent.

### Comments:

The primary databases, journals, and books likely to be used by students and faculty pursuing this certificate are either owned or subscribed to by the library at this time. Nevertheless, the library will need to take continuing support of the program into its future budget requests in order to maintain current subscriptions and to consistently update the print and electronic collection in the discipline. Finally, the library must support the need for new or additional materials reflecting changes in the profession, faculty teaching and research interests, as well as growth in the number of students in the program and their needs.



*Liaison Librarian Signature*

8-5-2016

*Date*

***When developing a new degree program, major, certificate, minor, concentration, track, or specialization please review the questions below when developing your response to the library or additional resources sections. Please consult your liaison librarian for assistance.***

### **Library Resources**

Address the following issues regarding the impact of the new program on the library's budget and personnel. Please respond to each item below indicating the library sources and services required to support the proposed program.

- Which databases/indexing sources will be used by the courses in this program?
  - ACM Digital Library
  - IEEE Xplore
  - Science Direct
  - Compendex
  - Scopus
  - Business Source Complete
  - Academic Search Premier
- What are the journals that will be used by students completing library research in this program? Please list three to five titles. Is there an expectation that access to new journals will need to be purchased for students in this program?

The following journal titles were selected based on their high impact factor in the disciplines related to advanced manufacturing engineering.

- *Production and Operations Management*
- *CIRP Annals - Manufacturing Technology*
- *IEEE Transactions on Industry Applications*
- *Materials and Manufacturing Processes*
- *IEEE Transactions on Components, Packaging and Manufacturing Technology*

The journals listed above and others related to advanced manufacturing are covered in databases subscribed to by the library. The library performs an annual review of journal titles and databases subscription to consider adding or discontinuing subscriptions. The library will need to consider maintaining these subscriptions in upcoming budget requests in order to retain the same level of support for the program.

- Are there any specific reference sources (e.g. encyclopedias, handbooks, standards, etc.) required to support the new program?
  - At this time, no new references sources will be required to support the certificate. If the program grows significantly, the demand for materials such as ASTM standards and similar materials may necessitate the need for an increase in the recurring materials budget to cover the cost of ongoing subscriptions.
- Is there an expectation for additional books to be purchased? What about DVD or audio/visual materials? What is the estimated dollar amount needed yearly to support this program with new books and media materials?
  - As the certificate is based on existing courses, the current monograph budget should be adequate to keep the collection up-to-date. In the case of additional needs becoming apparent, the library does have Special Needs Grants available to address gaps in the collection for one-time purchases.
- Will the new program use the Library's Document Delivery Services? Costs for this service come out of the Library's budget. What types of materials would the program be requesting through DDS?
  - The addition of the certificate program should not significantly impact Document Delivery Services.
- Who is the liaison librarian for this program? The liaison librarian provides support through involvement in Blackboard-supported classes, one-on-one research consultations, in-class instructional sessions, and tailored course guides for research assignments. Which of these librarian services do you anticipate will be utilized in the new program?
  - Sarah Wagner, [wagners@ipfw.edu](mailto:wagners@ipfw.edu), is the liaison librarian for this program. The liaison librarian will be able to provide all of the services listed above. New services may be added as recommended by the liaison librarian.
- Memo from Liaison Librarian regarding resources.
- Is there an accrediting body that will be overseeing this program? What are the statements of the accrediting body related to the library, e.g. holdings, personnel, services?
  - This new certificate program will not be accredited, separately the Mechanical Engineering program is accredited by ABET.