

**THE UNIVERSITY OF WISCONSIN-MILWAUKEE
College of Engineering and Applied Science**

FACULTY MEETING

Friday, October 2, 2020 10:30 A.M. Virtually Via Microsoft Teams

AGENDA

I. DEAN UPDATE

II. INTRODUCTIONS

A. Faculty

1. Mahsa Dabagh, Assistant Professor, Biomedical Engineering

B. Staff

1. Robert Barry, Assistant Dean

III. ANNOUNCEMENTS

- A. Jean Opitz – Development update

IV. INFORMAL REPORTS – See Attachment 1

- A. Opportunity for questions regarding Informal Reports

V. DETERMINATION OF THE PRESENCE OF A QUORUM FOR FACULTY MEETING

VI. AUTOMATIC CONSENT BUSINESS

- A. Minutes of the April 24, 2020 meeting
- B. New Courses and Course Changes – See Attachment 2
- C. Civil and Environmental Engineering Program Changes – See Attachment 3
- D. Electrical Engineering Ph.D. Program Changes – See Attachment 4

VII. SPECIAL ORDER OF BUSINESS – Nominations

- A. Awards and Recognition Committee

Faculty: To serve one year (to complete Prof. Suzuki's term). Only members of Biomedical Engineering, and Electrical Engineering and Computer Science may be nominated. One member are to be elected.

Nominations Already Received: None

VIII. NEW BUSINESS

A. Computer Science Honors in Major – See Attachment 5

IX. GENERAL DISCUSSION

X. ADJOURNMENT

John R. Reisel, Secretary
CEAS Faculty

JRR
Attachments

INFORMAL REPORTS

Office of Student Services – Todd Johnson
No Report

Career Services – Juli Pickering
No Report

Curriculum Committee – Prof. Church
No Report

Graduate Program Committee – Prof. Law

The GPC approved two items of business on the agenda of this meeting, and met to discuss the results of the Ph.D. Qualifying Exam.

Academic Planning Committee – Prof. ?
No Report

Faculty Senate – Prof. Reisel

In September, the Faculty Senate approved the Authorization to Implement a Ph.D. in Electrical Engineering. The Senate also approved changes to Graduate School policies on graduate faculty membership and the committees for M.S. and Ph.D. degrees. A revision to the academic forgiveness policy was also approved.

ATTACHMENT 2

NEW COURSES

- MECHENG 406 DESIGN FOR SIX-SIGMA, 3 cr., U/G
Familiarize students with the concepts, techniques, and tools of Design for Six Sigma. Explore benefits of DFSS approach to quality and compare/contrast with traditional defect prevention strategies.
Prereq: IND ENG 367(P) or 369 (P) or equivalent or consent of instructor
- MECHENG 407 DESIGN FOR RELIABILITY, 3 cr, U/G
Introductory course that explores the value of reliability activities throughout the product lifecycle. Goal is to acquire a working knowledge of the DfR process that is applied to increase product reliability and prevent defect escapes.
Prereq: IND ENG 367(P) or 369 (P) or equivalent or consent of instructor
- MECHENG 424 ENGINEERING FOR ENERGY STORAGE, 3 cr., U/G
Fundamental engineering aspects for energy storage and their application. Electrochemical engineering for batteries, fuel cells and supercapacitors. Construction of coin cell types of batteries.
Prereq: jr st, & MECHENG 301 (P)
- MECHENG 452 NANOBIOIMAGING, 3 cr, U/G
Optical microscopy. Near-infrared imaging and spectroscopy. X-ray microscopy. Atomic force microscopy. Topics from current engineering uses of imaging.
Prereq: PHYS 210 (P)

COURSE CHANGES

(Additions made in green. Deletions Indicated in Red)

- BME 699 INDEPENDENT STUDY, 1-3, U/G
In consultation with a faculty advisor, student will develop the study plan on a topic related to biomedical engineering. May be retaken to 6 cr max.
Prereq: jr st; cons instr & CEAS Associate Dean.
- MECHENG 479 ~~ADVANCED MECHATRONICS CONTROL AND DESIGN OF MECHATRONIC SYSTEMS~~ 3 cr. U/G
Semiconductor electronics; embedded programming; sensor instrumentation; digital and analog electronics; filtering, actuators; advanced communication protocols; wireless communications; mobile robot modeling for mechatronics application; design, development and feedback control of a mechatronic system. ~~Understanding interfacing of mechanical systems using electro-mechanical components; conceptual~~

~~design and analysis of high performance computer controlled mechanical systems; prototyping of mechatronic systems.~~

Prereq: senior standing or consent of instructor; MECHENG 379(P). ~~sr-st or cons instr; ElecEng 474(402)(P) or MechEng 474(P).~~

CIVIL AND ENVIRONMENTAL ENGINEERING PROGRAM CHANGES

The marked-up revised curriculum sheet can be found on the following pages.

