

PCAF: Master of Engineering Degree (M.Engr.)

The proposed Master of Engineering Degree (M.Engr.) "...will be accredited by the Accreditation Board of Engineering Technology (ABET) and the Engineering Accreditation Commission (EAC) and qualify graduates for professional engineering licensure." "The primary target population is our Bachelor of Engineering (BS E) and Bachelor of Engineering Technology (BS ET) graduates who either immediately enter the M.Engr. or those with a few years of experience who are ready to progress into management. Beyond our own graduates are approximately 18,000 BS ET graduates each year in the United States." The target date for implementation is Fall 2021.

I support the proposed M.Engr. Degree for the following reasons. The M.Engr. will allow faculty in the College of Engineering Technology to:

- Change the future of engineering education at Ferris. "This first professional graduate degree will enable faculty in the CET to "adopt a lifelong educational partnership mindset to serve our students, not just for four short years, but for their entire careers."
- Create customizable educational opportunities for students. Three highly marketable 12 cr hour graduate certificates comprised of existing graduate courses in the College of Business along with proposed M.Engr. graduate courses have been identified. (Specifically, Cost Engineering Leadership, Engineering Risk Analysis and Leadership, and Engineering Entrepreneurship and Leadership).
- Attract students from across the country. "There are approximately 84,000 baccalaureate engineering graduates each year, About 10% progress into project or product manager positions and may find this degree more appealing than a traditional MBA."
- Provide credentialing opportunities CET faculty. "The M.Engr. will be a pathway for many of our own faculty to gain advanced degrees in the field."

I approve the PCAF giving permission for faculty in the College of Engineering Technology (CET) to develop the full proposal. Over this next budget year (2020-21), the proposers are expected to work with the Dean and the account clerk in the College of Engineering, Kim Wilber, and myself to build the projected start-up costs (\$359,935) into the College of Technology budget for 2021-22. Then, continue to plan for and build the additional projected costs for Year 2 (\$572,615) and Year 3 (\$721,255) into subsequent College of Engineering Technology budgets.

 11/6/20

Preliminary Curriculum Approval Form (PCAF)

Form Current on 7/29/20

A PCAF is required when significant new resources (equipment, library, facilities, funding, faculty/staff, etc.) will be required to implement the modification or addition. If a Preliminary Curriculum Approval Form (PCAF) is required, it must be completely approved prior to proposal submission.

The preliminary curriculum approval process assures that curriculum development is aligned with the Ferris State University Strategic Plan. The PCAF requires a brief description that addresses a range of pertinent information and topics and is reviewed by department administrators, deans, the Provost or his/her designee and the Presidents Council. *Approval of the PCAF does not guarantee funding support from Academic Affairs.*

Preliminary approval by the Provost does not guarantee final approval of the full proposal. Approved PCAFs are posted on the [Academic Affairs PCAF website](#) to inform the University community about programs under development.

Name(s) of proposal initiator(s): Michael Staley
Department(s)/College(s): College of Engineering Technology

Type of curriculum change (check one):

<input checked="" type="checkbox"/> New Degree, Program/Major requiring 3 or more new courses and/or new resources
<input type="checkbox"/> New Minor requiring 3 or more new courses and/or new resources
<input type="checkbox"/> New Concentration requiring 3 or more new courses and/or new resources
<input checked="" type="checkbox"/> New Certificate requiring 3 or more new courses and/or new resources
<input type="checkbox"/> Existing program redirection or shift in emphasis requiring 3 or more new courses and/or new resources
<input type="checkbox"/> Curricular customization of existing program for off-campus cohort group

