BACHELOR OF ENGINEERING IN INDUSTRIAL AND SYSTEMS ENGINEERING 4+1 GRADUATE TRACK

The industrial and systems engineer functions as a problem-solver, innovator, coordinator, and agent of change in a wide variety of positions in manufacturing industries, service industries, and government. The industrial and systems engineer's unique background combines a study of science, mathematics, and management principles with the principles of engineering analysis and design to provide access to a wide variety of flexible technical and managerial careers.

The aim of the industrial and systems engineering program is to produce graduates who secure professional engineering positions, practice the profession ethically and effectively, maintain their professional competency through lifelong learning, and advance in one of the many technical and managerial career paths available to industrial and systems engineers.

The program prepares its students for these accomplishments by providing them with a broad scientific and engineering base via courses in mathematics, physics, chemistry, and the engineering sciences. In addition, courses in the social sciences and the humanities develop sensitivity to the social context within which the profession must be ethically practiced. Finally, industrial and systems engineering courses in the areas of manufacturing systems, human-machine systems, management systems, and management science develop the technical expertise required by professional practice.

Students already in the YSU Industrial and Systems Engineering undergraduate program can apply for admission into this accelerated track after completing 82 semester hours with a GPA of 3.3 or higher. After being admitted into the accelerated track, students will be allowed a maximum of nine semester hours of graduate coursework to be double-counted towards both Bachelor's and Master's degrees upon approval by the Graduate Program Director. An additional 6000 level graduate coursework of three semester hours can be completed as an undergraduate and used exclusively for graduate credit. This will allow students to obtain a graduate degree with 30 semester hours or more within a year after the Bachelor's degree.

For more information about the 4+1 BE/MSE in Industrial and Systems Engineering track, please contact:

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COURSE	TITLE	S.H.
First Year Requirement--Student Success		
YSU 1500	Success Seminar	1-2
or YSU 1500S	Youngstown State University Success Seminar	
or HONR 1500	Intro to Honors	
General Education Requirements		
ENGL 1550	Writing 1	3-4
or ENGL 1549	Writing 1 with Support	
ENGL 1551	Writing 2	3
Natural Science (6-7 s.h.) Met with courses in major		
Arts and Humanities (Select 1 additional class for 3 s.h.)		3
PHIL 2625	Introduction to Professional Ethics	3
Social Science (6 s.h.)		6
General Education Electives (9 s.h. select 2 courses)		6
CMST 1545	Communication Foundations	3
Industrial Engineering Courses		
ISEN 2610	Engineering Statistics	3
ISEN 2616	Systems Analysis and Design	3
ISEN 2620	IE Applied Statistics	3
ISEN 2624	Engineering Economy	3
ISEN 3720	Statistical Quality Control	3
ISEN 3723	Manufacturing Processes	3
ISEN 3723L	Manufacturing Processes Lab	1
ISEN 3727	Simulation of Industrial Engineering Systems	3
ISEN 3730	Materials Handling and Facilities Planning	3
ISEN 3740	Prod Planning and Supply Chain	3
ISEN 4821	Capstone Design 1	3
ISEN 4822	Capstone Design 2	3
ISEN 5801	Operations Research 1	3
ISEN 5881	Competitive Manufacturing Management	3
Dual Credit Requirements		
Select 9 s.h. from the 5800 or 6900 level courses below that will count for both undergraduate and graduate credit		9
ISEN 5820	Advanced Quality for Engineers	
ISEN 5823	Automation	
ISEN 5825	Advanced Engineering Economy	
ISEN 5830	Human Factors Engineering	
ISEN 5850	Operations Research 2	
ISEN 5880	Management of Technology	
ISEN 6905	Applied Statistics for Design, Quality, and Productivity	
ISEN 6920	Project Management	
ISEN 6921	Engineering Statistics	
ISEN 6935	Decision Analysis for Engineering	
Other Engineering Courses		
ENGR 1500	Engineering Orientation	1
ENGR 1550	Engineering Concepts	2
ENGR 1560	Engineering Computing	2
ECEN 2614	Basics of Electrical Engineering	3
MECH 1560	Engineering Communication with CAD	2
MECH 2620	Statics and Dynamics	3
STEM Required Courses		
CSIS 2610	Programming and Problem-Solving	3
CSIS 2610L	Programming and Problem-Solving Lab	1
DATX 5801	Data Management	3
DATX 5803	Data Visualization	3
Mathematics Courses		
MATH 1571	Calculus 1	4
MATH 1572	Calculus 2	4
MATH 2673	Calculus 3	4
MATH 3720	Linear Algebra and Matrix Theory	3
Science Courses		
CHEM 1515	General Chemistry 1	3
CHEM 1515L	General Chemistry 1 Laboratory	1
PHYS 2610	General Physics 1	4
PHYS 2611	General Physics 2	4
Total Semester Hours		**127-129**

4+1 BE/MSE in Industrial and Systems Engineering

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Year 1		
Fall		**S.H.**
YSU 1500 or YSU 1500S or HONR 1500	Success Seminar or Youngstown State University Success Seminar or Intro to Honors	1-2
ENGL 1550 or ENGL 1549	Writing 1 or Writing 1 with Support	3-4
MATH 1571	Calculus 1	4
CHEM 1515 & 1515L	General Chemistry 1 and General Chemistry 1 Laboratory	4
ENGR 1500	Engineering Orientation	1
ENGR 1550	Engineering Concepts	2
	Semester Hours	**15-17**
Spring		
ENGL 1551	Writing 2	3
MATH 1572	Calculus 2	4
PHYS 2610	General Physics 1	4
ENGR 1560	Engineering Computing	2
CMST 1545	Communication Foundations	3
	Semester Hours	**16**
Year 2		
Fall		
ISEN 2610	Engineering Statistics	3
MATH 2673	Calculus 3	4
CSIS 2610	Programming and Problem-Solving	3
CSIS 2610L	Programming and Problem-Solving Lab	1
PHYS 2611	General Physics 2	4
	Semester Hours	**15**
Spring		
ISEN 2616	Systems Analysis and Design	3
ISEN 2620	IE Applied Statistics	3
ISEN 2624	Engineering Economy	3
MECH 1560	Engineering Communication with CAD	2
MECH 2620	Statics and Dynamics	3
MATH 3720	Linear Algebra and Matrix Theory	3
	Semester Hours	**17**
Year 3		
Fall		
ISEN 3723 & 3723L	Manufacturing Processes and Manufacturing Processes Lab	4
ISEN 3730	Materials Handling and Facilities Planning	3
ECEN 2614	Basics of Electrical Engineering	3
SS Gen Ed Course		3
SS Gen Ed Course		3
	Semester Hours	**16**
Spring		
ISEN 3720	Statistical Quality Control	3
ISEN 3727	Simulation of Industrial Engineering Systems	3
ISEN 3740	Prod Planning and Supply Chain	3
DATX 5801	Data Management	3
PHIL 2625	Introduction to Professional Ethics	3
	Semester Hours	**15**
Year 4		
Fall		
ISEN 4821	Capstone Design 1	3
ISEN 5801	Operations Research 1	3
ISEN Dual Credit Course		3
ISEN Dual Credit Course		3
DATX 5803	Data Visualization	3
AH Gen Ed Course		3
	Semester Hours	**18**
Spring		
ISEN 4822	Capstone Design 2	3
ISEN 5881	Competitive Manufacturing Management	3
ISEN Dual Credit Course		3
Gen Ed Electives		6
	Semester Hours	**15**
	Total Semester Hours	**127-129**

Student Outcomes

The curriculum is structured to achieve the following outcomes as prescribed by ABET:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies