



Department of
Industrial and Manufacturing Systems Engineering

2016 Undergraduate Student Handbook

3038 Black Engineering
515-294-0129

<http://www.imse.iastate.edu/>

Last updated 9.29.16 (SSC)
For most current information please see an academic adviser.

Welcome!

Dear Industrial Engineering Undergraduate,

The Industrial and Manufacturing Systems Engineering (IMSE) Department welcomes you to Iowa State University and the College of Engineering. The College of Engineering has offered a degree in Industrial Engineering since 1946 and continues to provide a program that is based on the fundamentals of engineering science as well as the latest and most innovative technology available.

We are pleased to have you as a student in our department and thank you for joining the IMSE family.

Sincerely,

The Faculty and Staff of the IMSE Department

INDUSTRIAL AND MANUFACTURING SYSTEMS ENGINEERING

UNDERGRADUATE HANDBOOK

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Part 1

GENERAL INFORMATION

Our Mission

IMSE by the Numbers

A Brief History of the Department

PART 1 – GENERAL INFORMATION

Our Mission

These are the primary goals of the IMSE Department:

- to develop technically qualified industrial engineers equipped with the necessary analytical, data-based decision making, computing, communication, teamwork and leadership skills for the design, analysis, implementation, and management of production, information, and service systems;
- to expand the field of knowledge in industrial and manufacturing systems engineering with emphases on manufacturing systems, information engineering, human factors, and applied operations research; and
- to provide continuing education and outreach activities in our professional areas.

Undergraduate Study

For the undergraduate curriculum in industrial engineering leading to the degree bachelor of science. The Industrial Engineering Program of this curriculum is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

The Industrial Engineering (IE) Program educates its future graduates to accomplish its educational objectives in their early careers. Specifically, the IE curriculum prepares its majors so that, within a few years after graduation, graduates' attainments are

1. industrial engineering decisions that result in well-reasoned, value-added solutions,
2. communications with stakeholders that are informative, persuasive, and constructive,
3. contributions to team goals through effective team interactions and leadership,
4. new skills and knowledge that advance professional practice and enable career advancement.

Details on industrial engineering program outcomes that foster the attainment of these objectives are available at appropriate sections of: www.imse.iastate.edu

The industrial engineering undergraduate curriculum provides students with fundamental knowledge in mathematics and science, engineering science, social science, and humanities as well as professional industrial engineering course work. Management electives provide students with an opportunity to become familiar with modern business practices that they will encounter in their career. A senior capstone design course provides students with an opportunity to solve open-ended industrial problems with an industrial partner. The cooperative education program provides students with real world experience in the profession and a good perspective on career choices. Students are encouraged to participate in international experiences through exchange programs.

IMSE by the Numbers

Faculty 23 faculty members

Staff 13 staff members

Students 563 undergraduates and 199 graduate students (8.16)

Alumni More than 5,000 alumni worldwide

Facilities 16 labs

A Brief History of the Department

It begins...

The Twenties

1919 ... An IE option is introduced for mechanical engineers at what was then Iowa State College. The program is directed by J.O. Keller, who in 1911 received the first IE degree awarded from Penn State.

1926 ... The general engineering curriculum is initiated.

1929 ... The Department of General Engineering (GE) is established, with Frank Paine as head. The curriculum has only two GE courses – both personnel-related – with the rest made up of electrical, mechanical, and civil engineering courses.

The Forties

1942 ... Joseph Walkup becomes department head.

1946 ... An IE option is offered in the GE department.

1948 ... The department starts a student AIIE organization.

The foundation...

The Fifties and Sixties

1953 ... A local Gamma Epsilon Sigma honorary society is established.

1956 ... The department's name is changed from general engineering to industrial engineering. By 1957 the department has 197 undergraduates and three lab "rooms" in Marston Hall. The first students with a B.S. in industrial engineering graduate.

1961 ... The engineering operations curriculum begins.

The Seventies

1973 ... Wilber Meier becomes department chair.

1974 ... Keith McRoberts becomes department chair. Alpha Pi Mu, the national IE honor society, is started in the department.

From the Fifties to the Seventies, the curriculum was made up of courses split about equally between engineering and management. The department was nationally recognized for the quality of its curriculum, faculty, and students. By 1987 the student body numbered approximately 551.

Impetus for change...

The Late Eighties to Mid-Nineties

1988 ... At a retreat, engineering DEOs vote to combine the IE and ME departments. The general feeling is that much of the IE curriculum duplicates that of the recently accredited business college, a theme that leads to many subsequent discussions and decisions regarding the department's future.

1989 ... The ISU Long Range Planning Committee Report recommends that the IE department be eliminated, a finding supported by a study initiated by the Board of Regents. The department refocuses on manufacturing and operations research to establish a unique identity. Dean David Kao defends the department before the Board of Regents, indicating that its new focus will alleviate concerns of duplication.

1989 ... Way Kuo is named department chair.

1989 ... The department moves into the Engineering Annex, where it has six laboratory rooms.

- 1989 ... The Board of Regents approves a name change to the Department of Industrial and Manufacturing Systems Engineering (IMSE), with the understanding of a commitment to changing the departmental focus away from management to engineering. However, the degree granted remains a B.S. in industrial engineering.
- 1991 ... Changes proposed by the Board of Regents are implemented: the department replaces 40% of existing curriculum, eliminating courses in management, human resources, and project management.
- 1991 ... The engineering operations curriculum is transferred to the College of Engineering.
- 1992 ... A new Ph.D. program in industrial engineering replaces the engineering valuation Ph.D. The M.S. in operations research is approved.
- 1993 ... Geraldine Montag is appointed interim chair.
- 1995 ... An interdisciplinary M.S. in systems engineering begins, managed by the IMSE department.
- 1996 ... Pius Egbelu is appointed department chair.
- 1997 ... IMSE has 167 undergraduates. The Executive In Residence program begins in IMSE.

Management emphasis returns...

Entering the 21st century

- 1999 ... With the addition of three electives and an option to take two additional courses, the department moves to make engineering management a significant part of the IE curriculum. This is a result of input from our Industrial Advisory Council and companies hiring our students, as well as the students themselves. In addition, as a result of their coursework, many students now minor in management. Based on our students' hiring patterns, more manufacturing classes are also added to the curriculum. The department moves into Black Engineering Building, where we have 16 laboratory facilities.
- 2000 ... Patrick Patterson becomes interim chair. An IMSE study committee meets to determine the department's strategic focus and to set long-term goals. The foci will be on manufacturing (already a strength), engineering management, enterprise computing, and information engineering. The IMSE and EE departments partner with the University of Iowa College of Business to offer an Executive M.B.A. Program. The program's home is in the IMSE department.
- 2001 ... Patrick Patterson is appointed department chair.
- 2002 ... "Information Technology throughout the Curriculum" initiative is instituted. We have approximately 265 students in the undergraduate program, 40 M.S. students, 25 Ph.D.s, and about 120 students in our M.S. in Systems Engineering Program. We are also coordinating and providing instruction for an Executive M.B.A. Program, in which participants receive a master's in systems engineering from ISU and an M.B.A. from The University of Iowa.
- 2003 ... The Joseph K. Walkup Prominence in Industrial Engineering Award and the Walkup Distinguished Lecturers Series are initiated.
- 2004 ... A BSIE/MBA degree program is established.
- 2006 ... Dr. Sarah Ryan is appointed interim department chair.
- 2007 ... Dr. Gary Mirka is appointed department chair.
- 2009 ... Engineering Sales minor is established.

2011 ... Dr. Max Morris is appointed interim department chair.
2011 ... Dr. Janis Terpenney is appointed department chair.
2013 ... MENG Engineering Management degree program is established.
2015 ... Dr. Frank Peters is appointed interim department chair.
2016 ... Dr. Gül Kremer is appointed department chair.

Part 2

REQUIRED COURSES

Basic Program Requirements

Course Requirements: 2011-2012 Catalog
(Expires end of summer 2017)

Course Requirements: 2012-2013 Catalog
(Expires end of summer 2018)

Course Requirements: 2013-2014 Catalog
(Expires end of summer 2019)

Course Requirements: 2014-2015 Catalog
(Expires end of summer 2020)

Course Requirements: 2015-2016 Catalog
(Expires end of summer 2021)

Course Requirements: 2016-2017 Catalog
(Expires end of summer 2022)

IMSE Required Course Offerings by Semester

PART 2 – REQUIRED COURSES

Basic Program Requirements

The Basic Program Rule states that until students complete the Basic Program (BP), they can take 200 level or higher engineering courses for only one semester (transfer students are allowed two semesters).

Nine courses comprise what is known as the Basic Program; the courses are listed below. Students must earn at least a 2.00 (C) average in the BP in order to progress to upper-division Industrial Engineering courses.

In general, students may not take any IE courses until the BP is complete. There is one exception: Students who have only one BP course remaining may take this course concurrently with IE 248 or IE 271, if they meet the prerequisites for these courses. These students must also have an Iowa State cumulative GPA of 2.00 or higher in order for the Basic Program to be considered complete.

Computing Your Basic Program GPA

Calculate your GPA in the BP after each semester so you can track your progress. Use the following method:

The Basic Program		Grade Values (quality points/credit)		
CHEM 167	4 credits	A	=	4.00
ENGL 150	3 credits	A-	=	3.67
ENGL 250	3 credits	B+	=	3.33
LIB 160	1 credit	B	=	3.00
ENGR 101	R credit	B-	=	2.67
I E 148	3 credits	C+	=	2.33
MATH 165	4 credits	C	=	2.00
MATH 166	4 credits	C-	=	1.67
PHYS 221	5 credits	D+	=	1.33
		D	=	1.00
		D-	=	0.67
		F	=	0.00

1. Multiply the number of credits given for the course by the numerical value of the grade you earned.

For example, assume you earned an A in CHEM 167. CHEM 167 is taken for 4 credits at Iowa State, and an A is worth 4.00 quality points (QP)/credit. So you would receive 4 credits x 4 QP/credit = 16 quality points for CHEM 167.