1. Name of degree, program/major, concentration, certificate, or minor. Briefly describe the curriculum plan/template. **Master of Engineering – this professional practice graduate degree will focus on the “practice” of engineering rather than engineering research. The M.Engr. is a first professional degree and will be accredited by ABET EAC and qualify the graduates for professional engineering licensure. The M.Engr. degree requires 18 graduate hours of engineering analysis and design core plus 12 credit hours in professional practice seminars focused on the project and product level of leadership. The M.Engr. student will develop a capstone project integrating technical and professional practice knowledge. The Master of Engineering degree program will accept engineering, engineering technology and related students who want to advance to a professional engineering practice/leadership role.**
2. Target date for implementation. **Fall 2021**
3. Briefly explain the rationale for this initiative. If the initiative involves customization of an existing program for delivery to an off-campus cohort group, also explain the nature of the proposed curricular customization. **The primary target population is our BS E and BS ET graduates who either immediately enter the M.Eng. or those BS ET graduates with a few years of experience who are ready to progress into management. The M.Eng. degree will qualify our BS ET graduates for advancement into professional engineering and engineering management positions.**
4. Are there similar programs at other Michigan universities? If so, where? What is the enrollment in the other programs?**Yes/No. There are Master of Engineering programs in Michigan but none of them are a first professional degree accredited under the ABET EAC Integrated BS/M.Engr. model and none are specifically focused on**

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professional practice. University of Michigan offers the Master of Engineering in Systems + Design. MTU offers the Master of Engineering in Hybrid Electric Vehicles and an interdisciplinary track. The proposed M.Engr. is based upon programs found at Northwestern, Johns Hopkins, and Cornell. These programs do a good job of remaining focused on professional practice graduate studies. The M.Engr. at Ferris State University, College of Engineering Technology will offer the same professional practice foci but accessible to the general engineering and engineering population.

5. Briefly explain any similarities of the proposed initiative (program objectives and/or curriculum) with already established FSU or KCAD programs: There are no similar programs at FSU or KCAD. However, it is similar in the sense that this is a first professional engineering graduate degree similar to other professional graduate degrees offered at FSU and KCAD.
6. Briefly describe indicators of the employment market for students completing this initiative, including sources used for employment information/data. Industrial Engineering and related jobs are expected to grow by 10% through 2029 which is must faster than all other jobs. Mechanical, Electrical/Electronics, Civil and other sectors will grow as fast as or faster than all jobs through 2029. There are areas within Michigan that have higher concentrations of engineers than the average metro areas because of the economic business mix. Grand Rapids is one of these locations with more industrial, manufacturing, mechanical and electrical engineers to support the local market. Engineering is also one of the few professions that creates new products, jobs and even new industries with innovation. Many of the products and services that engineers produce are exported to other states and countries which places the job need in a different category than those jobs needed only to support a local population. We believe that these engineering graduates will produces the products that drive our economy. We believe that these engineering graduates will create the jobs of their generation with these new products. One of the principle reasons for adding innovation and creativity to the M.Engr. program.
1. Briefly describe indicators of potential student interest/demand for the new initiative, including sources used for student market information/data. The primary target population is our BS E and BS ET graduates who either immediately enter the M.Eng. or those BS ET graduates with a few years of experience who are ready to progress into management. The M.Eng. degree will qualify our BS ET graduates for advancement into professional engineering and engineering management positions. Beyond our own BS ET graduates, there are approximately 18,000 BS ET graduates each year in the united states. A professional practice graduate degree that can qualify them for engineering and engineering management positions will be appealing for this population. There are approximately 84,000 baccalaureate engineering graduates each year. About 10% progress into project or product manager positions and may find this degree more appealing than a traditional MBA. There are approximately 800,000 professional engineers. A percentage of these individuals will be candidates for a Master of Engineering and presumably interested in professional practice given their progression towards licensure. We also envision the M.Eng. degree will be popular with community college faculty who are looking to increase their credentials. We estimate 15,000 community college engineering technology faculty. Again, this population is more likely interested in professional practice than research as they work at teaching institutions not research institutions. The M.Eng. will be a pathway for many of our own faculty to gain advanced degrees in field. This degree having 18 graduate credit hours in field, will satisfy the HLC and university faculty criteria for instruction at the baccalaureate level. A larger percentage of our faculty have the master's degree in career and technical education because there was no graduate degree option within the College of Engineering Technology.
2. To what extent will this initiative draw new students to FSU or KCAD? To what extent will it draw students from existing programs? We do not expect this program to draw students away from other programs. This graduate program will both extend undergraduate students in a graduate degree (10% to 15% of our graduates will continue

