TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Engineering Education

RE: Changes in BSE Degree Requirements in Multidisciplinary Engineering (MDE)

The Faculty of the School of Engineering Education has approved the following new changes in the curriculum for the B.S.E degree in Multidisciplinary Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Detailed Degree Requirements: See attachment.

Effective Date: Effective for all students entering Purdue effective Fall 2018

Reasons:
Streamlined and simplified document by separating advising comments from required curriculum, so that changes such as the new honors courses (ENGR 161/2) are automatically incorporated into the MDE curriculum.

Audeen Fentiman
Interim Head, School of Engineering Education
Crowley Family Professor of Engineering Education

Current:

Current 120 credit Degree Requirements for Bachelor of Science in Engineering (BSE) Degree in Multidisciplinary Engineering

Definition	Credits
First-year Engineering Program If the common first year program in engineering is changed, the BSE requirements will be changed to reflect these changes.	29-32
Required sophomore mathematics Multivariate calculus (MA 26100), and linear algebra & differential equations, MA 26200 or (MA 26500 & 26600), or equivalent	8-10
Sophomore Science selective ENE approved selective. (May not be the same course used as FYE Science Selective.)	3-4
Statistics selective ENE approved statistics course from the Department of Statistics or approved engineering statistics course. The engineering statistics courses count towards the engineering requirements. Statistics courses from the Department of Statistics count towards the Area requirements and help fill the accreditation requirement for Math and basic sciences	3 counted elsewhere
Accreditation Requirement for Mathematics and Basic Sciences There must be a minimum of 30 credits of ENE approved mathematics and basic sciences (biological, chemical and physical). Students who take MA 16500, 16600, 26100, 26200, Chem 11500, Chem 11600, Phys 17200, and a 3 credit sophomore science selective meet this requirement with 31 credits. Students who take this sequence with CS 15900 (3 cr, which counts in the FYE program) in the first year instead of Chem 11600 are 3 credits short and must take an additional 3 credits of ENE approved mathematics and basic sciences	minimum of 30
Communications Com 11400 or equivalent. Must select a course that satisfies the Purdue University Foundational Learning Outcome in Oral Communication, and satisfies 3 credits of the general education program. Recommendation: take Com 11400 as part of the FYE program.	3 counted in FYE program
English ENGL 106 or 108 or equivalent. Must select a course that satisfies the Purdue University Foundational Learning Outcomes in Information Literacy and in Written Communication. This requirement satisfies 3 or 4 credits of the Engineering general education program. Recommendation: take ENGL 106 or 108 as part of the FYE program.	3 or 4 counted in FYE program
General Education Follow Engineering's General Education Program requirements. A total of at least 24 credits are required – 6 or 7 of these credits for Com and ENGL are counted in the FYE program. The remaining credits must be chosen to satisfy the Purdue University Foundational Learning Outcomes in Humanities, Behavior/Social Science and Science, Technology & Society. At least 18 credits of the General Education program (including Com and ENGL) must be taken outside of the Colleges of Engineering, Science, and Technology. Courses from the Colleges of Engineering, Science and Technology used in the General Education Program may only be used to satisfy Purdue University Foundational Learning Outcomes in Humanities, Behavior/Social Science and Science, Technology & Society (they cannot be used to add	17-18