2. Sum your quality points.

3. Sum your credits (attempted or earned).
4. Divide the total number of quality points by the total number of credits attempted or earned. The result from step 4 is your Basic Program Grade Point Average.
Note: Lib 160 credit affects your GPA only if you fail it!

Example

Course	Credits	Grade	Quality Points
CHEM 167	4.0	A	16.00
ENGL 150	3.0	C+	6.99
ENGL 250	3.0	C	6.00
I E 148	3.0	A-	11.01
LIB 160	1	S	
MATH 165	5.0 (transferred in)	B-	13.35
MATH 166	5.0 (transferred in)	B	15.00
PHYS 221	5.0	C	10.00
Totals	28.0		78.35

$$\text{Basic Program GPA} = 78.35 \text{ QP}/28.0 \text{ cr.} = 2.80$$

Completing the Basic Program

Be aware of the following policies in the College of Engineering:

- If you have taken all the BP courses but your GPA in the Basic Program is less than 2.00, your BP is not complete.
- If you have taken all the BP courses but your cumulative GPA at Iowa State is less than 2.00, your BP is not complete.

Grades earned in courses transferred to Iowa State University will not be used in calculating a transfer student's Iowa State cumulative grade point average or Basic Program GPA (effective for 2016 catalog and later; students in earlier catalogs will still use transfer course grades towards their Basic Program GPA).

COURSE REQUIREMENTS: 2011-2012 CATALOG

To graduate under the 2011-2012 catalog, you are required to successfully complete 121.5 credits. The credits are distributed among seven areas. In the list below, please note that alternative courses are suggested in parentheses:

	<u>Credits</u>	<u>Area Total</u>
1. Communications		
1. Sp Cm 212	3	
2. Engl 314	3	6.0
2. Social Sciences and Humanities*		
1. U.S. Diversity elective	3	
2. International Perspective Elective	3	
3. An additional 6 credits from approved departmental SSH List	6	12.0
* At least 6 credits must be taken within the same department.		
* At least 6 credits must be 200-level or higher.		
3. Basic Program		
1. Chem 167	4	
2. Engl 150	3	
3. Engl 250	3	
4. Engr 101	R	
5. IE 148	3	
6. Lib 160	0.5	
7. Math 165	4	
8. Math 166	4	
9. Phys 221	5	26.5
4. Math and Physical Science		
1. Math 265	4	
2. Phys 222	5	
3. Math 267	4	
4. Stat 231	4	17.0
5. Industrial Engineering Core		
1. I E 248	3	
2. I E 271	3	
3. I E 305	3	
4. I E 312	3	
5. I E 341	3	
6. I E 348	3	
7. I E 361	3	
8. I E 413	4	
9. I E 441	3	
10. I E 448	3	31.0

		<u>Credits</u>	<u>Area Total</u>
6.	Other Remaining Courses		
	1. Mat E 273	3	
	2. E M 274	3	
	3. M E 231	3	
	4. E E 442	2	
	5. Focus electives (choose from list)	6	
	6. Management electives (choose from list)	6	
	7. Engineering Topic elective (choose from list)	6	29
7.	Required Seminar		
	1. I E 101	R	R
	TOTAL CREDITS		<u>121.5</u>

Bachelor of Science in Industrial Engineering

2011-2012 Catalog

Total Credits Required =121.5

1. Communications (6 cr.)

- _____ Sp Cm 212 Fundamentals of Public Speaking (3)
- _____ Engl 314 Technical Communication (3)

2. Social Science & Humanities (12 cr.)*

- _____ U.S. Diversity (3)
- _____ International Perspectives (3)
- _____ (3)
- _____ (3)

Note: Six credits in the SSH area must be 200-level or above, and six credits must form a sequence of prerequisite or related courses.

**See the list of courses approved by the IMSE Department.*

3. Basic Program (26.5 cr.)

- _____ Chem 167 General Chemistry for Engineering Students (4)
or Chem 177 General Chemistry and Chemistry Lab (4)
- _____ Engl 150 Critical Thinking and Communication (3)
- _____ Engl 250 Written, Oral, Visual, & Electronic Composition (3)
- _____ Engr 101 Engineering Orientation (R)
- _____ IE 148 Information Engineering (3)
- _____ Lib 160 Introduction to Library (0.5)
- _____ Math 165 Calculus I (4)
- _____ Math 166 Calculus II (4)
- _____ Phys 221 Introduction to Classical Physics I (5)

4. Math and Physical Science (17 cr.)

- _____ Math 265 Calculus III (4)
- _____ Phys 222 Introduction to Classical Physics II (5)
- _____ Math 267 Elementary Differential Equations & Laplace Transforms (4)
- _____ Stat 231 Probability & Statistical Inference for Engrs (4)

5. Industrial Engineering Core (31 cr.)

- _____ I E 248 Engineering System Design, Manufacturing Processes & Specifications (3)
- _____ I E 271 Applied Ergonomics & Work Design (3)
- _____ I E 305 Engineering Economic Analysis (3)
- _____ I E 312 Optimization (3)
- _____ I E 341 Production Systems (3)
- _____ I E 348 Solidification Processes (3)
- _____ I E 361 Statistical Quality Assurance (3)
- _____ I E 413 Stochastic Modeling, Analysis & Simulation (4)
- _____ I E 441 Industrial Engineering Design (3)
- _____ I E 448 Manufacturing Systems Engineering (3)

6. Other Remaining Courses (29)

- _____ Mat E 273 Principles of Materials Science & Engineering (3)
- _____ EM 274 Statics of Engineering (3)
- _____ M E 231 Engineering Thermodynamics I (3)
- _____ E E 442 Introduction to Circuits & Instruments (2)
- _____ Engineering Topic Elective (6)
- _____ Focus Elective (6)
- _____ Management Elective (6)

7. Required Seminar

- _____ I E 101 Industrial Engineering Profession (R)

Last updated 7-1-2011 (DPS)

Industrial Engineering 2011-2012 Catalog: Suggested Course Sequence

Degrees	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
B.S. in IE 121.5 credits	Math 165 Calc I 4 cr Placement	Math 166 Calc II 4 cr C- or better in Math 165	Math 265 Calc III 4 cr C- or better in Math 166	Math 267 Diff Eq/Lap 4 cr C- or better in Math 166	I E 305 Eng Econ 3 cr Math 166	I E 348 Solidif Proc 3 cr IE 248	I E 413 Stoch Model 4 cr Math 267 Stat 231	I E 441 Design Proj 3 cr 248, 271, 361 Credit or Enrollment in 341, 413 and 448
	SSH Elective 3 cr	Phys 221 Class Phys I 5 cr Credit/enrollment in Math 166	I E 248 Intro Mfg Pr 3 cr Credit or enrollment in 101 & Mat E 273	Stat 231 Prob & Stat 4 cr Credit/enrollment in Math 265	I E 341 Prod Syst 3 cr Stat 231 Credit/enrollment in IE 312	I E 361 Qual Control 3 cr Stat 231	Engl 314 Tech Comm 3 cr	I E 448 Manuf Sys E 3 cr IE 248 & 305
	Chem 167 Engr Chem 4 cr Math 140 or placement	SSH Elective 3 cr	Mat E 273 Principles of Materials Science 3 cr Sophomore Chem 167 or 177, Math 165	I E 271 Appl Ergo 3 cr Physics 221	I E 312 Optimization 3 cr Math 267	Engr Topic Elective 3 cr	M E 231 Engineering Thermodynamics I 3 cr Math 265, Chem 167, Phys 222	Focus Elective 3 cr
	IE 148 Infor Eng 3 cr Credit/enrollmen t in Math 142	Engl 150 Comp I 3 cr C or Better	Phys 222 Class Phys II 5 cr Phys 221 Math 166	E M 274 Statics 3 cr Credit/enrollment in Math 166 & Phys 221	E E 442 Intro Circuits 2 cr Math 267 Physic 222	SSH Elective 3 cr	Focus Elective 3 cr	Mgmt Elective 3 cr
	Engr 101 Orientation R cr	Lib 160 Library .5 cr	Engl 250 Comp II 3 cr C or better		Sp Cm 212 Prof Comm 3 cr	Mgmt Elective 3 cr	SSH Elective 3 cr	Engr Topic Elective 3 cr
		I E 101 I E Orient R cr						
121.5 Total Credits	14 cr	15.5 cr	18 cr	14 cr	14 cr	15 cr	16 cr	15 cr

Applicable prerequisites and co-requisites are listed under each course.

Note: Please verify all prerequisites and semester offerings with current course catalog.

