SECTION: 12
DATE: February 13, 2020

BOARD OF REGENTS

EASTERN MICHIGAN UNIVERSITY

RECOMMENDATION

NEW ACADEMIC PROGRAM: CIVIL ENGINEERING, BACHELOR OF SCIENCE

ACTION REQUESTED

It is recommended that the Board of Regents approve a New Academic Program: Civil Engineering (Bachelor of Science).

STAFF SUMMARY

The *Bachelor of Science in Civil Engineering* is dedicated to preparing students for productive careers in Civil Engineering with an emphasis on structural engineering, transportation, water resources, environmental engineering, and construction management.

PROPOSAL ELEMENTS

Rationale

The health of the infrastructure (e.g., bridges, drinking water, rail, roads, transit, and solid waste) is a critical component to the society and the economy of the U.S. in general and the State of Michigan in particular.

The most recent American Society of Civil Engineers (ASCE) report on the infrastructure rated Michigan as D+. Also, the report stated a need for investing $3.6 trillion in the U.S. by 2020 to fix infrastructure issues. In Michigan, the report says that the following investments in infrastructure are needed, schools ($9 billion), wastewater systems ($4 billion), drinking water infrastructure ($14 billion), and transportation systems ($4 billion).

The U.S. Bureau of Labor Statistics' latest projections of national employment projected an 8% growth in Civil Engineering employment in the 2014-2024 time frame.

Program Distinction

The program is unique given the integration of EMU's General Education program. Our students having completed the general education requirements are prepared to participate in the global community. Students in the B.S. in Civil Engineering program will learn in and beyond the classroom, and graduates will be ready to solve future engineering problems locally and globally.

Curriculum Design Students will take courses that involve civil engineering materials, soil mechanics, fluid mechanics, construction management, transportation engineering, and concrete and steel design. Laboratory experiments and the use of computer aided engineering tools will be integrated into the program. Students will also study engineering design theories and will acquire numerous engineering design experiences. The major requires 85-86 credit hours.

The civil engineering curriculum will culminate with a capstone design project experience. The capstone design project experience will require students to draw from their previously acquired knowledge in mathematics and the engineering sciences to solve engineering design problems supplied by external customers.

The is a STEM (science, technology, engineering, and math) designated program.

Projected Enrollment Based upon present interest, the School of Visual and Built Environments anticipate graduating the program's first class of 15-20 students by April 2023 and plan on building the enrollment as they advertise the new major.

FISCAL IMPLICATIONS

The current Academic Affairs budget will absorb program costs.

ADMINISTRATIVE RECOMMENDATION

The proposed Board action has been reviewed and is recommended for Board approval.

[redacted]

University Executive Officer
Rhonda Longworth, Ph.D.

1/20/2020
Date

Civil Engineering [BS]

New Program [The effective date will be determined following consideration by the Academic Officers Committee, Michigan Association of State Universities, and the Board of Regents.]

The Bachelor of Science in Civil Engineering (CIVE) program prepares students for productive careers in Civil Engineering with an emphasis on at least four areas of Civil Engineering, including and not limited to, Structural Analysis and Design, Transportation Engineering, Construction Engineering and Management, Water and Waste Water Engineering, Soil Mechanics and Foundation Engineering, and Pavement and Materials Engineering.

Learn

Students will take courses that involve civil engineering materials, soil mechanics, fluid mechanics, construction management, transportation engineering, and concrete and steel design. Laboratory experiments and the use of computer aided engineering tools will be integrated into the program. Students will also study engineering design theories and will acquire numerous engineering design experiences.

Opportunities

The civil engineering curriculum will culminate with a capstone design project experience. The capstone design project experience will require students to draw from their previously acquired knowledge in mathematics and the engineering sciences to solve engineering design problems supplied by external customers.

This is a designated STEM (science, technology, engineering, and math) program.

School Information

Visual and Built Environments | *Suleiman Ashur, Ph.D.*, Director | 206 Roosevelt, 734.487.2490, sashur@emich.edu

Advisor Information

College of Engineering and Technology Student Services, 311 King Hall, 734.487.9751, cot_advising@emich.edu

Program Admission

Requirements for Admission - To be considered for admission, students must meet the following criteria:

- A minimum EMU cumulative GPA of 2.5. (If a student has not yet established an EMU GPA, a combined GPA of 2.5 from all transfer institutions will be accepted)
- Completion of PHY 223 with a grade of "C" or higher (or equivalent transfer credit)
- Completion of MATH 120 and MATH 121, with a grade of "C" or higher (or equivalent transfer credit.)

Application Process - To be considered for admission, applicants must take the following steps:

- Submit an Application online by **October 1**, **February 1**, or **July 1**
- Attend a mandatory meeting with a Civil Engineering faculty member or COET Staff Advisor. *Applicants are contacted to schedule an appointment after the receipt of their application.*

Decision Notification Process - Students are notified, by letter, no later than the start of the semester following the application.

General Education Requirements:

For specific requirements, see General Education or print a worksheet.

