



## Memo

To: Randy Smith, Vice Provost for Academic Programs  
From: Rosie Quinzon-Bonello, Assistant Dean for Curriculum and Assessment  
Date: June 1, 2023  
Re: Program Change Proposal - Industrial and Systems Engineering Undergraduate Program

---

On May 15, 2023, the Industrial and Systems Engineering UG program informed the College of Engineering Committee for Academic Affairs (CCAA) of the following actions:


- Overlap of the non-engineering required course, PHIL 1332, with the GE Foundation *Historical and Cultural Studies* (HCS)
- Addition of 3 credit hours of free electives

CCAA acknowledged and supported these actions.

The ISE BS program requires a minimum 127 credit hours for the degree. In Spring 2022 (in the middle of the GE program implementation) the program added PHIL 1332 to its undergraduate curriculum as a required non-major course. At the time, PHIL 1332 was not on the HCS Foundation course list. Unbeknownst to the program, the course was subsequently added to HCS Foundation, and this resulted in the unintended consequence of reducing the minimum number of required credit hours for the degree from 127 to 124. The program wants to maintain this 127 minimum credit hour requirement and proposes to add 3 credit hours of free electives.

Attached is the proposal for CAA to review and determine whether or not this should be considered an informational item or a proposal for a CAA subcommittee.

Yours sincerely,

  
Rosie Quinzon-Bonello

9 May 2023

**To:** Rosie Quinzon-Bonello, Assistant Dean for Curriculum and Assessment

**From:** Carolyn Sommerich, Chair, ISE Department Undergraduate Studies Committee

**Re:** Adjustment to curriculum for the BS Industrial & Systems Engineering program

Dear Dean Quinzon-Bonello,

In Feb. 2022 the faculty of the Industrial & Systems Engineering Program in the Department of Integrated Systems Engineering proposed making several changes to the undergraduate program and these were approved by CAA in June 2022.

As part of those changes, Philosophy 1332 became a required course in the ISE curriculum. ISE's curriculum changes were drafted and approved while the new General Education requirements were (and still are) in flux. Philosophy 1332 was approved for GEN Foundations: Historical and Cultural Studies after ISE's curriculum change proposal was in review. So, currently, Philosophy 1332 and the GEN Foundations: Historical and Cultural Studies requirement are separate requirements for students to complete since the GE approval was not accounted for.

**As such, there are two related, credit neutral adjustments that ISE is requesting to make to the curriculum:**

- Allow for the overlap of Philosophy 1332 and GEN Foundations: Historical and Cultural Studies
- Add a free elective to the ISE curriculum

**Benefits to students:**

- There is no limit to the number of courses that may overlap between the GE Foundations and the rest of the academic program. Therefore, an overlap is in the student's best interest and requires an update to the ISE curriculum sheet.
- Allowing Philosophy 1332 to count towards the student's general education requirement and the non-major course requirement, yields an opportunity to provide a free elective in the ISE curriculum. Students often remark to us in exit interviews that they wish they would have had room for another ISE course (technical elective) in their program, and this will give students with that desire an opportunity to fulfill it. Alternatively, for students who come to OSU with a lot of credit hours, this allows them to count more of those hours towards their ISE degree.

This set of adjustments was discussed within the ISE Undergraduate Studies Committee. It was then discussed in a department meeting on 5 May 2023 and the faculty subsequently voted to approve it (19 tenured and tenure track faculty with ISE as their TIU voted to approve; 2 did not vote).

As such we would appreciate receiving any further approvals that are needed in order for ISE to make these adjustments to the ISE undergraduate curriculum.

## Bachelor of Science Industrial and Systems Engineering

Students in this major will complete a minimum of 127 hours outlined as follows.

General Education Requirements		
Requirement	Course Options	Hours
GE Launch Seminar	<i>GEN ED 1201</i>	1
Foundations: Writing and Information Literacy <sup>a</sup>	<i>Student Choice</i>	3
Foundations: Mathematical & Quantitative Reasoning/Data Analysis <sup>a</sup>	<i>Student Choice</i> *	0-5
Foundations: Literary, Visual and Performing Arts <sup>a</sup>	<i>Student Choice</i>	3
Foundations: Historical & Cultural Studies <sup>a</sup>	<i>Student Choice</i> *	0-3
Foundations: Natural Science <sup>a</sup>	<i>Student Choice</i> *	0-5
Foundations: Social & Behavioral Sciences <sup>a</sup>	<i>Student Choice</i>	3
Foundations: Race, Ethnic and Gender Diversity <sup>a</sup>	<i>Student Choice</i>	3
Theme: Citizenship for a Diverse & Just World <sup>b</sup>	<i>Student Choice</i> ❖	0-4
Theme: Student Choice <sup>b</sup>	<i>Student Choice</i>	4
GE Reflection	Capstone**	Embedded into Major Core Capstone
<b>Total</b>		<b>17-34</b>