Elective List can be found on the IMSE website at <http://www.imse.iastate.edu/undergraduate-program/advising/>

COURSE REQUIREMENTS: 2012-2013 CATALOG

To graduate under the 2012-2013 catalog, you are required to successfully complete 122 credits. The credits are distributed among seven areas. In the list below, please note that alternative courses are suggested in parentheses:

	<u>Credits</u>	<u>Area Total</u>
1. Communications		
1. Sp Cm 212	3	
2. Engl 314	3	6.0
2. Social Sciences and Humanities*		
1. U.S. Diversity elective	3	
2. International Perspective Elective	3	
3. An additional 6 credits from approved departmental SSH List	6	12.0
* At least 6 credits must be taken within the same department.		
* At least 6 credits must be 200-level or higher.		
3. Basic Program		
1. Chem 167	4	
2. Engl 150	3	
3. Engl 250	3	
4. Engr 101	R	
5. IE 148	3	
6. Lib 160	1	
7. Math 165	4	
8. Math 166	4	
9. Phys 221	5	27
4. Math and Physical Science		
1. Math 265	4	
2. Phys 222	5	
3. Math 267	4	
4. Stat 231	4	17.0
5. Industrial Engineering Core		
1. I E 248	3	
2. I E 271	3	
3. I E 305	3	
4. I E 312	3	
5. I E 341	3	
6. I E 348	3	
7. I E 361	3	
8. I E 413	4	
9. I E 441	3	
10. I E 448	3	31.0

		<u>Credits</u>	<u>Area Total</u>
6.	Other Remaining Courses		
	1. Mat E 273	3	
	2. E M 274	3	
	3. M E 231	3	
	4. E E 442	2	
	5. Focus electives (choose from list)	6	
	6. Management electives (choose from list)	6	
	7. Engineering Topic elective (choose from list)	6	29
7.	Required Seminar		
	1. I E 101	R	R
	TOTAL CREDITS		<hr/> 122

Bachelor of Science in Industrial Engineering 2012-2013 Catalog

Total Credits Required =122

1. Communications (6 cr.)

- _____ Sp Cm 212 Fundamentals of Public Speaking (3)
- _____ Engl 314 Technical Communication (3)

2. Social Science & Humanities (12 cr.)*

- _____ U.S. Diversity (3)
- _____ International Perspectives (3)
- _____ (3)
- _____ (3)

Note: Six credits in the SSH area must be 200-level or above, and

six credits must form a sequence of prerequisite or related courses.

**See the list of courses approved by the IMSE Department.*

3. Basic Program (27 cr.)

- _____ Chem 167 General Chemistry for Engineering Students (4)
or Chem 177 General Chemistry and Chemistry Lab (4)
- _____ Engl 150 Critical Thinking and Communication (3)
- _____ Engl 250 Written, Oral, Visual, & Electronic Composition (3)
- _____ Engr 101 Engineering Orientation (R)
- _____ I E 148 Information Engineering (3)
- _____ Lib 160 Introduction to Library (1)
- _____ Math 165 Calculus I (4)
- _____ Math 166 Calculus II (4)
- _____ Phys 221 Introduction to Classical Physics I (5)

4. Math and Physical Science (17 cr.)

- _____ Math 265 Calculus III (4)
- _____ Phys 222 Introduction to Classical Physics II (5)
- _____ Math 267 Elementary Differential Equations & Laplace Transforms (4)
- _____ Stat 231 Probability & Statistical Inference for Engrs (4)

5. Industrial Engineering Core (31 cr.)

- _____ I E 248 Engineering System Design, Manufacturing Processes & Specifications (3)
- _____ I E 271 Applied Ergonomics & Work Design (3)
- _____ I E 305 Engineering Economic Analysis (3)
- _____ I E 312 Optimization (3)
- _____ I E 341 Production Systems (3)
- _____ I E 348 Solidification Processes (3)
- _____ I E 361 Statistical Quality Assurance (3)
- _____ I E 413 Stochastic Modeling, Analysis & Simulation (4)
- _____ I E 441 Industrial Engineering Design (3)
- _____ I E 448 Manufacturing Systems Engineering (3)

6. Other Remaining Courses (29 cr.)

- _____ Mat E 273 Principles of Materials Science & Engineering (3)
- _____ E M 274 Statics of Engineering (3)
- _____ M E 231 Engineering Thermodynamics I (3)
- _____ E E 442 Introduction to Circuits & Instruments (2)
- _____ Engineering Topic Elective (6)
- _____ Focus Elective (6)
- _____ Management Elective (6)

7. Required Seminar

- _____ I E 101 Industrial Engineering Profession (R)

Last updated 4-24-2012 (KMS)

Industrial Engineering

2012-2013 Catalog: Suggested Course Sequence

Degrees	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
B.S. in IE 122 credits	Math 165 Calc I 4 cr Placement	Math 166 Calc II 4 cr C- or better in Math 165	Math 265 Calc III 4 cr C- or better in Math 166	Math 267 Diff Eq/Lap 4 cr C- or better in Math 166	I E 305 Eng Econ 3 cr Math 166	I E 348 Solidif Proc 3 cr IE 248 <i>Spring Only</i>	I E 413 Stoch Model 4 cr Math 267 Stat 231 <i>Fall Only</i>	I E 441 Design Proj 3 cr 248, 271, 361 Credit or Enrollment in 341, 413 and 448
	SSH Elective 3 cr	Phys 221 Class Phys I 5 cr Credit/enrollment in Math 166	I E 248 Intro Mfg Pr 3 cr Credit or enrollment in 101 and Mat E 273 <i>Fall Only</i>	Stat 231 Prob & Stat 4 cr Credit/enrollment in Math 265	I E 341 Prod Syst 3 cr Stat 231 Credit/enrollment in IE 312 <i>Fall Only</i>	I E 361 Qual Control 3 cr Stat 231	Engl 314 Tech Comm 3 cr	I E 448 Manuf Sys E 3 cr IE 248 & 305 <i>Spring Only</i>
	Chem 167 Engr Chem 4 cr Math 140 or placement	SSH Elective 3 cr	Mat E 273 Principles of Materials Science 3 cr Sophomore Chem 167 or 177, Math 165	I E 271 Appl Ergo 3 cr Physics 221 <i>Spring Only</i>	I E 312 Optimization 3 cr Math 267 <i>Fall Only</i>	Engr Topic Elective 3 cr	M E 231 Engineering Thermodynamics I 3 cr Math 265, Chem 167, Phys 222	Focus Elective 3 cr
	IE 148 Infor Eng 3 cr Credit/enrollment in Math 142	Engl 150 Comp I 3 cr C or Better	Phys 222 Class Phys II 5 cr Phys 221 Math 166	E M 274 Statics 3 cr Credit/enrollment in Math 166 & Phys 221	E E 442 Intro Circuits 2 cr Math 267 Physic 222	SSH Elective 3 cr	Focus Elective 3 cr	Mgmt Elective 3 cr
	Engr 101 Orientation R cr	Lib 160 Library 1 cr	Engl 250 Comp II 3 cr C or better		Sp Cm 212 Prof Comm 3 cr	Mgmt Elective 3 cr	SSH Elective 3 cr	Engr Topic Elective 3 cr
		I E 101 I E Orient R cr						
122 Total Credits	14 cr	16 cr	18 cr	14 cr	14 cr	15 cr	16 cr	15 cr

Applicable prerequisites and co-requisites are listed under each course.

Note: Please verify all prerequisites and semester offerings with current course catalog.

Elective List can be found on the IMSE website at <http://www.imse.iastate.edu/undergraduate-program/advising/>

COURSE REQUIREMENTS: 2013-2014 CATALOG

To graduate under the 2013-2014 catalog, you are required to successfully complete 122 credits. The credits are distributed among seven areas. In the list below, please note that alternative courses are suggested in parentheses:

	<u>Credits</u>	<u>Area Total</u>
1. Communications		
1. Sp Cm 212	3	
2. Engl 314	3	6.0
2. Social Sciences and Humanities*		
1. U.S. Diversity elective	3	
2. International Perspective Elective	3	
3. An additional 6 credits from approved departmental SSH List	6	12.0
* At least 6 credits must be taken within the same department.		
* At least 6 credits must be 200-level or higher.		
3. Basic Program		
1. Chem 167	4	
2. Engl 150	3	
3. Engl 250	3	
4. Engr 101	R	
5. IE 148	3	
6. Lib 160	1	
7. Math 165	4	
8. Math 166	4	
9. Phys 221	5	27
4. Math and Physical Science		
1. Math 265	4	
2. Phys 222	5	
3. Math 267	4	
4. Stat 231	4	17.0
5. Industrial Engineering Core		
1. I E 248	3	
2. I E 271	3	
3. I E 305	3	
4. I E 312	3	
5. I E 341	3	
6. I E 348	3	
7. I E 361	3	
8. I E 413	4	
9. I E 441	3	
10. I E 448	3	31.0

	<u>Credits</u>	<u>Area Total</u>
6. Other Remaining Courses		
1. Mat E 273	3	
2. E M 274	3	
3. M E 231	3	
4. E E 442	2	
5. Focus electives (choose from list)	6	
6. Management electives (choose from list)	6	
7. Engineering Topic elective (choose from list)	6	29
7. Required Seminar		
1. I E 101	R	R
	TOTAL CREDITS	<hr/> 122

Bachelor of Science in Industrial Engineering 2013 Catalog

Total Credits Required =122

1. Communications (6 cr.)

- _____ Sp Cm 212 Fundamentals of Public Speaking (3)
- _____ Engl 314 Technical Communication (3)

2. Social Science & Humanities (12 cr.)*

- _____ U.S. Diversity (3)
- _____ International Perspectives (3)
- _____ (3)
- _____ (3)

Note: Six credits in the SSH area must be 200-level or above, and six credits must form a sequence of prerequisite or related courses.