Definition		Credits
depth or non-technical breadth). If EPICS is used to satisfy the Science, Technology & Society Outcome, three credits of EPICS are required. The engineering credits at the 20000 level or higher used in the General Education program can also be used to satisfy the engineering requirements, but credits are not double-counted for graduation. At least 6 credit hours must come from courses at the 30000-level or above, or from courses with a required prerequisite in the same department. Note: Individual plans of study may recommend particular general education courses.		
Engineering Minimum 45* credits at 20000+ levels, of which at least 18 credits are at 30000+ levels and 6 credits of the 18 must be at 40000+ level. Maximum number of credits in any engineering discipline is 24. *Note: It is the student's responsibility to see that all prerequisites are met.* *With prior approval from the Director of the Multidisciplinary Engineering program and the professor teaching THTR 59700, 3 credits of THTR 59700 may substitute for 3 credits of engineering.		
Required Engineering Core (Can substitute or transfer equivalent courses except for IDE 30100 and major design experience courses, which must be taken at Purdue-West Lafayette)		
Topic:	**Example Courses**	**Credits**
Electrical circuits	ECE 20100 or equivalent	3
Statics and Dynamics	(ME 27000 + 27400), A&AE 20300, (CE 29700 + 29800) or equiv	3/6
Fluid mechanics	ME 30900 (1 cr. counts as lab), CE 34000, A&AE 33300 & 33300L (1 cr. Counts as lab), ChE 37700 (1 cr. Counts as lab) or equivalent	3
Thermodynamics	ME 20000, ABE 21000, ChE 21100 or equivalent	3 or 4
Engineering Economics	IE 34300 (3 cr) or IDE 48300 (1 cr) or equivalent	1 or 3
Major design experience	EPCS 41100 & 41200, IDE 48400 & 48500, or other approved major design experience courses [e.g., ECE 40020 or THTR 59700 (prior approval required – some may require IDE48400 additionally)]	3 or 4
Professional Preparation	IDE 30100 (1) and IDE 48700 (1)	2
	Typical Engineering Core Total Credits	**18-25**
	Most common Core	**22**
Engineering Selectives: Do parts a, b, and c.		**Credits**
a. Three additional credits of engineering design	Must be approved by School of Engineering Education. Should be completed before taking major design experience course(s)	3

Definition		Credits
b. Three credits of ENE approved hands-on (not computer) laboratory	At least 2 credits must be in engineering. One credit of hands-on lab (not computer) may be in other disciplines (e.g., science, THTR, A&D) but courses cannot be one of the required courses in the First Year Engineering Program. Note: Since CHEM 11600 or BIOL 11000 may be used as a science selective for students in FYE, it satisfies the requirement of one credit of lab, but the credit cannot be double counted. Only the credits assigned to lab can be included in this category Note: The lecture credits of engineering courses with 1 or 2 credits of lab can be included in engineering electives, and the lecture credit for courses in other disciplines can be in area.	1 cr lab (may be counted elsewhere) + 2 engr lab
c. ENE approved engineering course in materials or strength of materials		3
	Total Credits Engineering Selectives	**8 engr + 1 cr lab**
Engineering Area		***Credits***
For each plan of study may include required, selectives and/or electives (may include extra engineering laboratory or design credits). Engineering course taken as Statistics Selective counts as engineering area course.		Typically 9-18
	Minimum Engineering credits @ 20000 + level	**45**
Area		***Credits***
Chosen to satisfy educational objectives. For each plan of study may include required courses, selectives and/or electives. Statistics course taken as Statistics Selective counts as area course. If needed for accreditation math and basic science requirement, a 3 credit math or basic science course may be counted here.		Typically 8-16
	Minimum Required for Graduation	**120**
Other Graduation Requirements:		
Plans of study for all concentrations must be approved by the School of Engineering Education. All concentrations must be sufficiently different from plans of study in the Schools of Engineering (other than ENE) so that the student's educational goals could not be met in one of those Schools. An overall Graduation Index of 2.0 or higher and a minimum GPA of 2.0 in the engineering courses at the 20000 level and higher included in the plan of study are required. All other Purdue University graduation requirements must be satisfied.		