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on and complete the graduate degree) and capture alumni who have separated from the university within 10 years or so. We also expect to capture many BS ET graduates from around the country as well as many BS Engr. Graduates from around the country who want a professional practice graduate degree rather than a traditional research based master of science degree.

3. Approximately how many students are expected to enroll? Include rationale for estimates. [Click here to enter text.](#)

45 in the first year?

160 after three years?

4. At which FSU campuses/regional centers or other sites will the initiative be offered? **Big Rapids campus for full time students, Grand Rapids for part time working adults and online for part time working adults outside of the BR/GR area.**
5. Will Internet or other distance learning technology be used for course/program delivery? Describe. **Yes, for the part time students outside of the Big Rapids and Grand Rapids area, an online line format with short residency will be utilized.**

Complete questions 12, 13, 14 in consultation with department administrator and/or dean.

6. Provide a rough estimate of the resources needed to implement the initiative. Please attach a three year budget to include faculty salaries plus benefits, library materials estimate, equipment and classroom materials estimate, and renovation estimate. **See budget attached**
7. Project the resources that could come from reallocation within the department or college and the new resources that would be required. **We have identified 4 faculty with terminal qualifications and 11 additional faculty that may qualify as practice terminal faculty. These faculty would be qualified to help develop and/or teach courses in the program. We envision needing only one initial FT Tenure Track Faculty supplemented by existing faculty teaching as part of base load or overload as well as adjunct faculty. See three-year simplified budget and estimate of tuition revenue attached. We will use space within the six CET buildings on campus, taking advantage of classrooms and laboratories that currently exist and are not 100% utilized during the day.**
8. Are there new space needs? If so, how much? How would the space be used? Has existing space been identified? If so, where? Is renovation/remodeling necessary? **We will use space within the six CET buildings on campus, taking advantage of classrooms and laboratories that currently exist and are not 100% utilized during the day.**
9. Is there professional accreditation for the program? Is it required or voluntary? Will accreditation be sought, and when? What will be the one- time and ongoing costs of accreditation? **This program will become accredited through ABET EAC Integrated BS/M.Engr. accreditation process. This will qualify our students with a BS ET degree with a first professional engineering degree qualifying them for professional engineering licensure.**
10. Has there been preliminary discussion with other departments/colleges that will be involved in course/program delivery? If yes, what was the feedback? **Discussion of this degree started with the CET Welcome back where all faculty and staff were briefed of the vision for creating a graduate degree. We followed this up with a survey of all faculty. More than 50% of faculty responding was supportive of adding graduate education. We have started small group discussions within CET to further refine the concept. We have also discussed the Grand Rapids and online options with EIO. We briefed the RAM committee. We met with Mandy S. to discuss credentialing and accreditation issues.**

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Prof. P. Fleischman Digitally signed by Bobby Fleischman
Date: 2020.11.04 15:49:51 -05'00'

Department Administrator's signature: _____ Date _____

Note: If this is an interdepartmental initiative, include additional Department Administrator signatures

Comments:

Michael D. Staley Digitally signed by Michael D. Staley
Date: 2020.10.29 09:45:52 -04'00'

Dean's signature: _____ Date _____

- For cross-college initiatives, include additional signature(s) of Dean(s)
- For existing programs customized for off-campus delivery to a cohort group, include College and EIO Deans' signatures

Comments:

Leonard Johnson Digitally signed by Leonard Johnson
Date: 2020.10.30 13:36:46 -04'00'

Associate Provost's Signature: _____ Date _____

Approved

Please see attached summary.