Proposed Civil and Environmental Engineering Curriculum Changes – April 2020

A number of changes are proposed to improve efficiency, address new CEAS goals for graduation credit requirements, incorporate feedback from students and ABET, and streamline and simplify the CEE curriculum.

- 1) The existing core courses Civ Eng 201 (3 cr) and Civ Eng 303 (4 cr) are replaced with a combined new core course Civ Eng 203 (4 cr). All civil students will be required to take Civ Eng 203. Students in structures area would also take the intermediate mechanics course Civ Eng 401. This is to address the needs of other CEAS departments and to improve the efficiency and relevancy of our course offerings.
- 2) Civ Eng 280 (a core course) is replaced with Ind Eng 367 (as a core course). A review of Ind Eng 367 indicated broad similarity with Civ Eng 280. This change would improve the efficiency of instruction in CEAS and would address some of the student feedback regarding Civ Eng 280.
- 3) The chemistry requirements are now simplified with the requirement to take either Chem 105 or Chem 102 (both 5 credits). The option for taking the Chem 102-104 sequence is removed as few take that option (most take Chem 105). This is in line with the recommendations of the CEAS Student Services.
- 4) The category labeled “Other Natural Sciences (3 credits)” is removed. The course requirements under that category were very broad and resulted in students taking less rigorous courses within the broad range of choices. This category was originally developed to address the minimum ABET requirements for math and science content in the curriculum. The current ABET credit requirement for such courses is 30, which would be met with 16 credits of math, 5 credits of chemistry, 8 credits of physics and 3 credits of statistics (new core course Ind Eng 367). This would allow students more flexibility in taking our technical elective courses.
- 5) The college of engineering has set a goal of 120 credits to complete a BS degree for all CEAS departments. The current credit requirement for Civil is 127. With the introduction of Civ Eng 203, removal of “Other Natural Sciences” category, and reduction of technical electives from 21 to 18. This objective can be achieved. The number of free electives is increased from 3 to 5.
- 6) The course Civ Eng 401 is added to the technical electives list. This would activate the existing inactive course by the same number.
- 7) All course prerequisites referring to Civ Eng 201 or 303 are changed to Civ Eng 203.
- 8) Corrections are made to typographical errors.

University of Wisconsin – Milwaukee

College of Engineering and Applied Science

CIVIL ENGINEERING CURRICULUM

Proposed

The minimum number of credits required to complete the Bachelor of Science in Engineering with a major in Civil Engineering is ~~127~~120 credits. Students who need background preparation courses in math, English, and chemistry may need additional credits. See information below regarding placement examinations.

Engineering Core Courses (3330 credits)		Credits	Prerequisite
EAS 200	Professional Seminar	1	none
Ind Eng 111	Introduction to Engineering ¹	3	Math 116 (C)
Ind Eng 112	Engineering Drawing & Computer Aided Design/Drafting ¹	3	Math 116
Ind Eng 360	Engineering Economic Analysis	3	Jr St
Civ Eng 280 Computer-Based Engineering Analysis Ind Eng 367 Introductory Statistics for Physical Sciences and Engineering			Math 226 or 231,
CompSci 132 or equivalent			
Civ Eng 201 Statics Math 232			
Civ Eng 202	Dynamics	3	Civ Eng 201, Math 233 (C)
Civ Eng 303 Strength of Materials 4 Civ Eng 201, Math 233 (C)			
Civ Eng 203	Statics and Mechanics of Materials	4	Introduction to Solid Mechanics Math 233 (C)
MatlEng 201	Engineering Materials ²	4	Chem 105 or 102 or 117
MechEng 301	Basic Engineering Thermodynamics	3	Math 233, Physics 209
MechEng 320	Introduction to Fluid Mechanics	3	MechEng 301 (C), ElecEng 234, Civ Eng 202

¹ MechEng 110 and 111 may substitute for Ind Eng 111 and 112 for students transferring from another engineering major.
² Civil Engineering majors may take Civ Eng 431 (with proper prerequisites) in place of MatlEng 201.