**See the list of courses approved by the IMSE Department.*

3. Basic Program (27 cr.)

- _____ Chem 167 General Chemistry for Engineering Students (4)
_____ or Chem 177 General Chemistry and Chemistry Lab (4)
- _____ Engl 150 Critical Thinking and Communication (3)
- _____ Engl 250 Written, Oral, Visual, & Electronic Composition (3)
- _____ Engr 101 Engineering Orientation (R)
- _____ I E 148 Information Engineering (3)
- _____ Lib 160 Introduction to Library (1)
- _____ Math 165 Calculus I (4)
- _____ Math 166 Calculus II (4)
- _____ Phys 221 Introduction to Classical Physics I (5)

4. Math and Physical Science (17 cr.)

- _____ Math 265 Calculus III (4)
- _____ Phys 222 Introduction to Classical Physics II (5)
- _____ Math 267 Elementary Differential Equations &

Laplace

Transforms (4)

- _____ Stat 231 Probability & Statistical Inference for Engrs (4)

5. Industrial Engineering Core (31 cr.)

- _____ I E 248 Engineering System Design, Manufacturing Processes & Specifications (3)
- _____ I E 271 Applied Ergonomics & Work Design (3)
- _____ I E 305 Engineering Economic Analysis (3)
- _____ I E 312 Optimization (3)
- _____ I E 341 Production Systems (3)
- _____ I E 348 Solidification Processes (3)
- _____ I E 361 Statistical Quality Assurance (3)
- _____ I E 413 Stochastic Modeling, Analysis & Simulation (4)
- _____ I E 441 Industrial Engineering Design (3)
- _____ I E 448 Manufacturing Systems Engineering (3)

6. Other Remaining Courses (29 cr.)

- _____ Mat E 273 Principles of Materials Sci & Engineering (3)
- _____ E M 274 Statics of Engineering (3)
- _____ M E 231 Thermodynamics (3)
- _____ E E 442 Introduction to Circuits and Instruments (2)
- _____ Engineering Topic Elective (6)
- _____ Focus Elective (6)
- _____ Management Elective(6)

7. Required Seminar

- _____ I E 101 Industrial Engineering Profession (R)

Last updated 5-29-2013 (KMS)

Industrial Engineering

2013-2014 Catalog: Suggested Course Sequence

Degrees	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
B.S. in IE 122 credits	Math 165 Calc I 4 cr Placement Exam	Math 166 Calc II 4 cr C- or better in Math 165	Math 265 Calc III 4 cr C- or better in Math 166	Math 267 Diff Eq/Lap 4 cr C- or better in Math 166	I E 305 Engr Econ Analysis 3 cr Math 166	I E 348 Solidif Processes 3 cr IE 248 Mat E 273 <i>Spring Only</i>	I E 413 Stoch Modeling 4 cr Math 267 Stat 231 <i>Fall Only</i>	I E 441 IE Design 3 cr IE 248, IE 271, IE 361 Credit/Enrollment in IE 341, IE 413 & IE 448
	SSH Elective 3 cr	Phys 221 Classical Phys I 5 cr Credit/enrollment in Math 166	I E 248 Intro Mfg Processes 3 cr Math 166, Phys 221; Credit/ enrollment in IE 101 & Mat E 273 <i>Fall Only</i>	Stat 231 Prob & Stat 4 cr Credit/enrollment in Math 265	I E 341 Production Systems 3 cr Stat 231 Credit/enrollment in IE 312 <i>Fall Only</i>	I E 361 Quality Assurance 3 cr Stat 231	Engl 314 Tech Comm 3 cr	I E 448 Manuf Sys Engr 3 cr IE 248 IE 305 <i>Spring Only</i>
	Chem 167 Engr Chem 4 cr Math 140	SSH Elective 3 cr	Mat E 273 Principles of Materials Science 3 cr Sophomore classification Chem 167 or 177, Math 165	I E 271 Appl Ergonomics 3 cr Physics 221 <i>Spring Only</i>	I E 312 Optimization 3 cr Credit/enrollment in Math 267 <i>Fall Only</i>	Engr Topic Elective 3 cr	M E 231 Engineering Thermodynamics I 3 cr Math 265, Chem 167, Phys 222	Focus Elective 3 cr
	IE 148 Information Engr 3 cr Credit/enrollment in Math 142	Engl 150 Comp I 3 cr	Phys 222 Classical Phys II 5 cr Phys 221 Math 166	E M 274 Statics 3 cr Credit/enrollment in Math 166 & Phys 221	E E 442 Intro Circuits 2 cr Math 267 Physic 222	SSH Elective 3 cr	Focus Elective 3 cr	Mgmt Elective 3 cr
	Engr 101 Orientation R cr	Lib 160 Library 1 cr	Engl 250 Comp II 3 cr C or better in Engl 150 or placement		Sp Cm 212 Prof Comm 3 cr	Mgmt Elective 3 cr	SSH Elective 3 cr	Engr Topic Elective 3 cr
		I E 101 I E Orient R cr						
122 Total Credits	14 cr	16 cr	18 cr	14 cr	14 cr	15 cr	16 cr	15 cr

COURSE REQUIREMENTS: 2014-2015 CATALOG

To graduate under the 2012 catalog, you are required to successfully complete 122 credits. The credits are distributed among seven areas. In the list below, please note that alternative courses are suggested in parentheses:

	<u>Credits</u>	<u>Area Total</u>
1. Communications		
1. Sp Cm 212	3	
2. Engl 314	3	6.0
2. Social Sciences and Humanities*		
1. U.S. Diversity elective	3	
2. International Perspective Elective	3	
3. An additional 6 credits from approved departmental SSH List	6	12.0
* At least 6 credits must be taken within the same department.		
* At least 6 credits must be 200-level or higher.		
3. Basic Program		
1. Chem 167	4	
2. Engl 150	3	
3. Engl 250	3	
4. Engr 101	R	
5. IE 148	3	
6. Lib 160	1	
7. Math 165	4	
8. Math 166	4	
9. Phys 221	5	27
4. Math and Physical Science		
1. Math 265	4	
2. Phys 222	5	
3. Math 267	4	
4. Stat 231	4	17.0
5. Industrial Engineering Core		
1. I E 222	3	
2. I E 248	3	
3. I E 271	3	
4. I E 305	3	
5. I E 312	3	
6. I E 341	3	
7. I E 348	3	
8. I E 361	3	
9. I E 413	4	
10. I E 441	3	
11. I E 448	3	34.0

	<u>Credits</u>	<u>Area Total</u>	
6.	Other Remaining Courses		
	1. Mat E 273	3	
	2. E M 274	3	
	3. M E 231	3	
	4. E E 442	2	
	5. Focus electives (choose from list)	6	
	6. Management electives (choose from list)	3	
	7. Engineering Topic elective (choose from list)	6	26
7.	Required Seminar		
	1. I E 101	R	R
	TOTAL CREDITS		<hr/> 122

Bachelor of Science in Industrial Engineering 2014 Catalog

Total Credits Required =122

1. Communications (6 cr.)

- _____ Sp Cm 212 Fundamentals of Public Speaking (3)
- _____ Engr 314 Technical Communication (3)

2. Social Science & Humanities (12 cr.)*

- _____ U.S. Diversity (3)
- _____ International Perspectives (3)
- _____ (3)
- _____ (3)

Note: Six credits in the SSH area must be 200-level or above, and six credits must form a sequence of prerequisite or related courses.

**See the list of courses approved by the IMSE Department.*

3. Basic Program (27 cr.)

- _____ Chem 167 General Chemistry for Engineering Students (4)
or Chem 177 General Chemistry and Chemistry Lab (4)
- _____ Engr 150 Critical Thinking and Communication (3)
- _____ Engr 250 Written, Oral, Visual, & Electronic Composition (3)
- _____ Engr 101 Engineering Orientation (R)
- _____ I E 148 Information Engineering (3)
- _____ Lib 160 Introduction to Library (1)
- _____ Math 165 Calculus I (4)
- _____ Math 166 Calculus II (4)
- _____ Phys 221 Introduction to Classical Physics I (5)

4. Math and Physical Science (17 cr.)

- _____ Math 265 Calculus III (4)
- _____ Phys 222 Introduction to Classical Physics II (5)
- _____ Math 267 Elementary Differential Equations & Laplace Transforms (4)
- _____ Stat 231 Probability & Statistical Inference for Engrs (4)

5. Industrial Engineering Core (34 cr.)

- _____ I E 222 Design & Analysis Methods for System Improvements (3)
- _____ I E 248 Engineering System Design, Manufacturing Processes & Specifications (3)
- _____ I E 271 Applied Ergonomics & Work Design (3)
- _____ I E 305 Engineering Economic Analysis (3)
- _____ I E 312 Optimization (3)
- _____ I E 341 Production Systems (3)
- _____ I E 348 Solidification Processes (3)
- _____ I E 361 Statistical Quality Assurance (3)
- _____ I E 413 Stochastic Modeling, Analysis & Simulation (4)
- _____ I E 441 Industrial Engineering Design (3)
- _____ I E 448 Manufacturing Systems Engineering (3)

6. Other Remaining Courses (26 cr.)

- _____ Mat E 273 Principles of Materials Sci & Engineering (3)
- _____ E M 274 Statics of Engineering (3)
- _____ M E 231 Thermodynamics (3)
- _____ E E 442 Introduction to Circuits and Instruments (2)
- _____ Engineering Topic Elective (6)
- _____ Focus Elective (6)
- _____ Management Elective (3)

7. Required Seminar

- _____ I E 101 Industrial Engineering Profession (R)

Last updated 4/22/2014 (KJW)

