



## Memo

To: Randy Smith, Vice Provost for Academic Programs, Office of Academic Affairs  
From: Rosie Quinzon-Bonello, Assistant Dean for Curriculum and Assessment  
Date: May 1, 2023

Re: Informational Item - Adding a required course to Industrial Systems Engineering UG Curriculum

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This memo is to document support of a program change request submitted by the Industrial Systems Engineering Bachelor of Science program to add ENGR 2301 *Exploring Diversity, Equity & Inclusion in Engineering Contexts: Integrative Designation* as a required non-major course (See section "Major Supporting Coursework")

On April 28, 2023, the College Committee on Academic Affairs (CCAA) was informed of this action. In this way, a formal, college-level record of this action has been created.

Please feel free to contact me should have additional questions.

Yours sincerely,

Rosie Quinzon-Bonello

25 Apr. 2023

Vice Provost W. Randy Smith  
Council on Academic Affairs  
Office of Academic Affairs  
203 Bricker Hall  
190 North Oval Mall  
Columbus, OH 43210

Re: Complete the approval process of the proposal to make changes to the curriculum for the BS Industrial & Systems Engineering program

Dear Vice Provost Smith,

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.

One item that was included in our proposal was not explicitly approved, however. This was that ENGR 2301 is required to fulfill the Citizenship for a Diverse & Just World theme. The content of this course is important for our engineering students, including the writing experiences that are included in the course. As we understand it, this item was not explicitly approved because ENGR 2301 was planned but did not exist at the time our proposal package was reviewed and approved.

ENGR 2301 has now been approved and so we are asking that it be approved for inclusion in our curriculum, as originally proposed in Feb. 2022.

Sincerely,



Farhang Pourboghrat, PhD  
Department Chair  
Integrated Systems Engineering

cc. Steven A. Lavender, Associate Chair, Undergraduate Program  
Carolyn Sommerich, Chair, Undergraduate Studies Committee

## 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> *	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>20-34</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 1100.15		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>

Major Supporting Coursework		
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	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)	Exploring Diversity, Equity & Inclusion in Engineering Contexts: Integrative Designation	4
<b>Total</b>		<b>35</b>

Required Technical / Directed / Targeted Electives; Career Courses		
Technical Electives		15
<b>Total</b>		<b>15</b>

