BACHELOR OF ENGINEERING IN INDUSTRIAL AND SYSTEMS ENGINEERING

Welcome to the Youngstown State University (YSU) Industrial & Systems Engineering program webpage. We offer a Bachelor of Engineering (BE) degree in Industrial & Systems Engineering. This program offers a strong background in mathematics, the sciences, management principles, and principles of engineering analysis and design. Also, in addition to receiving a quality education in this program, many students participate in co-op or internship job assignments during their time with us, making them highly marketable upon completion of their degrees. Graduates of the program enjoy placement in many areas of the diverse industrial engineering job market.

I hope that you find this webpage informative. If you have any additional questions, please contact me.

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Moser Hall 2420

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.

Program Educational Objectives

The industrial and systems engineering program at Youngstown State University is committed to offering its students a high standard of educational training. In fulfillment of its mission, as well as the missions of the College of STEM and the University, the program has established educational objectives that ensure graduating engineers have the educational knowledge and skills to practice industrial engineering effectively. The objectives of the Industrial and Systems Engineering Program are for our graduates to be:

- Professionals who are technically competent in modern industrial engineering based careers, as well as other emerging disciplines.
- World citizens who exhibit leadership qualities in their chosen disciplines, and who pursue continuing education through advanced degrees, certifications, licensure, etc.
- Active contributors to their professions, industries and/or communities.

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

Accreditation

The YSU undergraduate program in Industrial and Systems Engineering has been accredited by the Engineering Accreditation Commission of ABET (https://www.abet.org/), under the commission's General Criteria and Program Criteria for Industrial and Similarly Named Engineering Programs.

Industrial and Systems Engineering Laboratories

The industrial and systems engineering laboratory spaces are located in Moser Hall and are equipped with hardware, software and networks to serve experiences within the curriculum that are hands on, team based, and communications or computational intensive. Laboratory experiences develop capabilities to design detailed components and to integrate solutions into large scale systems. Successively more challenging assignments are taken on throughout the curriculum and culminate in comprehensive experiences in the capstone facilities design sequence.

The industrial and systems engineering program makes optimum use of the Engineering Computing Complex, which is equipped with state-of-the-art computation, design, and communication hardware and software of a multi-disciplinary nature.

The ISE Project Laboratory is focused on team-based activities throughout the curriculum and particularly serves the methods engineering, human factors engineering and facilities design areas. At its core is a network of computing stations equipped with modern industrial and systems engineering software. Data collection and processing software supports video analysis of human performance, workspace and manufacturing cell design, facility layout, flow analysis and line balancing. The goal of this laboratory is to be able to cover any topic from the planning of initial resources for a start-up enterprise to the distribution of goods and services in global networks.

The Automation Laboratory Suite is a collection of spaces where students at all levels can learn and achieve together with an opportunity to make sustainable contributions to an initial or on-going project experience. It encompasses programmable robots, programmable logic controllers, vibratory

bowl feeders, reciprocating feeders, power conveyors and numerous actuator and sensing devices.

The Manufacturing Laboratory Suite consists of several spaces containing equipment for rapid prototyping, casting processes, plastic injection molding and blow molding processes, CNC machining processes, sheet metal processing and instrumentation for inspection, measurement, and testing.

For more information, visit **Industrial And Systems Engineering (http://www.ysu.edu/academics/science-technology-engineering-mathematics/industrial-and-systems-engineering-major/).**

Cooperative Education

The industrial and systems engineering program strongly encourages its students to actively participate in the optional cooperative education program. The parallel co-op arrangement which combines work and study each semester is recommended. However, full-time employment in the summer can also be included. Students must register for a co-op course and submit documentation as specified by professional practice office. Currently a substitution of one elective course with three co-op experiences is allowed.

Advisement

The industrial and systems engineering program specifies mandatory advisement. Every student in the program is advised every semester before his or her registration. Students cannot finalize their registration without approval of the faculty advisor or program coordinator.

Accreditation

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Industrial & Systems Engineering Program

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
Mathematics requirement (met through MATH in the major)		
Arts and Humanities (Select 1 additional class for 3 s.h.)		3
PHIL 2625	Introduction to Professional Ethics	3
Natural Science (7 s.h.) Met with courses in major		
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
ISEN 5823	Automation	3
ISEN Electives (2 courses from the list below)		**6**
ISEN 5830	Human Factors Engineering	
ISEN 5850	Operations Research 2	
ISEN 4810	Special Topics	
ISEN 5820	Advanced Quality for Engineers	
ISEN 5825	Advanced Engineering Economy	
ISEN 5880	Management of Technology	
ENGR Elective (Select 1)		**3**
STEM 5890	STEM Graduate Internships	
DATX 5805	Predictive Modeling Algorithms	
Any ISE Elective Course		
Any engineering course 3000+		
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
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		**130-132**

Year 1		
Fall		**S.H.**
YSU 1500	Success Seminar	1-2
or YSU 1500S	or Youngstown State University Success Seminar	
or HONR 1500	or Intro to Honors	
ENGL 1550	Writing 1	3-4
or ENGL 1549	or Writing 1 with Support	
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	Manufacturing Processes	3
ISEN 3723L	Manufacturing Processes Lab	1
ISEN 3730	Materials Handling and Facilities Planning	3
ECEN 2614	Basics of Electrical Engineering (others with consent of Program Coordinator)	3
GER Elective 1 (SS)		3
GER Elective 2 (SS)		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
DATX 5803	Data Visualization	3
ISEN 5823	Automation	3
ISEN Elective 1		3
GER Elective 4 (AH)		3
	Semester Hours	**18**
Spring		
ISEN 4822	Capstone Design 2	3
ISEN Elective 2		3
ENGR Elective		3
GER Elective 5		3
GER Elective 6		3
	Semester Hours	**15**
	Total Semester Hours	**127-129**

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