Industrial Engineering

2014-2015 Catalog: Suggested Course Sequence

Degrees	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
B.S. in IE 122 credits	MATH 165 Calc I 4 cr Placement Exam	MATH 166 Calc II 4 cr C- or better in MATH 165	MATH 265 Calc III 4 cr C- or better in MATH 166 or MATH 166H	MATH 267 Diff Eq/Lap 4 cr C- or better in MATH 166 or MATH 166H	I E 305 Engr Econ Analysis 3 cr MATH 166	I E 348 Solidif Processes 3 cr IE 248 MAT E 273 <i>Spring Only</i>	I E 413 Stoch Modeling 4 cr Math 267 Stat 231 <i>Fall Only</i>	I E 441 IE Design 3 cr IE 248, IE 271, IE 361, Credit/Enrollment in IE 341, IE 413, IE 448
	Social Sciences and Humanities Elective 3 cr	PHYS 221 Classical Phys I 5 cr Credit/enrollment in MATH 166	I E 248 Intro Mfg Processes 3 cr MATH 166, PHYS 221, Credit/enrollment in IE 101, MAT E 273 <i>Fall Only</i>	STAT 231 Prob & Stat 4 cr Credit/enrollment in MATH 265	I E 341 Production Systems 3 r STAT 231, Credit/enrollment in IE 312 <i>Fall Only</i>	I E 361 Quality Assurance 3 cr STAT 231	ENGL 314 Tech Comm 3 cr Junior Classification ENGL 250	I E 448 Manuf Sys Engr 3 cr IE 248 IE 305 <i>Spring Only</i>
	CHEM 167 Engr Chem 4 cr MATH 140 CHEM 50 or HS Equivalent	Social Sciences and Humanities Elective 3 cr	MAT E 273 Principles of Materials Science 3 cr Soph classification, CHEM 167 or 177, MATH 165	I E 271 Appl Ergonomics 3 cr PHYS 221 <i>Spring Only</i>	I E 312 Optimization 3 cr Credit/enrollment in MATH 267 <i>Fall Only</i>	Engineering Topic Elective 3 cr	M E 231 Engineering Thermodynamics I 3 cr MATH 265, CHEM 167, PHYS 222	Focus Elective 3 cr
	IE 148 Information Engr 3 cr Credit/enrollment in MATH 142	ENGL 150 Comp I 3 cr Credit/enrollment in LIB 160	PHYS 222 Classical Phys II 5 cr PHYS 221 MATH 166	I E 222 Design & Analysis Sys Improvements 3 cr IE 248, Credit/ enrollment in IE 271 <i>Spring Only</i>	E M 274 Statics 3 cr Credit/enrollment in MATH 166 PHYS 221	Social Sciences and Humanities Elective 3 cr	Focus Elective 3 cr	Management Elective 3 cr
	ENGR 101 Orientation R cr	LIB 160 Library 1 cr	ENGL 250 or ENGL 250H Comp II 3 cr C or better in ENGL 150 or placement, Credit/enrollment in LIB 160		SP CM 212 Fund of Public Speaking 3 cr	E E 442 Intro to Circuits 2 cr MATH 267 PHYS 222	Social Sciences and Humanities Elective 3 cr	Engineering Topic Elective 3 cr
		I E 101 IE Orient R cr						
122 Total Credits	14 cr	16 cr	18 cr	14 cr	15 cr	14 cr	16 cr	15 cr

Applicable prerequisites and co-requisites are listed under each course.

Note: Please verify all prerequisites and semester offerings with current course catalog

Elective List can be found on the IMSE website at <http://www.imse.iastate.edu/undergraduate-program/advising/>

Course Descriptions can be found at: <http://catalog.iastate.edu/azcourses/>

Light blue shading indicates Basic Program classes for all Engineering Majors; Dark blue indicates the IE core, course descriptions on the back of this page

9/29/2016 KJW

COURSE REQUIREMENTS: 2015-2016 CATALOG

To graduate under the 2015 catalog, you are required to successfully complete 122 credits. The credits are distributed among seven areas. In the list below, please note that alternative courses are suggested in parentheses:

	<u>Credits</u>	<u>Area Total</u>
1. Communications		
1. SP CM 212	3	
2. ENGL 314	3	6
2. Social Sciences and Humanities*		
1. U.S. Diversity elective	3	
2. International Perspective Elective	3	
3. An additional 6 credits from approved departmental SSH List	6	12
* At least 6 credits must be taken within the same department.		
* At least 6 credits must be 200-level or higher.		
3. Basic Program		
1. CHEM 167	4	
2. ENGL 150	3	
3. ENGL 250	3	
4. ENGR 101	R	
5. I E 148	3	
6. LIB 160	1	
7. MATH 165	4	
8. MATH 166	4	
9. PHYS 221	5	27
4. Math and Physical Science		
1. MATH 265	4	
2. MATH 247	4	
3. STAT 231	4	
4. PHYS 222	5	17
5. Industrial Engineering Core		
1. I E 222	3	
2. I E 248	3	
3. I E 271	3	
4. I E 305	3	
5. I E 312	3	
6. I E 341	3	
7. I E 348	3	
8. I E 361	3	
9. I E 413	4	
10. I E 441	3	
11. I E 448	3	34

		<u>Credits</u>	<u>Area Total</u>
6.	Other Remaining Courses		
	1. MAT E 273	3	
	2. E M 274	3	
	3. M E 231	3	
	4. E E 442	2	
	5. Focus Electives (choose from list)	6	
	6. Management Electives (choose from list)	3	
	7. Engineering Topic Elective (choose from list)	6	26
7.	Required Seminar		
	1. I E 101	R	R
	TOTAL CREDITS		<u>122</u>

Bachelor of Science in Industrial Engineering 2015 Catalog

Total Credits Required =122

1. Communications (6 cr.)

- _____ Sp Cm 212 Fundamentals of Public Speaking (3)
- _____ Engl 314 Technical Communication (3)

2. Social Science & Humanities (12 cr.)*

- _____ U.S. Diversity (3)
- _____ International Perspectives (3)
- _____ (3)
- _____ (3)

Note: Six credits in the SSH area must be 200-level or above, and six credits must form a sequence of prerequisite or related courses.

**See the list of courses approved by the IMSE Department.*

3. Basic Program (27 cr.)

- _____ Chem 167 General Chemistry for Engineering Students (4)
- _____ or Chem 177 General Chemistry and Chemistry Lab (4)
- _____ Engl 150 Critical Thinking and Communication (3)
- _____ Engl 250 Written, Oral, Visual, & Electronic Composition (3)
- _____ Engr 101 Engineering Orientation (R)
- _____ I E 148 Information Engineering (3)
- _____ Lib 160 Introduction to Library (1)
- _____ Math 165 Calculus I (4)
- _____ Math 166 Calculus II (4)
- _____ Phys 221 Introduction to Classical Physics I (5)

4. Math and Physical Science (17 cr.)

- _____ Math 265 Calculus III (4)
- _____ Phys 222 Introduction to Classical Physics II (5)
- _____ Math 267 Elementary Differential Equations & Laplace Transforms (4)
- _____ Stat 231 Probability & Statistical Inference for Engrs (4)

5. Industrial Engineering Core (34 cr.)

- _____ I E 222 Design & Analysis Methods for System Improvements (3)
- _____ I E 248 Engineering System Design, Manufacturing Processes & Specifications (3)
- _____ I E 271 Applied Ergonomics & Work Design (3)
- _____ I E 305 Engineering Economic Analysis (3)
- _____ I E 312 Optimization (3)
- _____ I E 341 Production Systems (3)
- _____ I E 348 Solidification Processes (3)
- _____ I E 361 Statistical Quality Assurance (3)
- _____ I E 413 Stochastic Modeling, Analysis & Simulation (4)
- _____ I E 441 Industrial Engineering Design (3)
- _____ I E 448 Manufacturing Systems Engineering (3)

6. Other Remaining Courses (26 cr.)

- _____ Mat E 273 Principles of Materials Sci & Engineering (3)
- _____ E M 274 Statics of Engineering (3)
- _____ M E 231 Thermodynamics (3)
- _____ E E 442 Introduction to Circuits and Instruments (2)
- _____ Engineering Topic Elective (6)
- _____ Focus Elective (6)
- _____ Management Elective (3)

7. Required Seminar

- _____ I E 101 Industrial Engineering Profession (R)

Last updated 8/18/16 (SSC)

Industrial Engineering

2015-2016 Catalog: Suggested Course Sequence

Degrees	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
B.S. in IE 122 credits	MATH 165 Calc I 4 cr Placement Exam	MATH 166 Calc II 4 cr C- or better in MATH 165	MATH 265 Calc III 4 cr C- or better in MATH 166 or MATH 166H	MATH 267 Diff Eq/Lap 4 cr C- or better in MATH 166 or MATH 166H	I E 305 Engr Econ Analysis 3 cr MATH 166	I E 348 Solidif Processes 3 cr IE 248 MAT E 273 <i>Spring Only</i>	I E 413 Stoch Modeling 4 cr Math 267 Stat 231 <i>Fall Only</i>	I E 441 IE Design 3 cr IE 248, IE 271, IE 361, Credit/Enrollment in IE 341, IE 413, IE 448
	Social Sciences and Humanities Elective 3 cr	PHYS 221 Classical Phys I 5 cr Credit/enrollment in MATH 166	I E 248 Intro Mfg Processes 3 cr MATH 166, PHYS 221, Credit/enrollment in IE 101, MAT E 273 <i>Fall Only</i>	STAT 231 Prob & Stat 4 cr Credit/enrollment in MATH 265	I E 341 Production Systems 3 cr STAT 231, Credit/enrollment in IE 312 <i>Fall Only</i>	I E 361 Quality Assurance 3 cr STAT 231	ENGL 314 Tech Comm 3 cr Junior Classification ENGL 250	I E 448 Manuf Sys Engr 3 cr IE 248 IE 305 <i>Spring Only</i>
	CHEM 167 Engr Chem 4 cr MATH 140 CHEM 50 or HS Equivalent	Social Sciences and Humanities Elective 3 cr	MAT E 273 Principles of Materials Science 3 cr Soph classification, CHEM 167 or 177, MATH 165	I E 271 Appl Ergonomics 3 cr PHYS 221 <i>Spring Only</i>	I E 312 Optimization 3 cr Credit/enrollment in MATH 267 <i>Fall Only</i>	Engineering Topic Elective 3 cr	M E 231 Engineering Thermodynamics I 3 cr MATH 265, CHEM 167, PHYS 222	Focus Elective 3 cr
	IE 148 Information Engr 3 cr Credit/enrollment in MATH 142	ENGL 150 Comp I 3 cr Credit/enrollment in LIB 160	PHYS 222 Classical Phys II 5 cr PHYS 221 MATH 166	I E 222 Design & Analysis Sys Improvements 3 cr IE 248, Credit/ enrollment in IE 271 <i>Spring Only</i>	E M 274 Statics 3 cr Credit/enrollment in MATH 166 PHYS 221	Social Sciences and Humanities Elective 3 cr	Focus Elective 3 cr	Management Elective 3 cr
	ENGR 101 Orientation R cr	LIB 160 Library 1 cr	ENGL 250 or ENGL 250H Comp II 3 cr C or better in ENGL 150 or placement, Credit/enrollment in LIB 160		SP CM 212 Fund of Public Speaking 3 cr	E E 442 Intro to Circuits 2 cr MATH 267 PHYS 222	Social Sciences and Humanities Elective 3 cr	Engineering Topic Elective 3 cr
		I E 101 I E Orient R cr						
122 Total Credits	14 cr	16 cr	18 cr	14 cr	15 cr	14 cr	16 cr	15 cr

Applicable prerequisites and co-requisites are listed under each course.