Comments and/or suggestions:

Not approved - Explanation:

Prof. P. Fleischman Digitally signed by Bobby Fleischman
Date: 2020.11.04 15:47:58 -05'00'

Provost's Signature: _____ Date _____

Presented to the President's Council for comments

Approved - Approval indicates permission to develop the full proposal. It does not assure final approval.

Comments and/or suggestions:

Not approved - Explanation:

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M.Engr. & Graduate Certificates			
	Yr 1	Yr 2	Yr 3
Revenue	948,960	1,897,920	2,135,160
FT Faculty	135,375	135,375	270,750
Overloads BR	61,139	122,278	122,278
Adjunct GR	61,139	122,278	122,278
Adjunct Online	61,139	122,278	122,278
Lab Spaces	0	0	0
Classroom	0	0	0
Equipment	5,000	7,500	10,000
Materials	2,500	3,750	5,000
Software	12,000	18,000	24,000
Accreditation ABET	18,000	18,000	18,000
Instructional Delivery	356,291	549,458	694,583
SCH	1,440	2,500	3,240
FTE-F	6	10	11
SCH/FTE-F	240	250	295
Net Revenue	592,669	1,348,462	1,440,577
Multiplier on instruction (>3.0)	2.66	3.45	3.07

Projected Program Budget

M.Engr. & Graduate Certificates

Funding Source <i>Required</i>	(enter Funding Source here)		FOAP	G38000		
Budget Item	Please Check One		Year 1	Year 2	Year 3	Total
	Base	One Time				
Salaries & Benefits						
Current Faculty Salaries	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Current Faculty Benefits	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Current Adjunct Faculty Salaries	<input checked="" type="checkbox"/>	<input type="checkbox"/>				\$ -
Current Adjunct Faculty Benefits	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
New Faculty Salaries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$ 95,000	\$ 97,138	\$ 194,604	\$ 386,742
New Faculty Benefits	<input type="checkbox"/>	<input type="checkbox"/>	\$ 40,375	\$ 41,283	\$ 82,707	\$ 164,365
New Adjunct Faculty Salaries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$ 143,892	\$ 287,784	\$ 287,784	\$ 719,460
New Adjunct Faculty Benefits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$ 43,168	\$ 99,160	\$ 99,160	\$ 241,488
Total			\$ 322,435	\$ 525,365	\$ 664,255	\$ 1,512,055
Supply & Expense						
Library						
Library Materials	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Total			\$ -	\$ -	\$ -	\$ -
Facility Enhancements						
Classroom/Lab Equipment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$ 5,000	\$ 7,500	\$ 10,000	\$ 22,500
Classroom/Lab Materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$ 2,500	\$ 3,750	\$ 5,000	\$ 11,250
Classroom/Lab Space	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$ 12,000	\$ 18,000	\$ 24,000	\$ 54,000
	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Total			\$ 19,500	\$ 29,250	\$ 39,000	\$ 87,750
Accreditation						
ABET	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$ 18,000	\$ 18,000	\$ 18,000	\$ 54,000
(enter here)	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
(enter here)	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
(enter here)	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Total			\$ 18,000	\$ 18,000	\$ 18,000	\$ 54,000
Marketing						
Print Materials	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Recruitment Materials	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Website Analytics	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Website Development	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Total			\$ -	\$ -	\$ -	\$ -
Other						
Recruiting (existing, no additional cost)	<input type="checkbox"/>	<input type="checkbox"/>	\$ -	\$ -	\$ -	\$ -
	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
	<input type="checkbox"/>	<input type="checkbox"/>				\$ -
Total			\$ -	\$ -	\$ -	\$ -
			Year 1	Year 2	Year 3	
Total Budget By Year			\$ 359,935	\$ 572,615	\$ 721,255	\$ -
Total New Base Budget			\$ 359,935	\$ 572,615	\$ 721,255	\$ 1,653,805
Total New One-time Budget			\$ -	\$ -	\$ -	\$ -