Major Requirements: 85-86 hours

Foundational Requirements: 36 hours

- CET 151 - Introduction to Computing in Engineering Technology 3 hrs
- CHEM 121 - General Chemistry I [GEKN] 3 hrs
- CHEM 122 - General Chemistry I Laboratory [GEKN] 1 hr
- MATH 120 - Calculus I [GEQR] 4 hrs
- MATH 121 - Calculus II 4 hrs
- MATH 122 - Elementary Linear Algebra 3 hrs
- MATH 223 - Multivariable Calculus 4 hrs
- MATH 325 - Differential Equations 3 hrs
- PHY 223 - Mechanics and Sound [GEKN] 5 hrs
- STAT 360 - Statistical Methods 3 hrs

  Choose a minimum of three credit hours from the following science electives:
  With advisor approval, other courses may be used to satisfy this requirement.
- BIO 110 - Introductory Biology I [GEKN] 3 hrs

  and BIO 111 - Introductory Biology I Laboratory [GEKN] 2 hrs
- ESSC 110 - The Dynamic Earth System [GEKN] 4 hrs
- GEOG 276 - Principles of Geographic Information Systems 3 hrs

Technical Requirements: 49-50 hours

Mechanical Engineering: 15-16 hours

- ME 100 - Introduction to Engineering Design & Manufacturing 3 hrs
- ME 211 - Statics 3 hrs
- ME 312 - Dynamics 3 hrs

  or PHY 230 - Engineering Dynamics 4 hrs
- ME 313 - Mechanics of Materials 3 hrs
- ME 317 - Fluid Mechanics 3 hrs

  or PHY 485 - Fluid Dynamics 3 hrs

Civil Engineering: 34 hours

- CIVE 200 - Surveying 3 hrs
- CIVE 210 - Civil and Construction Materials 3 hrs
- CIVE 310 - Construction Management 3 hrs
- CIVE 330 - Structural Analysis 3 hrs
- CIVE 340 - Geotechnical Engineering 3 hrs
- CIVE 341 - Geotechnical Engineering Laboratory 1 hr
- CIVE 350 - Water and Wastewater Engineering 3 hrs
- CIVE 360 - Transportation Engineering 3 hrs
- CIVE 400 - Hydraulics 3 hrs
- CIVE 410 - Reinforced Concrete Design 3 hrs
- CIVE 420 - Steel Structures 3 hrs

- CIVE 490 - Capstone Project 3 hrs

Minor Requirement:

This major does not require a minor.

Program Total:

Students must earn a minimum total of 124 credits at the 100-level or above.

Critical Graduation Information

The following are minimum requirements for all bachelor's degrees awarded by Eastern Michigan University. Some majors and minors require more than the minimum in one or more of the areas below; students are urged to consult the online catalog for the requirements of their particular programs.

- Earn a minimum total of 124 credits at the ***100-level and above.*** **Courses with numbers below 100 will not be counted toward this degree requirement. At most 8 credit hours of physical education (PEGN) activity courses will be counted toward this requirement.**
- Meet the requirements of the General Education program (see *information below*).
- Complete a Writing Intensive (GEWI) Course in your major.
- Earn a minimum of 60 credits from a four-year college or university; **courses taken at community colleges cannot be used to meet this requirement.** (Some formal program-to-program articulation agreements modify this requirement. See specific agreements for details.)
- Earn a minimum of 30 credits from courses taken at EMU.
- Complete 10 of the last 30 hours for the degree from courses taken at EMU.
- Have a minimum of 30 ***unique*** credit hours in their major and 20 ***unique*** credit hours in their minor for a total of at least 50 unique credit hours between them. Some majors that require 50 or more hours themselves do not require a minor; students should check requirements of the selected major in the undergraduate catalog to see if a minor is required.
- Earn no more than 60 credit hours in one subject area (prefix). Credits in excess of the 60 maximum will not be counted toward the minimum of 124 credits required for a bachelor's degree.
- Earn the minimum number of credits in 300-level and above courses in each major and minor as specified below - these credits must be earned in distinct courses; that is, no course can be used to fulfill this requirement in more than one major or minor.
    - Earn a minimum of 6 credits in 300-level or higher courses at EMU in each minor
    - Earn a minimum of 9 credits in 300-level or higher courses at EMU in each major that requires a minor.
    - Earn a minimum of 15 credits in 300-level or higher courses at EMU in each major that does not require a minor
- Transfer credit will be awarded for courses taken at colleges and universities that are accredited by one of the recognized regional accrediting bodies only if the courses are college-level (equated to 100-level or above at EMU) and the student earned a "C" (or 2.0 on a 4 point scale) or better. Transfer credit may be awarded on a case-by-case basis for college-level courses in which a "C" (2.0) or better was earned at institutions outside the U.S. or at non-accredited U.S. institutions; individual departments/schools conduct the internal review of such courses within EMU, and additional documentation may be required. *Please note:* EMU awards only credit for transferred courses; grades are not used in the calculation of an EMU GPA.
- Earn a minimum cumulative GPA of 2.0 in courses taken at EMU in order to graduate. In addition, a minimum cumulative GPA of 2.0 must be reached in each major and minor. Only courses taken at EMU and those applied to a student's major or minor will be used in the calculation of their major and minor cumulative GPAs. (Note: some programs may require a higher GPA - check with your program advisor.)

