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

F A C U L T Y M E E T I N G

Friday, March 25, 2016

A G E N D A

The March 25, 2016 faculty meeting has been canceled due to a lack of business.

AUTOMATIC CONSENT BUSINESS

A. New Course and Course Changes – See Attachment 1

B. Biomedical Engineering Curriculum Changes – See Attachment 2

NOTE TO FACULTY:

CEAS Faculty legislation allows for the approval of Automatic Consent Business in the absence of a regularly scheduled faculty meeting. If there is any objection to the above, consideration will be delayed until the next regularly scheduled faculty meeting.

Objections to approval of the above must be received by the Secretary of the CEAS Faculty in writing before 1:30 p.m., Friday, March 25, 2016.

John R. Reisel, Secretary
CEAS Faculty

JRR
Attachment

ATTACHMENT 1

NEW COURSE

BME 320 ENGINEERING OF BIOMEDICAL DEVICES I, 3 cr., U
Physiological and biomechatronic systems, sensors and actuators, signal processing, hearing aid and implants.
Prereq: jr st, BME 101(P), ElecEng 234 (P), Physics 210(P)

BME 325 ENGINEERING OF BIOMEDICAL DEVICES II, 3 cr., U
Feedback and control systems, visual prostheses, heart assist and replacement devices, respiratory aids, active and passive prosthetic limbs.
Prereq: jr st, Bio Sci 203(P), BME 320(P)

BME 385 INTRODUCTION TO BIOMATERIALS, 3 cr., U
Introduction to the fundamentals of biomaterials including ceramics, metals, and polymers. Important issues in the selection, design, manufacturing, and evaluation of biomaterials. Current applications, and emerging technologies. Jointly offered with and counts as repeat of MatlEng 385.
Prereq: jr st., MatlEng 201 (P)

COMPST 790 ADVANCED TOPICS IN COMPUTER STUDIES (SUBTITLE), 3 cr.,G
Discussion of special advanced topics in the study of computing. Retakable w/chg in topic.
Prereq: grad st; add'l prereqs depending on topic.

COURSE CHANGES

MATLENG 385(485) INTRODUCTION TO BIOMATERIALS, 3 cr., U
Introduction to the fundamentals of biomaterials including ceramics, metals, and polymers. Important issues in the selection, design, manufacturing, and evaluation of biomaterials. Current applications, and emerging technologies. Jointly offered with and counts as repeat of BME 385.
Prereq: jr st., MatlEng 201 (P)

had been

MATLENG 485 INTRODUCTION TO BIOMATERIALS, 3 cr., U/G
Introduction to the fundamentals of biomaterials including ceramics, metals, and polymers. Important issues in the selection, design, manufacturing, and evaluation of biomaterials. Current applications, and emerging technologies.
Prereq: jr st, MatlEng 201(P).

ATTACHMENT 2

BIOMEDICAL ENGINEERING CURRICULUM CHANGES

The proposed changes to the Biomedical Engineering Curriculum are highlighted on the following curriculum sheets.

University of Wisconsin – Milwaukee

PROPOSED

College of Engineering and Applied Science

BIOMEDICAL ENGINEERING CURRICULUM

The minimum number of credits required to complete the Bachelor of Science in Engineering with a major in Biomedical Engineering is **120** credits. Students who need background preparation courses may need additional credits. See information below regarding placement examinations.

Engineering Core Courses (26 credits)		**Credits**	**Prerequisite**
BME 101	Fundamentals of Biomedical Engineering	3	MechEng 101 (C)
Civ Eng 201	Statics	3	Math 232
Civ Eng 202	Dynamics	3	Civ Eng 201, Math 233(C)
EAS 200	Professional Seminar	1	None
ElecEng 301	Electrical Circuits I	3	Physics 210(C)
ElecEng 305	Electrical Circuits II	4	ElecEng 234, 301
MatlEng 201	Engineering Materials	4	Math 231 (C), Chem 100* or score 1 on chem placement test
MechEng 101	Computational Tools for Engineers	2	Math 221(C) or 231(C)
MechEng 301	Basic Engineering Thermodynamics	3	Math 233, Physics 209