Note: Please verify all prerequisites and semester offerings with current course catalog

Elective List can be found on the IMSE website at <http://www.imse.iastate.edu/undergraduate-program/advising/>

Course Descriptions can be found at: <http://catalog.iastate.edu/azcourses/>

Light blue shading indicates Basic Program classes for all Engineering Majors; Dark blue indicates the IE core, course descriptions on the back of this page

9/29/2016 SSC

COURSE REQUIREMENTS: 2016-2017 CATALOG

To graduate under the 2015 catalog, you are required to successfully complete 122 credits. The credits are distributed among seven areas. In the list below, please note that alternative courses are suggested in parentheses:

	<u>Credits</u>	<u>Area Total</u>
1. Communications		
1. SP CM 212	3	
2. ENGL 314	3	6
2. Social Sciences and Humanities*		
1. U.S. Diversity elective	3	
2. International Perspective Elective	3	
3. An additional 6 credits from approved departmental SSH List	6	12
* At least 6 credits must be taken within the same department.		
* At least 6 credits must be 200-level or higher.		
3. Basic Program		
1. CHEM 167	4	
2. ENGL 150	3	
3. ENGL 250	3	
4. ENGR 101	R	
5. I E 148	3	
6. LIB 160	1	
7. MATH 165	4	
8. MATH 166	4	
9. PHYS 221	5	27
4. Math and Physical Science		
1. MATH 265	4	
2. MATH 247	4	
3. STAT 231	4	
4. PHYS 222	5	17
5. Industrial Engineering Core		
1. I E 222	3	
2. I E 248	3	
3. I E 271	3	
4. I E 305	3	
5. I E 312	3	
6. I E 341	3	
7. I E 348	3	
8. I E 361	3	
9. I E 413	4	
10. I E 441	3	
11. I E 448	3	34

		<u>Credits</u>	<u>Area Total</u>
6.	Other Remaining Courses		
	1. MAT E 273	3	
	2. E M 274	3	
	3. M E 231	3	
	4. E E 442	2	
	5. Focus Electives (choose from list)	6	
	6. Management Electives (choose from list)	3	
	7. Engineering Topic Elective (choose from list)	6	26
7.	Required Seminar		
	1. I E 101	R	R
	TOTAL CREDITS		<hr/> 122

Bachelor of Science in Industrial Engineering 2016 Catalog

Total Credits Required =122

1. Communications (6 cr.)

- _____ Sp Cm 212 Fundamentals of Public Speaking (3)
- _____ Engl 314 Technical Communication (3)

2. Social Science & Humanities (12 cr.)*

- _____ U.S. Diversity (3)
- _____ International Perspectives (3)
- _____ (3)
- _____ (3)

Note: Six credits in the SSH area must be 200-level or above, and six credits must form a sequence of prerequisite or related courses.

**See the list of courses approved by the IMSE Department.*

3. Basic Program (27 cr.)

- _____ Chem 167 General Chemistry for Engineering Students (4)
- _____ or Chem 177 General Chemistry and Chemistry Lab (4)
- _____ Engl 150 Critical Thinking and Communication (3)
- _____ Engl 250 Written, Oral, Visual, & Electronic Composition (3)
- _____ Engr 101 Engineering Orientation (R)
- _____ I E 148 Information Engineering (3)
- _____ Lib 160 Introduction to Library (1)
- _____ Math 165 Calculus I (4)
- _____ Math 166 Calculus II (4)
- _____ Phys 221 Introduction to Classical Physics I (5)

4. Math and Physical Science (17 cr.)

- _____ Math 265 Calculus III (4)
- _____ Phys 222 Introduction to Classical Physics II (5)
- _____ Math 267 Elementary Differential Equations & Laplace Transforms (4)
- _____ Stat 231 Probability & Statistical Inference for Engrs (4)

5. Industrial Engineering Core (34 cr.)

- _____ I E 222 Design & Analysis Methods for System Improvements (3)
- _____ I E 248 Engineering System Design, Manufacturing Processes & Specifications (3)
- _____ I E 271 Applied Ergonomics & Work Design (3)
- _____ I E 305 Engineering Economic Analysis (3)
- _____ I E 312 Optimization (3)
- _____ I E 341 Production Systems (3)
- _____ I E 348 Solidification Processes (3)
- _____ I E 361 Statistical Quality Assurance (3)
- _____ I E 413 Stochastic Modeling, Analysis & Simulation (4)
- _____ I E 441 Industrial Engineering Design (3)
- _____ I E 448 Manufacturing Systems Engineering (3)

6. Other Remaining Courses (26 cr.)

- _____ Mat E 273 Principles of Materials Sci & Engineering (3)
- _____ E M 274 Statics of Engineering (3)
- _____ M E 231 Thermodynamics (3)
- _____ E E 442 Introduction to Circuits and Instruments (2)
- _____ Engineering Topic Elective (6)
- _____ Focus Elective (6)
- _____ Management Elective (3)

7. Required Seminar

- _____ I E 101 Industrial Engineering Profession (R)

Last updated 8/18/16 (SSC)

Industrial Engineering

2016-2017 Catalog: Suggested Course Sequence

Degrees	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
B.S. in IE 122 credits	MATH 165 Calc I 4 cr Placement Exam or Math 143	MATH 166 Calc II 4 cr C- or better in MATH 165	MATH 265 Calc III 4 cr C- or better in MATH 166 or MATH 166H	MATH 267 Diff Eq/Lap 4 cr C- or better in MATH 166 or MATH 166H	I E 305 Engr Econ Analysis 3 cr MATH 166	I E 348 Solidif Processes 3 cr IE 248 MAT E 273 <i>Spring Only</i>	I E 413 Stoch Modeling 4 cr Math 267 Stat 231 <i>Fall Only</i>	I E 441 IE Design 3 cr IE 248, IE 271, IE 361, Credit/Enrollment in IE 341, IE 413, IE 448
	Social Sciences and Humanities Elective 3 cr	PHYS 221 Classical Phys I 5 cr Credit/enrollment in MATH 166	I E 248 Intro Mfg Processes 3 cr MATH 166, PHYS 221, Credit/enrollment in IE 101, MAT E 273 <i>Fall Only</i>	STAT 231 Prob & Stat 4 cr Credit/enrollment in MATH 265	I E 341 Production Systems 3 cr STAT 231, Credit/enrollment in IE 312 <i>Fall Only</i>	I E 361 Quality Assurance 3 cr STAT 231	ENGL 314 Tech Comm 3 cr Junior Classification ENGL 250	I E 448 Manuf Sys Engr 3 cr IE 248 IE 305 <i>Spring Only</i>
	CHEM 167 Engr Chem 4 cr MATH 143 CHEM 50 or HS Equivalent	Social Sciences and Humanities Elective 3 cr	MAT E 273 Principles of Materials Science 3 cr Soph classification, CHEM 167 or 177, MATH 165	I E 271 Appl Ergonomics 3 cr PHYS 221 <i>Spring Only</i>	I E 312 Optimization 3 cr Credit/enrollment in MATH 267 <i>Fall Only</i>	Engineering Topic Elective 3 cr	M E 231 Engineering Thermodynamics I 3 cr MATH 166, CHEM 167, PHYS 221	Focus Elective 3 cr
	IE 148 Information Engr 3 cr Credit/enrollment in MATH 143	ENGL 150 Comp I 3 cr Credit/enrollment in LIB 160	PHYS 222 Classical Phys II 5 cr PHYS 221 MATH 166	I E 222 Design & Analysis Sys Improvements 3 cr IE 248, Credit/ enrollment in IE 271 <i>Spring Only</i>	E M 274 Statics 3 cr Credit/enrollment in MATH 166 PHYS 221	Social Sciences and Humanities Elective 3 cr	Focus Elective 3 cr	Management Elective 3 cr
	ENGR 101 Orientation R cr	LIB 160 Library 1 cr	ENGL 250 or ENGL 250H Comp II 3 cr C or better in ENGL 150 or placement, Credit/enrollment in LIB 160		SP CM 212 Fund of Public Speaking 3 cr	E E 442 Intro to Circuits 2 cr MATH 267 PHYS 222	Social Sciences and Humanities Elective 3 cr	Engineering Topic Elective 3 cr
		I E 101 I E Orient R cr						
122 Total Credits	14 cr	16 cr	18 cr	14 cr	15 cr	14 cr	16 cr	15 cr

Applicable prerequisites and co-requisites are listed under each course.

Note: Please verify all prerequisites and semester offerings with current course catalog

Elective List can be found on the IMSE website at <http://www.imse.iastate.edu/undergraduate-program/advising/>

Course Descriptions can be found at: <http://catalog.iastate.edu/azcourses/>

Light blue shading indicates Basic Program classes for all Engineering Majors; Dark blue indicates the IE core, course descriptions on the back of this page

9/29/2016 SSC

IMSE REQUIRED COURSE OFFERINGS BY SEMESTER

Fall Semester Only

I E 248
I E 341
I E 312
I E 413

Spring Semester Only

I E 222
I E 271
I E 348
I E 448

Both Semesters

I E 148
I E 305
I E 361
I E 441

Part 3

ELECTIVES

Management Electives
Focus Electives
Engineering Topic Electives
Social Sciences & Humanities Electives

INDUSTRIAL ENGINEERING ELECTIVES LISTS 2016-2017

The IMSE curriculum provides students with the opportunity to obtain a greater depth of knowledge through several different elective areas: Management, Focus, Engineering Topic, and Social Sciences and Humanities.