*Civil Engineering Major (23 credits)		
Civ Eng 250	Engineering Surveying	3
Civ Eng 335	Soil Mechanics	3
Civ Eng 372	Introduction to Structural Design	4
Civ Eng 411	Engineering Principles of Water Resources Design	3
Civ Eng 413	Environmental Engineering	3
Civ Eng 490	Transportation Engineering	3
Civ Eng 494	Principles of Civil Engineering Design	1
Civ Eng 495	Senior Design	3

Soph. St., Math 232
 Civ Eng 303 [Civ Eng 203](#)
 Jr St, Civ Eng 303 [Civ Eng 203](#)
 Jr St, MechEng 320
 Mech Eng 320
 Civ Eng 280, Jr St
 Sr. St. in Civil Engineering
 Civ Eng 335, 372, 411, 490

**Mathematics (14–16 credits)		
(16 credits typical: Math 231, 232, 233, ElecEng 234)		
One of the following Calculus sequences must be completed:		
Math 231-232-233	12	Math placement score, or previous course with “C” grade.
Or Math 221–222 (Honors) 10		
And ElecEng 234 Analytical Methods in Engineering	4	Math 233 (P)

**Chemistry (5–10 credits)		
One of the following sequences must be completed:		
Chem 105 (Suggested) or Chem 102–104		Chem 100 with “C” grade or Chemistry placement test

Physics (8 credits)		
Physics 209 and 210		8

Other Natural Sciences (3 credits)
 Any geology course 300 level or above, or
 Any biology course 150 level or above, or
 Any atmospheric science course 200 level or above

General Education Requirements		
<i>Distribution Requirements (15 credits)</i>		
Art	3	none
Humanities	3	none
Social Science	6	none
English 310 Writing, Speaking and Technoscience in the 21st Century	3	English competency
Free Electives	5	

Cultural Diversity - One of the arts, humanities, or social science courses selected must also meet the UWM cultural diversity requirement.
Competency Requirements
****English Composition (0-6 credits)**
 The English Composition requirement is satisfied by:
 1. Earning a satisfactory score on the English placement test, **or**
 2. Earning a grade of C or higher in English 102
 3. Transferring a grade of C or better in a course (3 credits of more) equivalent to English 102 or higher level expository writing course
Foreign Language (0-8 credits) (for new freshman starting fall 1999) The foreign language requirement can be completed with one of these options:
 1. Two years of a single foreign language in high school
 2. Two semesters of a single foreign language in college
 3. Demonstrate ability by examination

*** Advancement to Major:** Effective Fall 2012 1. Complete a minimum of 24 credits required for major. (Excludes: general education, prerequisite and orientation courses). 2. Complete Math 232 (or 222) with “C” or better grade. 3. Complete EAS 200 Professional Seminar. 4. Complete the English composition requirement. 5. Obtain a 2.33 GPA in all courses in item 1. **The program may impose major status as a prerequisite for courses numbered 300 or above.**

**** Placement Examinations:** Students without previous college level credits in Math, Chemistry or English may be required to take placement exams. The results of these tests determine the appropriate course in which to register. Background prerequisite courses may be required in addition to the courses listed above.

Technical Electives – Civil Engineering **21-18 CREDITS REQUIRED**

The Civil Engineering and Mechanics Department offers numerous elective courses which allow students to work in one of **four areas** of concentration. Normally a minimum of 12 credits will be taken in an area of concentration. **Students who do not follow one of the four areas of concentration will require approval by the Department Chairperson for their programs.**

- 1 Students interested in **geotechnical engineering** should take Civ Eng 456, and select at least three courses from Civ Eng 360, [401](#), 412, 463, 492, and 598.
- 2 Students interested in **municipal and transportation engineering** should select at least three courses from Civ Eng 492, 590, 592, 594, 596, 598, and 610.
- 3 Students interested in **structural engineering** should take Civ Eng 360, [401](#), 463, , and at least two courses from Civ Eng 571, 572, 573, 574, 579, 560, ~~571, 572~~ and select at least two one other Group A courses from Civ Eng 431, 456, 466, 560, 573, 574 and 579.
- 4 Students interested in **water resources and environmental engineering** should select at least three courses from Civ Eng [311](#), 412, 511, 521, [610](#) and [6140](#)

Group A Technical Electives: Take 18 to 24 credits of Group A electives.