Semester 1			**Semester 2**		
CHM 115	General Chemistry	4	COM 114	FUND OF SPCH - GEN ED	3
ENGL 108/106	1st YR CMP-GEN ED	3/4	ENGR 132	TRANS IDEAS TO INNOV II	2
ENGR 131	TRANS IDEAS TO INNOV I	2	MA 166	PL ANAL GEO CALC II	4
MA 165	PL ANAL GEO CALC I	4	PHYS 172	MODERN MECHANICS	4
			SCI SEL	FYE SCIENCE SELECTIVE	3/4
	Total	13/14		Total	16/17
Semester 3			**Semester 4**		
AREA	AREA CLASS[1]	3	AREA	AREA CLASS[1]	3
MA 261	MULTIVARIATE CALCULUS	4	CGT 163	GRAPH COM & SPAT ANLY[5]	2
ME 200	THERMODYNAMICS[2]	3	ECE 201	LIN CIRCUIT ANALYSIS I	3
ME 270	BASIC MECHANICS I[3]	3	ECE 207	ELEC MEAS TECH LAB[6]	1
PHYS 241	ELECTRICITY & OPTICS[4]	3	MA 262	LIN ALG AND DIF EQU[7]	4
			ME 274	BASIC MECHANICS II[8]	3
	Total	16		Total	16
Semester 5			**Semester 6**		
CE 340	HYDRAULICS[9]	3	ENGR	ENGR CLASS (follow-up)[13]	3
CE 343	HYDRAULICS LAB[6]	1	ENGR	ENGR CLASS (design elective)[14]	3
ENGR	ENGR CLASS (beginning)[10]	3	GEN ED	GEN ED (Found Outcome BSS)[15]	3
GEN ED	GEN ED (Found Outcome H)[11]	3	GEN ED	GEN ED (300 level or non intro)[16]	3
IDE 301	PROF PREP IN IDE SEMINAR	1	IDE 360	MDE STATISTICS[17]	3
NUCL 273	MECHANICS OF MATERIALS[12]	3			
	Total	14		Total	15
Semester 7			**Semester 8**		
AREA	AREA CLASS[1]	3	AREA	AREA CLASS[1]	3
ENGR	ENGR CLASS (advanced)[18]	3	AREA	AREA CLASS[1]	3
GEN ED	GEN ED (Found Outcome STS)[19]	3	ENGR	ENGR CLASS (elective)[21]	3
GEN ED	GEN ED[16]	2/3	GEN ED	GEN ED (300 level or non intro)[16]	3
IDE 483	MDE ECONOMICS[20]	1	IDE 485	MDE ENGR DESIGN PROJ[22]	3
IDE 484	MDE DESIGN METHODOLOGY	1			
IDE 487	MDE SR. PROF. SEMINAR	1			
	Total	14/15		Total	15

Proposed changes & POS Alternative

120 credit Degree Requirements for
Bachelor of Science in Engineering (BSE) Degree in Multidisciplinary Engineering

Definition		Credits
First year Engineering Program If the common first year program in engineering is changed, the BSE requirements will be changed to reflect these changes.		29-33
Required sophomore mathematics Multivariate calculus (MA 26100), and linear algebra & differential equations, MA 26200 or (MA 26500 & 26600), or equivalent.		8-10
Sophomore Science selective ENE approved selective.		3-4
Statistics selective ENE approved statistics course from the Department of Statistics or approved engineering statistics course.		3 counted elsewhere
Accreditation Requirement for Mathematics and Basic Sciences There must be a minimum of 30 credits of ENE approved mathematics and basic sciences (biological, chemical and physical).		minimum of 30
Oral Communication Com 11400 or equivalent course taken from Engineering's General Education Program requirements.		3
Written Communication ENGL 106 or 108 or equivalent course taken from Engineering's General Education Program requirements.		3 or 4
General Education Follow Engineering's General Education Program requirements. *If EPICS is used to satisfy the Science, Technology & Society Outcome, three credits of EPICS are required*		17-18
Engineering Credits at 20000 + levels, of which *at least 18 credits are at 30000+* levels and *6 credits of the 18 must be at 40000+ level*. Maximum number of credits from any engineering discipline is 24.		minimum of 45
Required Engineering Core Can substitute or transfer equivalent courses ***except for*** IDE 30100, IDE 48700 *and major design experience courses*, which must be taken at Purdue-West Lafayette.		
Topic:	**Example Courses**	**Credits**
Electrical circuits	ECE 20100 or equivalent	3
Statics and Dynamics	(ME 27000 + 27400), A&AE 20300, (CE 29700 + 29800) or equiv	3/6
Fluid mechanics	ME 30900 (1 cr. counts as lab), CE 34000, A&AE 33300 & 33300L (1 cr. Counts as lab), ChE 37700 (1 cr. Counts as lab) or equivalent	3
Thermodynamics	ME 20000, ABE 20100, ABE 21000, ChE 21100 or equivalent	3 or 4
Engineering Economics	IE 34300 (3 cr) or IDE 48300 (1 cr) or equivalent	1 or 3

