TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Engineering Education

RE: Update to degree requirements: BSE degree in Multidisciplinary Engineering (MDE)

The Faculty of the School of Engineering Education has approved the attached revised degree requirement, and program grade acceptance clarification. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Summary of Proposed Changes:

This EFD seeks to accomplish three actions:

1) Establish use of EPCS 41200 - Senior Design Participation In EPICS (2cr) as the approved first occurrence EPICS Capstone Design Preparation course for the EPICS Capstone design option. **1 credit variations are ineligible.**

2) Establish a minimum acceptable grade (C- or better) for any MDE approved Capstone Design preparation course (i.e. IDE 48400 - Multidisciplinary Engineering Design Methodology, EPCS 41200 - Senior Design Participation In EPICS (1st occurrence) , or others approved.) to be allowed to advance to the senior sequence Capstone Design course such as, IDE 48500 - Multidisciplinary Engineering Design Project, or other EPICS options or approved alternatives.

3) Establish a minimum acceptable grade (C- or better) for any eligible MDE Capstone Design course option, (i.e. IDE 48500 - Multidisciplinary Engineering Design Project, EPCS 41200 - Senior Design Participation In EPICS (2nd occurrence) , etc.) to qualify for meeting MDE degree requirements for graduation.

Detailed Degree Requirements:

See attachment.

Current Requirements:

Based on EFD 20-20. See attachment.

Effective Date:

Effective for all students entering Purdue Fall 2021.

Reasons:

In support of the first action, the established use of EPCS 41200 (2cr.) as the approved Capstone Design preparation course for the EPICS Capstone option (2cr), creates earned credit parity with the primary MDE Capstone Design course sequence (IDE 48400 1cr + IDE485 3cr).

In support of the second action, the IDE48400 course (and other preparatory courses for capstone design) reinforces key capstone design methods, actions and reflections necessary to successfully contribute to a senior capstone design team. As such, a minimum threshold of performance is called for to improve student success in their capstone design course progression. Without achieving the minimum acceptable grade for these pre-capstone design courses, students run a risk of not sufficiently demonstrated senior level achievement of key ABET outcomes (1,2(analysis),3,6,7) which are assumed and drawn upon in depth within the second semester MDE capstone design course options.

In support of the third action, establishing a minimum acceptable grade of C- or better for all MDE Capstone Design course options (i.e. IDE48500, EPCS 41200, etc.), aims to ensure students have sufficiently demonstrated expected senior level achievement of all ABET outcomes, and can successfully contribute to their design teams, as well as the profession of engineering.

Donna Riley, Kamyar Haghighi Head
Professor of Engineering Education

EXISTING

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 to meet Engineering's General Education Program requirements.	3
Written Communication ▪ ENGL 106 or 108 or equivalent course taken to meet Engineering's General Education Program requirements.	3 or 4
General Education ▪ Students must take any course selected for a letter grade and earn a C- or better in order to receive credit for meeting the Foundational Learning Outcomes and this General Education requirement [a unit level requirement]. The P/NP option is not available for this requirement. ▪ *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 campus.	

Topic:	Example Courses	Credits
Electrical Circuits	ECE 20100 or equivalent	3
Statics and Dynamics	(ME 27000 + 27400), A&AE 20300, (CE 29700 + 29800) or equivalent	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
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*.
- At least one course taken must satisfy the MDE degree program data science requirement. See ENE approved list of courses to meet data science requirement.
- Courses selected for use on the approved plan of study must be taken for a letter grade. The P/NP option is not available for any course taken as part of degree requirements.
- 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.

ENE approved list of courses to meet MDE data science requirement
(List approved Spring 2019)

IDE 36000 Multidisciplinary Engineering Statistics (3cr)
ECE 29595 Introduction to Data Science (1cr)

Or other courses approved as developed, suggested and approved by the ENEUGCC committee.

PROPOSED

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 to meet Engineering's General Education Program requirements.	3
Written Communication ▪ ENGL 106 or 108 or equivalent course taken to meet Engineering's General Education Program requirements.	3 or 4
General Education ▪ Students must take any course selected for a letter grade and earn a C- or better in order to receive credit for meeting the Foundational Learning Outcomes and this General Education requirement [a unit level requirement]. The P/NP option is not available for this requirement. ▪ *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 campus.	

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Engineering Economics	IE 34300 (3 cr) or IDE 48300 (1 cr) or equivalent	1 or 3
Major Design Experience	EPCS 41200 & 41200; IDE 48400 & 48500, or other approved major design experience courses.	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**
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- At least one course taken must satisfy the MDE degree program data science requirement. See ENE approved list of courses to meet data science requirement.
- Courses selected for use on the approved plan of study must be taken for a letter grade. The P/NP option is not available for any course taken as part of degree requirements.
- Students must earn a C- or better in both the preparatory Capstone Design course (e.g. IDE48400, or EPCS 41200 (1st occurrence) *or other approved options*), AND the Capstone Design course (e.g. IDE48500, or EPCS

41200 (2nd occurrence) *or other approved options*).

- 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.

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