		<u>Credits</u>	<u>Prerequisite</u>
Civ Eng 311	Introduction to Energy, Environment and Sustainability	3	Jr. St.
Civ Eng 360	Introduction to Structural Analysis	3	Civ Eng 303 203
Civ Eng 401	Intermediate Strength of Materials	3	Civ Eng 203
Civ Eng 412	Applied Hydrology	3	Jr St, Math 233, MechEng 320
Civ Eng 431	Materials of Construction	3	Jr. St, Civ Eng 303203
Civ Eng 456	Foundation Engineering	3	Jr St, Civ Eng 335
Civ Eng 463	Introduction to Finite Elements	3	ElecEng 234, Civ Eng 303203 , MechEng 320 (C)
Civ Eng 466	Mechanics of Composite Materials	3	Jr. St, Civ Eng 303203
Civ Eng 492	Environmental Impact Assessment	3	Sr. St.
Civ Eng 502	Experimental Stress Analysis	3	Jr. St. Civ Eng 303203
Civ Eng 511	Water Supply and Sewerage	3	Jr St, Civ Eng 411
Civ Eng 521	Water Quality Assessment	3	Sr. St, Civ Eng 411
Civ Eng 555	Sustainable Construction Materials and Technologies	3	Jr. St.
Civ Eng 560	Intermediate Structural Analysis	3	Jr. St., 360, 372
Civ Eng 571	Design of Concrete Structures	3	Jr. St. Civ Eng 360 (C), 372
Civ Eng 572	Design of Steel Structures	3	Jr St, Civ Eng 360 (C) ,372
Civ Eng 573	Design of Masonry Structures	3	Jr St, Civ Eng 360 (C) ,372
Civ Eng 574	Design of Prestressed Concrete Structures	3	Jr St Civ Eng 360 (C) , 372
Civ Eng 579	Earthquake Engineering	3	Sr St, Civ Eng 571 or 572
Civ Eng 590	Urban Transportation Planning	3	Sr. St.
Civ Eng 592	Traffic Control	3	Sr. St.
Civ Eng 594	Physical Planning and Municipal Engineering	3	Sr. St., Cons Instr
Civ Eng 596	Transportation Facilities Design	3	Civ Eng 335 (C), Civ Eng 490
Civ Eng 598	Pavement Analysis and Design	3	Jr. St, Civ Eng 335
Civ Eng 610	Introduction to Water and Sewage Treatment	3	Sr. St., Civ Eng 413
Civ Eng 480	Software Applications for Civil Engineering	3	Jr. St.
Civ Eng 614	Hazardous waste management	3	Jr. St.
Civ Eng 616	Computational Hydraulics and Environmental Flows	3	Jr. St., Civ Eng 411
Civ Eng 691	Topics in Civil Engineering	3	Based on topic

All non-required Civil and Environmental Engineering courses numbered 400-699 are Group A Technical Electives

Group B Technical Electives: Select no more than **63** credits from this list.

EAS 001	Co-op Work Period	3 ²	None
English 206	Technical Writing	3	Soph St, Eng Comp Reqmt
Geog 403	Remote Sensing	3	Jr St; Geo 215
Comp Sci 250	Introductory Computer Programming	3	Math Placement code 40 or Math 116 or Math 211
ElecEng 301	Electrical Circuits	3	Physics 210
Ind Eng 455	Operations Research I	3	Jr St, Math 233
Ind Eng 465	Operations Research II	3	Ind Eng 467, 455
Ind Eng 467	Intro Statistics for Physical Sciences & Engineering	3	Jr St, Math 233
Ind Eng 575	Design of Experiments	3	Ind Eng 467 or Equivalent
MatlEng 431	Welding Engineering	3	Jr. St, MatlEng 201
MechEng 321	Basic Heat Transfer	4	MechEng 301
Urb Plan 591	Introduction to Urban Geographic Information Systems	3	Jr. St.
Geog 215	Introduction to Geographic Information Sciences	3	None
Any Mathematics course 400-level or above, Math 313, Math 321, Math 322, or			
Any Chemistry course 200-level or above, Chem 104 ¹ , or			
Any Physics course 300-level or above, Physics 214, Physics 215			

¹Students who take Chemistry 102 (or 117) may use Chemistry 104 (118) to satisfy three credits in this group.

²Students who earn **3 or more** credits of Co-op may use 3 of those credits as approved technical electives.