^**Biomedical Engineering Major (37 credits)**			
Bio Sci 202	Anatomy & Physiology I	4	None
Bio Sci 203	Anatomy & Physiology II	4	Bio Sci 202* or 315*
Bio Sci 465	Biostatistics	3	Jr St, Bio Sci 150, Math 105
or			
IndEng 467	Intro. Statistics for Physical Science & Engineering Students	3	Jr St, Math 233
BME 320	Engineering of Biomedical Devices I	3	BME 101(P), ElecEng 234(P), Physics 210(P)
BME 325	Engineering of Biomedical Devices II	3	BioSci 203(P), BME 320(P)
BME 385	Introduction to Biomaterials	3	Jr St, MatEng 201
BME 495	Biomedical Instrumentation Lab/Senior Lab	3	Bio Sci 203, BME 101, ElecEng 301, 436, MechEng 479 (C)
BME 595	Capstone Design Project	4	BME 495
ElecEng 310	Signals & Systems	3	ElecEng 305(C)
MechEng 469	Introduction to Biomechanical Engineering	3	Civ Eng 202,303
Mech Eng 474	Introduction to Control Systems	4	Sr St, Civ Eng 202*, Elec Eng 234*, 301

^^**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 at least "C" grade.
Or Math 221- 222 (Honors)		10	
And ElecEng 234	Analytical Methods in Engineering	4	Math 232*

Physics (10 credits)			
Physics 209 & 214 (Lab), and Physics 210 & 215 (Lab)		10	Physics 209: Math 232(C) Physics 210: Math 233(C), C- or better in Physics 209

General Education Requirements

Distribution Requirements (15 credits)

Art		3	
Humanities		3	
Social Science		6	
English 310	Writing, Speaking & Technoscience in the 21st Century	3	English Competency

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 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

***C or better in prerequisite** **(C) Concurrent Enrollment in Designated Course**

^**Advancement to Major:** 1. Complete a minimum of 24 credits required for major (Excludes: general education, prerequisite and orientation courses). 2. Complete Math 232 (or 222) with a "C" or better grade. 3. Complete EAS 200 Professional Seminar. 4. Complete the English composition requirement. 5. Obtain a 2.0 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 – Biomedical Engineering Major

PROPOSED

The Biomedical Engineering program requires a total of 16 credits of technical electives, chosen from the following list:

All non-required Biomedical Engineering courses numbered 400-699 are Technical Electives.