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

**Student Information**

Name: \_\_\_\_\_ OSU ID: \_\_\_\_\_ OSU Admit Term: \_\_\_\_\_

Phone: \_\_\_\_\_ Email (*name.number@osu.edu*): \_\_\_\_\_

**Suggested Curriculum**

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

Year	Autumn	Spring
1	___ PHYSICS 1250 ( <i>Intro Physics 1</i> ) (FNS)..... 5 hr ___ MATH 1151 ( <i>Calculus 1</i> ) (FM&QR/DA).... 5 hr ___ ENGR 1181 ( <i>Fundamentals of ENGR 1</i> ) ..... 2 hr ___ ENGR 1100 ( <i>Engineering Survey</i> ) ..... 1 hr ___ General Education ( <i>FW &amp; info literacy; 1<sup>st</sup> wr</i> ).... 3 hr 16 hr	___ PHYSICS 1251 ( <i>Intro Physics 2</i> )..... 5 hr ___ MATH 1172 ( <i>Engineering Math A</i> )..... 5 hr ___ ENGR 1182 ( <i>Fundamentals of ENGR 2</i> )..... 2 hr ___ CSE 1224 ( <i>Programming in Python</i> )..... 3 hr ___ Launch Sem ( <i>w/in 3 terms of enroll</i> ) ..... 1 hr 16 hr
2	___ MATH 2568 ( <i>Linear Algebra</i> )..... 3 hr ___ STAT 3470 ( <i>Probability &amp; Statistics</i> )..... 3 hr ___ MECHENG 2040 ( <i>Statics &amp; Mechanics</i> )..... 4 hr ___ ISE 2500 ( <i>Intro to Manf. Engineering</i> )..... 3 hr ___ CSE 2112 ( <i>Modeling w/ Sprdst &amp; DB for Engr.</i> ).... 3 hr 16 hr	___ MATH 2415 ( <i>Ordinary &amp; Partial Diff Eq</i> )..... 3 hr ___ ISE 2400 ( <i>Design of Work</i> )..... 2 hr ___ ISE 2040 ( <i>Engineering Economics</i> )..... 2 hr ___ ENGR2301 Gen Ed Theme ( <i>Writing II</i> )..... 4 hr ___ <i>Citizenship for a Diverse and Just World</i> ___ General Education ( <i>Found Soc &amp; Behav. Sci</i> )..... 3 hr ___ ISE 3200 ( <i>Linear &amp; Integer Programming</i> )..... 3 hr 17 hr
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 Eng</i> )..... 3 hr ___ General Ed. Theme ( <i>student choice</i> )..... 4 hr 16 hr	___ Additional Science <sup>1</sup> ..... 4-5 hr ___ ISE 4120 ( <i>Quality &amp; Reliability Engineering</i> )..... 3 hr ___ ISE 3400 ( <i>Prod Plan &amp; Fac Design</i> )..... 4 hr ___ General Education ( <i>Found. Hist. &amp; Culture</i> )..... 3 hr ___ PHILOS 1332 <i>Engineering Ethics</i> ..... 3 hr 17 hr
4	___ ISE 4100 ( <i>Stoch Modeling &amp; Simulation</i> )..... 4 hr ___ Technical Elective <sup>2</sup> ..... 3 hr ___ Technical Elective..... 3 hr ___ Technical Elective..... 3 hr ___ General Education ( <i>F.Lit, Vis. &amp; Perform Arts</i> )... 3 hr 16 hr	___ ISE 4900 ( <i>Capstone Des.; includes reflection sem</i> ) 4 hr ___ Technical Elective..... 3 hr ___ Technical Elective..... 3 hr ___ General Education ( <i>F: Race, ethnic, gen. div</i> )... 3 hr 13 hr

**Total Hours to complete the degree program = 127**

**Program Options**

<sup>1</sup> 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.

**Acceptance Criteria:**

Acceptance into this program is based on a holistic review of the student’s record including an essay. Admission to major is considered only after a student has taken at least 12 credit hours of letter grade in their undergraduate career at OSU and have

completed the following courses: MATH 1151, 1172; ENGR 1181, 1182; PHYSICS 1250, (or their equivalents). Applications are accepted Autumn and Spring semester ONLY. Students must complete the online ISE Major Application the semester in which the student is completing their pre-major requirements (i.e. the semester before the students wants to enter the major). For more information please visit our website (<https://ise.osu.edu/degrees/admission-ise-major>) or see an Academic Advisor in the Department of Integrated Systems Engineering.

## Technical and Other Electives

<sup>2</sup> The Industrial and Systems Engineering (ISE) program includes 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.

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## General Education Requirement

### Foundations

#### Writing and Information Literacy - 3hr

English 1110.xx 3 hr

#### Mathematical and Quantitative Reasoning OR Data Analysis 3-5 hr

Math 1151 5 hr

#### Literary, Visual and Performing Arts

3 hr

#### Historical and Cultural Studies

3 hr

#### Natural Science 4-5 hr

Physics 1250 5 hr

#### Social and Behavioral Sciences

3 hr

#### Race, Ethnic and Gender Diversity

3 hr

### Seminars

#### Launch Seminar

1 hr

#### Reflection Seminar

Incorporated into Capstone Design 1 hr

### Thematic Pathways

#### Citizenship for a Diverse and Just World 4-6 hr

4 cr from ENGR 2301 (includes 2<sup>nd</sup> writing req.) 4 hr

#### Second Thematic Pathway

4-6 hr