College / Degree Requirements <sup>a, b</sup>		
Requirement	Course Options	Hours
MATH 1151*, 1172*, (Math & Quantitative Reasoning / Data Analysis)		10
PHYSICS 1250* (Nat Sci)		5
ENGR 1181.0x, 1182.0x		4
ENGR 1100.xx		1
<b>Total</b>		<b>20</b>

<sup>a</sup> Some coursework required by the major or college may satisfy GE requirements. Please add an asterisk to "student choice" for any GE category where that category can be satisfied by a required course. Please indicate in parentheses following the course listing within College/Degree requirements or Major Coursework what GE category the course satisfies ( e.g., "Biology 1113 (Nat Sci)" in the Major Core for programs that require this as a prerequisite to major coursework). There is no limit to the number of courses that may overlap between the GE Foundations and the rest of the academic program

<sup>b</sup> Students complete either a 4-credit course or two 3-credit courses in each of two General Education Theme areas: Citizenship for a Diverse & Just World (required), and the student's choice of available GE Themes. If major-required courses are approved as a GE Theme course, one course in each GE Theme area may double count in the GE and major hours. Theme courses are identified with a ❖ symbol.

\* These courses are can also fulfill certain GE Requirements above (may be degree requirements, pre- or co-requisites, or major courses).

Major Coursework <sup>a, b</sup>		
Course	Title	Hours
<b>Major Core</b>		
ISE 2040	Engineering Economics	2
ISE 2400	Design of Work	2
ISE 2500	Intro to Manufacturing Engineering	3
ISE 3600	Workplace Ergonomics	3
ISE 3700	Cognitive Systems	3
ISE 3200	Linear Programming	3
ISE 3210	Non-Linear Programming	3
ISE 3800	Project Management	3
ISE 4120	Quality & Reliability Engineering	3
ISE 3400	Production Planning and Facility Layout	4
ISE 4100	Stochastics Modeling & Simulation	4
ISE 4900	Capstone	4
<b>Total</b>		<b>37</b>
<b>Major Supporting Coursework</b>		
CSE 1224	Introduction to Computer Programming in Python	3
CSE 2112	Modeling and Problem Solving with Spreadsheets and Databases for Engineers	3
MATH 2568	Linear Algebra	3
STAT 3470	Introduction to Probability and Statistics for Engineers	3
MATH 2415	Differential Equations	3
MECHENG 2040	Statics and Introduction to Mechanics of Materials	4
PHILOS 1332* (Foundations: Historical & Cultural Studies)	Ethics in the Professional: Introduction to Engineering Ethics	3
PHYSICS 1251	E&M, Waves, Optics, Modern Physics	5
Science	Additional Science	4-5
ENGR 2301❖ (Theme: Citizenship for a Diverse & Just World)	Citizenship in Engineering: Integrative Designation	4
<b>Total</b>		<b>35</b>
<b>Required Technical / Directed / Targeted Electives; Career Courses</b>		
Technical Electives		15
<b>Total</b>		<b>15</b>

General Education	17-34
College / Degree	20
Major Core	37
Major Supporting Coursework	35
Required Technical / Directed / Targeted Electives; Career Courses	15
Free elective(s)	3
<b>Minimum Total Credit Hours for Degree</b>	<b>127</b>

