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.

Martin Cala, Ph.D., P.E.

Professor and Program Coordinator

Department of Mechanical, Industrial and Manufacturing Engineering

Phone: (330) 941-1746

E-mail: mcala@ysu.edu

(330) 941-3016

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

Industrial and Systems Engineering Annual Enrollment and Graduation Data

The Industrial and Systems Engineering BE Program has been accredited by the engineering accreditation commission of ABET, http://www.abet.org (http://www.abet.org/).

Term Enrollment	
Fall 2012	35
Fall 2013	40
Fall 2014	38
Fall 2015	46
Fall 2016	54
Fall 2017	78
Fall 2018	78

Academic Year	Degree Awarded
2012-2013	10
2013-2014	15
2014-2015	10
2015-2016	16
2016-2017	14
2017-2018	18

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

The Industrial Engineering BE program has been accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org/

Industrial & Systems Engineering Program

COURSE	TITLE	S.H.
FIRST YEAR REQUIREMENT -STUDENT SUCCESS		
YSU 1500	Success Seminar	1-2
or SS 1500	Strong Start 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
CMST 1545	Communication Foundations	3
Mathematics requirement (met through MATH in the major)		
Arts and Humanities (6 s.h.)		6
Social Science (6 s.h.)		6
Natural Science (2 courses; one with lab) (6-7 s.h.)		
This requirement is met through required science courses in the major		
Social and Personal Awareness (6 s.h.)		6
Industrial Engineering Courses		
ISEN 3710	Engineering Statistics	3
ISEN 3716	Systems Analysis and Design	3
ISEN 3720	Statistical Quality Control	3
ISEN 3723	Manufacturing Processes	3
ISEN 3724	Engineering Economy	3
ISEN 3727	Simulation of Industrial Engineering Systems	3
ISEN 3736	Methods Engineering	2
ISEN 3736L	Methods Engineering Laboratory	1
ISEN 3745	Accounting for Engineers	3
ISEN 4821	Capstone Design 1: Manufacturing and Service Systems	3
ISEN 4822	Capstone Design 2: Logistics Systems	3
ISEN 5801	Operations Research 1	3
ISEN Electives (4 courses from the list below))		12
ISEN 5820	Advanced Quality for Engineers	3
ISEN 5823	Automation	3
ISEN 5830	Human Factors Engineering	3
ISEN 5850	Operations Research 2	3
ISEN 5881	Competitive Manufacturing Management	3
Other Engineering Courses		
ENGR 1500	Engineering Orientation	1
ENGR 1550	Engineering Concepts	2
ENGR 1560	Engineering Computing	2
CEEN 2601	Statics	3
ECEN 2614	Basics of Electrical Engineering	3
MECH 2641	Dynamics	3
STEM Elective		**4**
STEM Recommended Electives:		4
MECH 1560	Engineering Communication with CAD	2
MECH 2606	Engineering Materials	3
CSIS 2610	Programming and Problem-Solving	4
ISEN 5811L	Manufacturing Practices I Laboratory	1
Mathematics Courses		
MATH 1571	Calculus 1	4
MATH 1572	Calculus 2	4
MATH 2673	Calculus 3	4
Math Elective		3
MATH 3705	Differential Equations	3
or MATH 3720	Linear Algebra and Matrix Theory	
Science Courses		

CHEM 1515	General Chemistry 1	4
PHYS 2610	General Physics 1	4
PHYS 2611	General Physics 2	4
Science Elective		3
Total Semester Hours Required		**120**
Recommended GER Electives		
PHIL 1561	Technology and Human Values	3
PHIL 2626	Engineering Ethics	3
SOC 1500	Introduction to Sociology	3
PSYC 1560	General Psychology	3
FNUT 1551	Normal Nutrition	3
COUN 1587	Introduction to Health and Wellness in Contemporary Society	3

Year 1

Fall		**S.H.**
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	**14-15**
Spring		
ENGL 1551	Writing 2	3
MATH 1572	Calculus 2	4
PHYS 2610	General Physics 1	4
ENGR 1560	Engineering Computing	2
	Semester Hours	**13**

Year 2

Fall		
ISEN 3710	Engineering Statistics	3
ISEN 3724	Engineering Economy	3
MATH 2673	Calculus 3	4
CSIS 2610	Programming and Problem-Solving (others with consent of Program Coordinator)	4
CMST 1545	Communication Foundations	3
	Semester Hours	**17**
Spring		
ISEN 3716	Systems Analysis and Design	3
ISEN 3736 & 3736L	Methods Engineering and Methods Engineering Laboratory	3
PHYS 2611	General Physics 2	4
CEEN 2601	Statics	3
GER Elective (SS)		3
	Semester Hours	**16**

Year 3

Fall		
ISEN 3723	Manufacturing Processes	3
ISEN 3727	Simulation of Industrial Engineering Systems	3
ISEN 3745	Accounting for Engineers	3
ECEN 2614	Basics of Electrical Engineering (others with consent of Program Coordinator)	3
MECH 2641	Dynamics	3
	Semester Hours	**15**
Spring		
ISEN 3720	Statistical Quality Control	3
ISEN Elective 1 (Spring)		3
ISEN Elective 2 (Spring)		3
MATH Elective		3
GER Elective (SS)		3
	Semester Hours	**15**

Year 4

Fall		
ISEN 4821	Capstone Design 1: Manufacturing and Service Systems	3
ISEN 5801	Operations Research 1	3
ISEN Elective 3 (Fall)		3
Science Elective		3
GER Elective (SPA)		3
	Semester Hours	**15**
Spring		
ISEN 4822	Capstone Design 2: Logistics Systems	3
ISEN Elective 4 (Spring)		3
GER Elective (SPA)		3
GER Elective (AH)		3
GER Electivee (AH)		3
	Semester Hours	**15**
	Total Semester Hours	**120-121**

Required STEM and Electives

COURSE	**TITLE**	**S.H.**
Rquired Stem Hours		
ENGR 1500	Engineering Orientation	1
ENGR 1550	Engineering Concepts	2
ENGR 1560	Engineering Computing	2
CSIS 2610	Programming and Problem-Solving	4
CEEN 2601	Statics	3
ECEN 2614	Basics of Electrical Engineering	3
MECH 2641	Dynamics	3
MECH 1560	Engineering Communication with CAD	2
MECH 2606	Engineering Materials	3
Recommended GER Electives		
SOC 1500	Introduction to Sociology (SS)	3
PSYC 1560	General Psychology (SS)	3
PHIL 1561	Technology and Human Values (AH)	3
PHIL 2626	Engineering Ethics (AH)	3
FNUT 1551	Normal Nutrition (SPA)	3
COUN 1587	Introduction to Health and Wellness in Contemporary Society (SPA)	3
Math & Natural Science Electives		
MATH 3720 or MATH 3705	Linear Algebra and Matrix Theory Differential Equations	3
Natural Science (various)		3

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