Bio Sci 150	Foundations of Biological Sciences I		4	Chem 100 or 102 or Conc Reg
Bio Sci 152	Foundations of Biological Sciences II		4	C- or better in Bio Sci 150
Bio Sci 354	Introduction to Neuroscience I		3	Bio Sci 315* or Psych 254*
Bio Sci 355	Introduction to Neuroscience II		3	Bio Sci 152, 315(C), or Psych 254
BME 585	Advanced Biomaterials		3	Sr St or G
BME 599	Senior Thesis		1-3	Sr St, cons instr.
BME 690	Topics in Biomedical Engineering	may be taken with change in topic to 9 cr		Jr St
BME 699	Independent Study	may be taken to 6 cr max	1-3 cr	Jr St, cons instr & CEAS Assoc Dean
BusAdm 447	Entrepreneurship		3	Jr St, BusAdm 350
Chem 102	General Chemistry		5	Chemistry Plmt or Chem 100*; Math Plmt or Math 105*
Chem 104	General Chemistry & Quantitative Analysis		5	Chem 102*
Chem 343	Organic Chemistry		3	Chem 104*
Chem 344	Organic Chemistry Laboratory		2	Chem 343*, 345(C)(R)
Chem 345	Organic Chemistry		3	Chem 343*, Chem 344(C)
Civ Eng 303	Strength of Materials		4	Civ Eng 201, Math 233(C)
CompSci 250	Introductory Computer Programming		3	Math 116 or 211
EAS 001	Co-op Work Period		3	Prior Cons Co-Op Dir
EAS 497	Study Abroad		3	Acceptance to Study Abroad Program
ElecEng 361	Electromagnetic Fields		3	ElecEng 234, Math 233*, Physics 210
ElecEng 410	Principles of Discrete Systems & Digital Signal Processing		3	Jr St, ElecEng310
ElecEng 436	Introduction of Medical Instrumentation		3	Jr St, ElecEng 305
ElecEng 437	Introduction to Biomedical Imaging		3	Sr St, ElecEng 310
ElecEng 438	Bioanalytics & Biomedical Diagnostics		3	Sr St, ElecEng 310, 330
ElecEng 537	Fundamentals of Neuroimaging Technology		3	Sr St, ElecEng 437
ElecEng 539	Introduction to Magnetic Resonance Imaging		3	Jr St, ElecEng 310 and 361
Ind Eng 360	Engineering Economic Analysis		3	Jr St
Ind Eng 584	Biodynamics of Human Motion		3	Jr St, Civ Eng 202(C), ElecEng 234
MechEng 320	Introduction to Fluid Mechanics		3	Civ Eng 202, ElecEng 234, MechEng 301(C)
MechEng 370	Computer Aided Engineering Laboratory		2	Civ Eng 202, 303, ElecEng 234, MechEng 101, 111
OccThpy 593	Introduction to Biomedical and Rehabilitation Instrumentation		3	Jr St or Cons Instr
OccThpy 620	Introduction to Assistive and Rehabilitation Technology		3	OccThpy 401(P) or Cons Instr
OccThpy 625	Design and Disability		3	Jr St or Cons Instr
Physics 305	Medical Physics		3	B+ or better in Physics 209; Physics 210(C) strongly recommended
Physics 306	Introduction to Biophysics		3	Chem 104 or 105, Physics 122 or 201
Psych 254	Physiological Psychology		3	Psych 101

Pre-Medicine Suggested Courses: Students considering medical school should consult with the pre-medical advisor early in their undergraduate career for help in planning a program. The courses listed below are suggested for pre-medical students.

Science Courses			
Bio Sci 150	Foundations of Biological Sciences I	4	(Technical Elective for BME)
Bio Sci 152	Foundations of Biological Sciences II	4	(Technical Elective for BME)
One Advanced course in Bio Sci with lab		5	
Chem 102	General Chemistry	5	(Technical Elective for BME)
Chem 104	General Chemistry & Quantitative Analysis	5	(Technical Elective for BME)
Chem 343	Organic Chemistry	3	(Technical Elective for BME)
Chem 344	Organic Chemistry Laboratory	2	(Technical Elective for BME)
Chem 345	Organic Chemistry	3	(Technical Elective for BME)
Chem 501	Introduction to Biochemistry	3	
Math – a semester of calculus		4	(Required for BME)
Physics 209	General Physics I	4	(Required for BME)
Physics 210	General Physics II	4	(Required for BME)
Physics 214	Lab Physics I	1	(Required for BME)
Physics 215	Lab Physics II	1	(Required for BME)
Statistics – Any statistics course		3	(Required for BME)
General Education Courses			
Psych 101	Introduction to Psychology	3	(UWM Social Science GER)
Sociol 101	Introduction to Sociology	3	(UWM Social Science GER)
PH 101	Introduction to Public Health	3	(UWM Social Science GER)

***C or better in prerequisite** **(C) Concurrent Enrollment in Designated Course**

Degree Requirements: Students must maintain an average GPA of at least 2.0 on all work attempted at the University and in all courses offered by the College. Students majoring in Biomedical Engineering must maintain an average GPA of at least 2.0 in all 300-level required major courses. Transferable courses will be included as appropriate. Advancement to major status is required for graduation.

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Department of Biomedical Engineering (414) 229-4768
Engineering & Mathematical Science Building (EMS) Room 503

Web Site: www.ceas.uwm.edu

CURRENT

University of Wisconsin – Milwaukee

College of Engineering and Applied Science

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Mech Eng 479	Control & Design of Mechatronic Systems	3	Sr St, ElecEng 474 or Mech Eng 474

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Effective Spring 2016