* Students who entered ISU prior to Fall '14 must select two courses from each of the Management, Focus, and Engineering Topic elective lists. Students must also choose four Social Sciences and Humanities electives.

* Students who entered ISU in or after Fall '14 must select two courses from each of the Focus and Engineering Topic elective lists and one from the Management elective list. Students must also choose four Social Sciences and Humanities electives.

MANAGEMENT ELECTIVES

* Students who entered ISU prior to Fall '14 will choose two courses from the Management elective list.

* Students who entered ISU in or after Fall '14 will choose one course from the Management elective list.

Class	Description	Prerequisites	Semester
ACCT 284	Financial Accounting	Not open to first term freshmen	F.S.SS.
AFAS 341	Air Force Leadership Studies I		F.
CON E 222	Contractor Organization and Management of Construction	Completion of basic program	F.S.
ECON 320	Labor Economics	ECON 101	VARIES
ECON 334	Entrepreneurship in Agriculture	ECON 101	F.S.
ECON 336	Agricultural Selling	ECON 101	VARIES
ECON 337	Agricultural Marketing	ECON 101 required, ECON 235 recommended	VARIES
ECON 344	Public Finance	ECON 101	VARIES
I E 450	Technical Sales for Engineers I	Credit or enrollment in IE 305	F.
MGMT 310	Entrepreneurship and Innovation	Sophomore classification	F.S.
MGMT 370	Management of Organizations	ECON 101 or 102 or equivalent	F.S.SS.
MGMT 414	International Management		F.S.
MIS 301	Management Information Systems	COM S 113 or BUSAD 150 (ENGR 160, ME 160, IE 148)	VARIES
MKT 340	Principles of Marketing	Credit or current enrollment in ECON 101	F.S.SS.
PSYCH 250	Psychology of the Workplace		VARIES
PSYCH 450	Industrial Psychology	2 courses in psychology including PSYCH 101, STAT 101	F.S.
SP CM 312	Business and Professional Speaking	SP CM 212	F.S.

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FOCUS ELECTIVES

Students will choose two classes from one of the five focus areas: Engineering Management, Human Factors, Operations Research, Manufacturing, & Enterprise Computing.

Engineering Management - focuses on the strategies necessary for solving internal and external problems of a company in areas such as production, quality, project management, sales, and marketing strategies.

Class	Description	Prerequisites	Semester
ACCT 215	Legal Environment of Business	Sophomore classification	F.S.SS.
ACCT 285	Managerial Accounting	ACCT 284	F.S.SS.
CON E 380	Engineering Law	Junior Classification	F.S.
ECON 355	International Trade and Finance *	ECON 101, 102	VARIES
ECON 371	Introductory Econometrics	ECON 301, ECON 302 or ECON 353, STAT 326	F.S.
ECON 431	Managerial Economics	ECON 301	VARIES
ECON 437	Commodity Marketing and Risk Management	ECON 235, ECON 301, STAT 326	VARIES
ECON 455	International Trade *	ECON 301	VARIES
ECON 457	International Finance *	ECON 302	VARIES
ECON 532	Managerial Economics for the Global Organization	ECON 101 & enrollment in MBA or BAS program, not for ECON majors	VARIES
ECON 571	Intermediate Econometrics	ECON 500	S.
FIN 301	Principles of Finance	ACCT 284, ECON 101, and STAT 226 (or STAT 231)	F.S.SS.
I E 451	Technical Sales for Engineers II	IE 450	S.
I E 570	Systems Engineering and Project Management	Coursework in basic statistics	VARIES
MGMT 313	Feasibility Analysis and Business Planning	MGMT 310	F.S.
MGMT 371	Organizational Behavior	MGMT 370	F.S.
MGMT 471	Personnel and Human Resource Management	Junior classification	F.S.
MKT 368X	Spreadsheet-based Marketing Analytics (MIS)	MKT 340	F.
MKT 442	Sales Management	MKT 340	F.S.
SCM 301	Supply Chain Management	STAT 226 (or STAT 231) ECON 101	VARIES
SCM 450	Enterprise Resource Planning Systems in Supply Chain	SCM 301, MIS 301 or IE 148, IE 341	VARIES
SCM 461	Principles of Transportation	SCM 301	VARIES
SCM 466	International Transportation and Logistics	SCM 301	VARIES

* Meets International Perspectives Requirement.

Human Factors - focuses on with the relationships between people and their work tasks, machines, information, environment, engineering as well as technology.

Class	Description	Prerequisites	Semester
I E 571	Occupational Biomechanics	EM 274, STAT 231	VARIES
I E 572	Design and Evaluation of Human-Computer Interaction	I E 577 or instructor's permission	VARIES
I E 576	Human Factors in Product Design	I E 572 or I E 577	VARIES
I E 577	Human Factors	I E 271 or graduate classification	VARIES
KIN 355	Biomechanics	PHYS 111 or PHYS 115	F.S.SS.
PSYCH 350	Human Factors in Technology	PSYCH 101, junior classification	F.

Operations Research - focuses on the design and analysis of quantitative models and methods having applications in production and service systems such as inventory control, scheduling, transportation, and logistics.

Class	Description	Prerequisites	Semester
ECON 207	Applied Economic Optimization	MATH 151, MATH 160, MATH 165 or equivalent	F.S.
I E 403/503	Introduction to Sustainable Production Systems	Credit or enrollment in I E 341	VARIABLES
IE 405X/505X	Advanced Engineering Economy for Complex Engineering Projects	IE 305, MATH 265, MATH 267, STAT 231	F.
I E 487X/587X	Big Data Optimization	I E 312, STAT 231	S.
I E 508	Design and Analysis of Allocation Mechanisms	I E 312 or MATH 307	VARIABLES
I E 510	Network Analysis	I E 312	VARIABLES
I E 513	Analysis of Stochastic Systems	STAT 231	VARIABLES
I E 514	Production Scheduling	I E 312, I E 341	VARIABLES
I E 519	Simulation Modeling and Analysis	COM S 311, STAT 401	VARIABLES
I E 534	Linear Programming	I E 312	VARIABLES
I E 541	Inventory Control and Production Planning	I E 341	VARIABLES

Manufacturing - focuses on the design, analysis, operation, and control of manufacturing processes and systems.

Class	Description	Prerequisites	Semester
AER E 423	Composite Flight Structures	E M 324, Mat E 273	S.
A B E 363	Agri-Industrial Applications of Electric Power and Electronics	PHYS 222	F.S.
A B E 404/504	Instrumentation for Agricultural and Biosystems Engineering	A B E 316 & 363 or CPR E 281	F.
A B E 451/551	Food and Bioprocess Engineering	A B E 216 and M E 436 or CH E 357, or FS HN 351 and MATH 266 or MATH 267	F.
A B E 469/569	Grain Processing and Handling	A B E 216	S.
E E 332	Semiconductor Materials and Devices (MAT E)	PHYS 222; MAT E majors: MAT E 317; CPR E and E E majors: E E 230	S.
E E 432/532	Microelectronics Fabrication Techniques	E E 332 credit or enrollment	VARIABLES
E M 362	Principles of Nondestructive Testing (MAT E)	PHYS 112 or PHYS 222	S.
E M 362L	Nondestructive Testing Laboratory (MAT E)	Credit or enrollment in MAT E 362	S.
ENSCI 480	Engineering Analysis of Biological Systems (A B E)	A B E 380 or permission of the instructor	F.
I E 446/546	Geometric Variability in Manufacturing	I E 348, or MAT E 216, or M E 324	VARIABLES
IE 447X	Biomedical Design and Manufacturing	Students with two semesters or less before graduation	VARIABLES
I E 449/549	Computer Aided Design and Manufacturing	I E 248 or similar manufacturing engineering course, MATH 265	VARIABLES
I E 543	Wind Energy Manufacturing	Undergraduate engineering degree or permission of instructor	S. (offered even-numbered years)
I E 545	Rapid Prototyping and Manufacturing	I E 248 or similar manufacturing engineering course, MATH 265, Undergraduates: permission of instructor	VARIABLES
I E 588	Information Systems for Manufacturing	I E 148, I E 448	VARIABLES

MAT E 214	Structural Characterization of Materials	MAT E 215, credit or enrollment in PHYS 221	F.S.
MAT E 321	Introduction to Ceramic Science	MAT E 216	F.
MAT E 322	Introduction to Ceramic Processing	MAT E 216, MAT E 321	S.
MAT E 332	Semiconductor Materials and Devices (E E)	PHYS 222; MAT E majors: MAT E 317; CPR E and E E majors: E E 230	S.
MAT E 341	Metals Processing	MAT E 215 or 273 or 392, majors only	F.
MAT E 351	Introduction to Polymeric Materials	MAT E 216, CHEM 331	S.
MAT E 362	Principles of Nondestructive Testing (E M)	PHYS 112 or PHYS 222	S.
MAT E 362L	Nondestructive Testing Laboratory (E M)	Credit or enrollment in MAT E 362	S.
MAT E 418	Mechanical Behavior of Materials	MAT E 216	F.
MAT E 442	Structure/Property Relations in Nonferrous Metals	MAT E 215 or 273 or 392	F.
M E 270	Introduction to Mechanical Engineering Design	M E 160 or equivalent, M E 170 or equivalent, PHYS 221	F.S.
M E 324	Manufacturing Engineering	M E 270, E M 324, MAT E 273 and M E 324L or permission of instructor	F.S.SS.
M E 370	Engineering Measurements	E E 442, STAT 305	F.S.SS.
M E 410	Mechanical Engineering Applications of Mechatronics	E E 442, EE 448, credit or enrollment in M E 421	Alt. S. (offered irregularly)
M E 411	Automatic Controls	M E 421	F.
M E 418/518	Mechanical Considerations in Robotics	Credit or enrollment in M E 421	S.
M E 419	Computer-Aided Design	M E 325	F.
M E 421	System Dynamics and Control	E E 442, E E 448, E M 345, MATH 267	F.S.SS.