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ELECTRICAL ENGINEERING PH.D. PROGRAM CHANGES

Old (CEAS) Requirements:

Program Requirements

The minimum degree requirement is 66 graduate credits beyond the Bachelor's degree with minimum credit distribution as follows:

- 21 credits in the major area or concentration
- 9 credits in an approved minor area
- 6 credits in mathematics and/or quantitative methods
- 9 credits of approved electives
- 3 credit CEAS Graduate Seminar (Ethics and Engineering Communication, xxx700)
- A minimum of 26 credits, excluding dissertation, must be at the 700 level or higher
- 18 credits of doctoral thesis
- A minimum of 33 credits (including thesis) must be completed in the Ph.D. program at UWM.

Meet the 6 credit requirement in mathematics and/or quantitative methods by completing certain courses specified by the Graduate Program Subcommittee or by taking a minor in mathematics.

Minor areas of study are normally offered in other CEAS programs or in the physical sciences, management sciences, or mathematics. Minors in other areas require prior approval.

A maximum of 33 credits may be considered for transfer from prior graduate work, including a Master's degree earned at UWM or elsewhere provided the course work taken falls within the appropriate areas and has earned a grade of "B" or better.

Students entering the program without an applicable Master's degree are limited to a maximum transfer of 9 credits for courses taken elsewhere.

Proposed New (EE) Requirements:

Program Requirements

The minimum degree requirement is 54 graduate credits beyond the Bachelor's degree with minimum credit distribution as follows:

- 21 credits in the major area or concentration (*same*)
- 6 credits in an approved minor area (*reduced by 3*)
- 9 credits of approved electives (*same as before*)
- 3 credit CEAS Graduate Seminar (Ethics and Engineering Communication, EE700) (*same as before*)
- A minimum of 21 credits, excluding dissertation, must be at the 700 level or higher (*similar percentage as before*)
- 15 credits of doctoral thesis (*3 less*)
- A minimum of 27 credits (including thesis) must be completed in the Ph.D. program at UWM. (*same percentage as before*)

The minor must be taken using courses outside of Electrical Engineering (and excluding cross-listed courses); in other CEAS programs, or in the physical sciences, management sciences, or mathematics. However, in some cases there may be a subdomain of Electrical Engineering that is clearly separate yet necessary and complementary to their major area courses. In this case, the student may create a Program of Study that specifies a set of minor courses taken from within Electrical Engineering. These minor courses must be approved by the advisor *prior* to taking any of them.

A maximum of 24 credits may be considered for transfer from prior graduate work, including a Master's degree earned at UWM or elsewhere provided the course work taken falls within the appropriate areas and has earned a grade of "B" or better. (note: max transfer credit is ½ the total)

Students entering the program without an applicable Master's degree are limited to a maximum transfer of 9 credits for courses taken elsewhere. (same as before)

Comments for consideration:

1. For PhD w/o MS, there would be 36 course credits (not counting seminar), so 12 technical courses, down from 15. We dropped the math/quantitative methods requirement (6 credits), but kept the minor
2. For students entering with a MS and transferring in 24 credits, they would have to complete 15 credits of dissertation, and 3 credits of seminar, leaving 12 credits remaining of course credits (4 courses). If they did not satisfy the minor with transfer credit (probably unlikely), 2 of those 4 courses would be in the minor.
3. Can we expect people will be able to find 21 credits (7 courses) in the major area, especially given somewhat reduced teaching and smaller faculty?
4. We may need to have an EE faculty member serve in the role of approving Programs of Study, to be sure the various requirements (especially the minor) are met in a meaningful way.

HONORS IN THE COMPUTER SCIENCE MAJOR

Students in the Computer Science who meet all the following criteria can be awarded honors in the major upon graduation:

- I A 3.000 cumulative GPA in all UWM graded credits;

- II A 3.500 GPA over all upper-division (300 level and higher) Computer Science (CS) courses; and

- III. At least one of the following:
 - a. Successful completion of 3-cr of research experience via senior thesis (CS 599) or a 3-cr independent study (CS 699), subject to approval by the supervising faculty.
 - b. Participation in accelerated MS program with successful completion of 6 credits in approved courses for the MSCS program.
 - c. Successful completion of 4-cr team-based, faculty supervised, research experience via a capstone project via CS 594 and CS 595, subject to approval by the supervising faculty.

Students who believe they may qualify for honors in Computer Science should apply to the College of Engineering & Applied Science during their last semester of study.