**Suggested Curriculum** - This should be used as a guide only. Semester offerings are subject to change.

Year	Autumn	Spring
1	___ PHYSICS 1250 ( <i>Intro to Physics I</i> ) ..... 5 hr ___ MATH 1151 ( <i>Calculus I</i> ) ..... 5 hr ___ ENGR 1181 ( <i>Fundamentals of Engineering I</i> ) ..... 2 hr ___ ENGR 1100 ( <i>Engineering Survey</i> ) ..... 1 hr ___ General Education ( <i>Writing and Info Literacy</i> )..... 3 hr <b>16 hr</b>	___ PHYSICS 1251 ( <i>Intro to Physics II</i> )..... 5 hr ___ MATH 1172 ( <i>Engineering Math A</i> )..... 5 hr ___ ENGR 1182 ( <i>Fundamentals of Engineering II</i> )..... 2 hr ___ CSE 1224 ( <i>Intro to Programming in Python</i> )..... 3 hr ___ *GENED 1201 ( <i>GE Launch Seminar</i> )..... 1 hr <b>16 hr</b>
2	___ MATH 2568 ( <i>Linear Algebra</i> )..... 3 hr ___ STAT 3470.01 or .02 ( <i>Probability &amp; Statistics</i> ).. 3 hr ___ MECHENG 2040 ( <i>Statics &amp; Mechanics</i> )..... 4 hr ___ ISE 2500 ( <i>Intro to Manufacturing</i> )..... 3 hr ___ CSE 2112 ( <i>Spreadsheets/Databases for Engineers</i> ) 3 hr <b>16 hr</b>	___ MATH 2415 ( <i>Ordinary/Partial Diff. Equations</i> ).... 3 hr ___ ISE 2400 ( <i>Design of Work</i> )..... 2 hr ___ ISE 2040.01 or .02 ( <i>Engineering Economics</i> )..... 2 hr ___ ISE 3200 ( <i>Linear &amp; Integer Programming</i> ) ..... 3 hr ___ General Education ( <i>Social &amp; Behavioral Sci</i> ) ..... 3 hr ___ † ENGR 2301 ( <i>Citizenship in Eng. Integrative Designation</i> ) 4 hr <b>17 hr</b>
3	___ ISE 3210 ( <i>Non-linear &amp; Dynamic Optimization</i> ).... 3 hr ___ ISE 3800 ( <i>Project Management</i> ) ..... 3 hr ___ ISE 3600 ( <i>Workplace Ergonomics</i> )..... 3 hr ___ ISE 3700 ( <i>Cognitive Systems Engineering</i> ) ..... 3 hr ___ General Education ( <i>Theme: Student Choice</i> ) ..... 4 hr <b>16 hr</b>	___ Additional Science <sup>1</sup> ..... 4-5 hr ___ ISE 4120 ( <i>Quality &amp; Reliability Engineering</i> ) ..... 3 hr ___ ISE 3400 ( <i>Product Planning &amp; Facilities Design</i> ) ... 4 hr ___ ^ PHILOS 1332 ( <i>Engineering Ethics</i> )..... 3 hr ___ # Free Elective ..... 3 hr <b>17 hr</b>
4	___ ISE 4100 ( <i>Stochastic Modeling &amp; Simulation</i> )..... 4 hr ___ Technical Elective <sup>2</sup> ..... 3 hr ___ Technical Elective..... 3 hr ___ Technical Elective..... 3 hr ___ General Education ( <i>Racial/Ethnic/Gender Div.</i> ).... 3 hr <b>16 hr</b>	___ ISE 4900 ( <i>Capstone Design</i> )..... 4 hr ___ Technical Elective..... 3 hr ___ Technical Elective..... 3 hr ___ General Education ( <i>Lit., Visual, and Perf. Arts</i> ).... 3 hr <b>13 hr</b>

**Total hours required to complete the degree program = 127**

\* GENED 1201 must be taken within your first 3 semesters of enrollment at OSU (not including summer).

† ENGR 2301 can overlap with Theme GE: Citizenship for a Diverse and Just World

^ PHILOS 1332 can overlap with Foundations GE: Historical and Cultural Studies.

# Free Elective - may be another Technical Elective or any other course(s)

**<sup>1</sup>Additional Science Options**

Choose one of the following: ANATOMY 2220, 2300, 3300, ANTHROP 2200, BIOLOGY 1113, 1114, 2100, CHEM 1210, 1250, EARTHSC 1911, 2155, 2203, 2204, 3203, ENR 2155, 3280, EEOB 2510, 2520, GEOG 2200, 3300, PHYSICS 3700 All students must satisfy a 30 credit hour minimum for math and basic sciences. Students with high math or science placements and transfer students without credit for lower courses should consult with an ISE academic advisor to ensure this minimum is met. Such students may be required to take additional approved coursework to meet graduation requirements.

**<sup>2</sup>Technical Electives**

The ISE program includes at least 15 semester hours of technical electives from a specific track. These tracks are designed to provide depth within an area of ISE that is of interest to each student and include the following options: Supply Chain Management & Logistics, Data Analytics & Optimization, Management Systems & Operations Research, Human Systems Integration & Design, and Manufacturing. **In most tracks, students choose 9 credit hours of depth elective courses from a defined set and 6 credit hours of additional depth or breadth elective courses, also from a defined set.**