General Education Requirements EMU's General Education Program requires students to choose from a menu of approved courses in several different areas; do not assume that other courses in the same department or with similar names will fulfill these requirements. A detailed description of General Education requirements is available in the General Education section of the catalog.

Students who transferred to EMU may have modified general education requirements based on Michigan Transfer Agreement (MTA) or articulation agreements; consult your academic advisor for additional information.

EASTERN MICHIGAN UNIVERSITY

College of Engineering and Technology (CET) Update

Mohamad S. Qatu, Ph.D.,
Dean, College of Engineering and Technology

Recent Milestones

- Stable (slightly growing enrollment)
- New Accreditation
  - ABBI (Aviation Technology, Flight Management)
  - ABET - ETAC (Electronic Engineering Technology)
  - ABET – CAC (Information Assurance and Cyber Defense)
  - ABET - ETAC (Product Design Engineering technology)
  - ABET - EAC (Mechanical Engineering – anticipated August 2020)
- Supporting ongoing accreditation for all current programs
- More than doubled fundraising opportunities
  - Recent $1M donation from GameAbove
- Outstanding potential for global recruitment
  - Ongoing discussion on joint college (with BGU, China)
  - Opportunities for several Middle Eastern countries (UAE, KSA, Jordan)

Why EMU Engineering?

- Student Demand
  - Private and public support and demand for the programs
  - Students who succeed in engineering program have ACT between 24 and 36
  - Students who graduate with a BS in engineering
    - Have a higher employment rate (almost 100%)
    - Starting salaries of ($55K-$75K)
  - More successful graduates
  - Graduation rate with 6 years > 80%
  - Salaries $100K within 5-10 years (successful alums and potential donors)

Why EMU Engineering?

- Enrollment
  - Replace disciplines that have declining enrollment with in-demand programs
  - Ensure controlled and responsible enrollment growth
  - Assure sustainability
- Advance Research
  - Advance research portfolio at CET (more proposals and publications)
  - Need to attract new faculty from research intensive universities with experience in grants and scholarship
  - More research opportunities in engineering disciplines

Why EMU Engineering?

- Increase fundraising opportunities
- College Reputation and Ranking
  - No reputable system for ranking technology as a stand alone college
  - Chance to enter more rankings by US News & World Report
  - Become full member of ASEE (American Society of Engineering Education)
  - All our peer institutions are members of ASEE because they offer engineering programs
- ABET accreditation and licensing exams
  - Puts us on par with our peers

EMU Civil Engineering: Leveraging Existing Resources

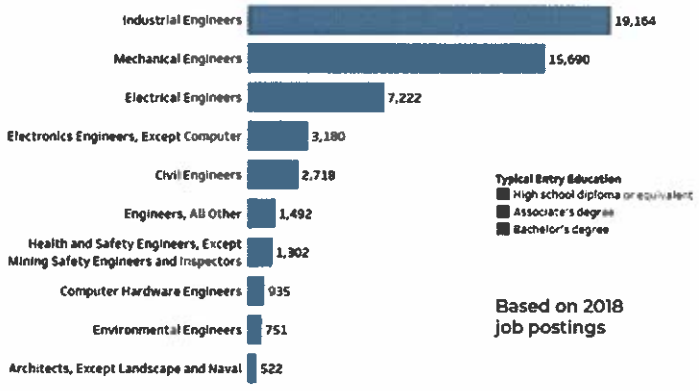
- Faculty – More than 20 faculty members with doctoral degrees in engineering or computer science; 3 in civil engineering
- Labs – Several existing labs (Surveying, Construction, Materials, Fluids)
- Curriculum:
  - 33 Credit hours of Math and Science and 39 hours of Gen Ed
  - 18 Credit hours shared with Mechanical Engineering
  - 9 Credit hours shared (or cross listed) with Construction Management
  - *25 Credit Hours Civil Engineering Specific (we have the expertise)*
- Small classes (15-30 students)
- Application oriented, project-based and hands-on (requested by industrial partners)
- Engaged with industry and community (co-op emphasized)

EMU Civil Engineering

Search for jobs on Indeed.com on 21 Jan 2020		
Last 30+ days	Detroit (25miles)	Michigan
Mechanical	587	1197
Industrial*	298	678
Manufacturing**	1033	2391
Electrical	656	1300
Computer ***	1462	2772
Civil/Construction/Env	682	1651
Chemical	208	363

* Often ME student qualify
** PDET and MET students qualify for most
*** IA, CS students qualify for many

GAP IN MICHIGAN ENGINEERING WORKFORCE



EMU Civil Engineering

Growth in Engineering Programs at EMU			
Discipline	Fall 17	Fall 18	Fall 19
Mechanical*	50	113	134
Electrical/Computer	NA	28	56
Civil/Construction/Env	NA	NA	NA

* Mechanical Engineering is at capacity for sophomore class – 30 students

Sill Renovation and Expansion