Definition		**Credits**
Major design experience	EPCS 41100 & 41200, IDE 48400 & 48500, or other approved major design experience courses.	3 or 4
Professional Preparation	IDE 30100 (1) and IDE 48700 (1)	2
	Typical Engineering Core Total Credits	
	Most common Core	**22**
Engineering Selectives: Do parts a, b, and c.		**Credits**
a. Three additional credits of engineering design	Must be approved by School of Engineering Education.	3
b. Three credits of ENE approved hands-on laboratory (not computer lab)	At least 2 credits must be in engineering.	1 cr lab (may be non-engr) + 2 engr lab
c. ENE approved engineering course in materials or strength of materials		3
	Total Credits Engineering Selectives	**8 engr + 1 cr lab**
Engineering Area		***Credits***
Each plan of study may include required engineering courses, engineering selectives and/or electives; may also include extra engineering laboratory or design credits.		Typically 9-18
	Minimum Engineering credits @ 20000 + level	**45**
Area		***Credits***
Chosen to satisfy educational objectives. For each plan of study may include required courses, selectives and/or electives.		Typically 8-16
	Minimum Required for Graduation	**120**
Other Graduation Requirements:		
Plans of study for all concentrations must be approved by the School of Engineering Education. All concentrations must be sufficiently different from plans of study in other Schools of Engineering (outside of ENE) so student's educational goals *could not be met in one of those Schools*. An overall Graduation Index of 2.0 or higher and a minimum GPA of 2.0 in the engineering courses at the 20000 level and higher included in the plan of study are required. All other Purdue University graduation requirements must be satisfied.		

Semester 1			**Semester 2**		
CHM 115	General Chemistry	4	COM 114	FUND OF SPCH - GEN ED	3
ENGL 108/106	1st YR CMP-GEN ED	3/4	***ENGR 162****	***Honors Creativity And Innovation In Eng Design II***	4
ENGR 161*	***Honors Creativity And Innovation In Eng Design I***	4	MA 166	PL ANAL GEO CALC II	4
MA 165	PL ANAL GEO CALC I	4	~~***PHYS 172****~~	~~***MODERN MECHANICS***~~	
			SCI SEL	FYE SCIENCE SELECTIVE	3/4
	Total	15/16		Total	14/15
Semester 3			**Semester 4**		
AREA	AREA CLASS[1]	3	AREA	AREA CLASS[1]	3
MA 261	MULTIVARIATE CALCULUS	4	CGT 163	GRAPH COM & SPAT ANLY[5]	2
ME 200	THERMODYNAMICS[2]	3	ECE 201	LIN CIRCUIT ANALYSIS I	3
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			ME 274	BASIC MECHANICS II[8]	3
	Total	16		Total	16
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	Total	14		Total	15
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AREA	AREA CLASS[1]	3	AREA	AREA CLASS[1]	3
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IDE 484	MDE DESIGN METHODOLOGY	1			
IDE 487	MDE SR. PROF. SEMINAR	1			
	Total	14/15		Total	15

***ALTERNATIVE*: ENGR16100 & 16200 may be taken in place of ENGR13100 & 13200. In that case, PHYS17200 is not required, as 4 credits from these courses will be applied to MBS degree requirements. Ref. EFD# 79-16**