Enterprise Computing - focuses on the integration of information within the functional units of an enterprise as well as among multiple enterprises.

Class	Description	Prerequisites	Semester
COM S 207	Fundamentals of Computer Programming (MIS)	MATH 150 or placement into MATH 140/MATH 141/MATH 142 or higher	F.S.
COM S 227	Introduction to Object-oriented Programming	Placement in MATH 143, 165, or higher, recommended a previous high school or college course in programming or equivalent experience	F.S.
COM S 228	Introduction to Data Structures	Minimum of C- in 227, credit or enrollment in MATH 165	F.S.
E E 285	Problem Solving Methods and Tools for Electrical Engineering		VARIES
I E 481/581	e-Commerce Systems Engineering	I E 148	VARIES
I E 582	Enterprise Modeling and Integration	3 credits in information technology or information systems	VARIES
I E 483/583	Knowledge Discovery and Data Mining	I E 148, IE 312, STAT 231	VARIES
I E 585	Requirements Engineering	3 credits in information technology or information systems	VARIES
I E 588	Information Systems for Manufacturing	I E 148, IE 448	VARIES
MIS 207	Fundamentals of Computer Programming (COM S)	MATH 150 or placement into MATH 140/MATH 141/MATH 142 or higher	F.S.

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ENGINEERING TOPIC ELECTIVES

Students will choose two classes from the Engineering Topic elective list.

Class	Description	Prerequisites	Semester
A B E 216	Fundamentals of Agricultural and Biosystems Engineering	A B E 160 or permission of the instructor	F.
A B E 363	Agri-Industrial Applications of Electric Power and Electronics	PHYS 222	F.S.
A B E 380	Principles of Biological Systems Engineering	A B E 316	S.
A B E 404/504	Instrumentation for Agricultural and Biosystems Engineering	A B E 316 and 363 or CPR E 281	F.
A B E 413	Fluid Power Engineering (M E)	Credit or enrollment in E M 378 or M E 335, A B E 216 or M E 270	F.
A B E 415	Agricultural & Biosystems Engineering Design I	A B E 316	F.S.
A B E 451/551	Food and Bioprocess Engineering	A B E 216 and M E 436 or CH E 357, or FS HN 351 and MATH 266 or MATH 267	F.
A B E 466	Multidisciplinary Engineering Design (AER E, CPR E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	F.S.
A B E 469/569	Grain Processing and Handling	A B E 216	S.
A B E 472/572	Design of Environmental Modification Systems for Animal Housing	A B E 216, M E 231	Alt. S., offered even-numbered years
A B E 480	Engineering Analysis of Biological Systems (ENSCI)	A B E 380 or permission of the instructor	F.
AER E 261	Introduction to Performance and Design	AER E 161, MATH 166, PHYS 221	F.S.
AER E 310	Aerodynamics I: Incompressible Flow	Grade of C- or better in AER E 261, MATH 265	F.S.
AER E 423	Composite Flight Structures	E M 324, MAT E 273	S.
AER E 466	Multidisciplinary Engineering Design (A B E, B M E, CPR E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	F.S.
AER E 467	Multidisciplinary Engineering Design II (CPR E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F. Alt. S. (offered irregularly)
AER E 468	Large-scale Complex Engineered Systems	Senior standing in College of Engineering or permission of AER E 468 instructor	S.
AER E 481	Advanced Wind Energy: Technology and Design	AER E 381 or senior classification in engineering or junior in engineering with a course in fluid mechanics	S.
CH E 210	Material and Energy Balances	CHEM 178, MATH 166, CH E 160	F.S.
CH E 310	Computational Methods in Chemical Engineering	CH E 160, CH E 205, CH E 210, MATH 165	F.S.
CH E 356	Transport Phenomena I	CH E 205, CH E 210, PHYS 221, credit or enrollment in MATH 267	F.S.
CH E 357	Transport Phenomena II	Credit or enrollment in CH E 310; CH E 356	F.S.
CH E 358	Separations	CH E 310, CH E 357	F.S.
CH E 381	Chemical Engineering Thermodynamics	Credit or enrollment in CH E 310; MATH 267, PHYS 222, CHEM 325	F.S.

CH E 382	Chemical Reaction Engineering	CH E 310; CH E 381; credit or enrollment in CH E 357	F.S.
CH E 415/515	Biochemical Engineering	CH E 357, CH E 382 recommended, CHEM 331	VARIES
CON E 352	Mechanical Systems in Buildings	CON E 251, PHYS 222	F.S.
CON E 353	Electrical Systems in Buildings	PHYS 222 and credit or enrollment in CON E 352	F.S.
CON E 354	Building Energy Performance	Junior classification	F.
CPR E 281	Digital Logic	Sophomore classification	F.S.
CPR E 288	Embedded Systems I: Introduction	CPR E 281, COM S 207 or COM S 227 or EE 285	F.S.
CPR E 308	Operating Systems: Principles and Practice	CPR E 381 or Com S 321	F.S.
CPR E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	F.S.
CPR E 467	Multidisciplinary Engineering Design II (AER E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F. Alt. S. (offered irregularly)
CPR E 489	Computer Networking and Data Communications	CPR E 381 or E E 324	F.S.
E E 224	Signals and Systems I	E E 201, MATH 267, PHYS 222	F.S.
E E 230	Electronic Circuits and Systems	E E 201, MATH 267, PHYS 222	F.S.
E E 303	Energy Systems and Power Electronics	MATH 267, PHYS 222, credit or enrollment in E E 224 and E E 230	F.S.
E E 311	Electromagnetic Fields and Waves	E E 201, MATH 265, PHYS 222, credit or registration in MATH 267	F.S.
E E 332	Semiconductor Materials and Devices (MAT E)	PHYS 222; MAT E majors: MAT E 317; CPR E and E E majors: E E 230	S.
E E 333X	Electronic Systems Design	E E 230, CPR E 288 (co-requisite)	F.
E E 351	Analysis of Energy Systems	PHYS 222	VARIES
E E 432/532	Microelectronics Fabrication Techniques (MAT E)	credit or enrollment in EE 332	VARIES
E E 448	Introduction to AC Circuits and Motors (2 credits)	E E 442	F.S.
E E 452	Electrical Machines and Power Electronic Drives	E E 303, E E 324	S.
E E 455	Introduction to Energy Distribution Systems	E E 303, credit or enrollment in E E 324	F.
E E 456	Power Systems Analysis I	E E 303, credit or enrollment in E E 324	F.
E E 457	Power System Analysis II	E E 303, credit or enrollment in E E 324	S.
E E 459/559	Electromechanical Wind Energy Conversion and Grid Integration	Credit or enrollment in E E 452, E E 456	VARIES
E E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	F.S.
E E 467	Multidisciplinary Engineering Design II (AER E, CPR E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F. Alt. S. (offered irregularly)
E E 554	Power System Dynamics	E E 456, E E 457, E E 475	S.
E E 555	Advanced Energy Distribution Systems	E E 455	VARIES
E E 556	Power Electronic Systems	E E 452	VARIES
E M 324	Mechanics of Materials	E M 274	F.S.SS.
E M 345	Dynamics	E M 274, credit or enrollment in MATH 266 or 267	F.S.SS.
E M 362	Principles of Nondestructive Testing (MAT E)	PHYS 112 or PHYS 222	S.

E M 362L	Nondestructive Testing Laboratory (MAT E)	Credit or enrollment in MAT E 362	S.
ENGR 340	Intro to Wind Energy: System Design & Delivery	MATH 166, PHYS 222	F.
ENGR 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, E E, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	F.S.
ENGR 467	Multidisciplinary Engineering Design II (AER E, CPR E, E E, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F. Alt. S. (offered irregularly)
I E 222	Design & Analysis Methods for Systems Improvements *Only an Engr Topic Elective for students who began I E program before Fall 2014.	I E 248 credit and enrollment in I E 271	S.
I E 403/503	Introduction to Sustainable Production Systems	Credit or enrollment in I E 341	VARIES
IE 405X/505X	Advanced Engineering Economy for Complex Engineering Projects	IE 305, MATH 265, MATH 267, STAT 231	F.
IE 446/546	Geometric Variability in Manufacturing	I E 348 or MAT E 216 or M E 324	VARIES
I E 449/549	Computer Aided Design and Manufacturing	I E 248 or similar manufacturing engineering course, MATH 265	VARIES
I E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, E E, ENGR, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	F.S.
I E 467	Multidisciplinary Engineering Design II (AER E, CPR E, E E, ENGR, ME, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F. Alt. S. (offered irregularly)
I E 468/568	Large-scale Complex Engineered Systems (LSCES) (AER E)	Senior standing in College of Engineering or permission of AER E 468X	S.
I E 481/581	e-Commerce Systems Engineering	I E 148	VARIES
I E 483/583	Knowledge Discovery and Data Mining	I E 148, I E 312, STAT 231	VARIES
I E 487X/587X	Big Data Optimization	I E 312, STAT 231	S.
I E 508	Design and Analysis of Allocation Mechanisms	I E 312 or MATH 307	VARIES
I E 510	Network Analysis	I E 312	VARIES
I E 513	Analysis of Stochastic Systems	STAT 231	VARIES
I E 514	Production Scheduling	I E 312, I E 341	VARIES
I E 519	Simulation Modeling and Analysis	COM S 311, STAT 401	VARIES
I E 534	Linear Programming	I E 312	VARIES
I E 541	Inventory Control and Production Planning	I E 341	VARIES
I E 543	Wind Energy Manufacturing	Undergraduate engineering degree or permission of instructor	Alt. S., offered even-numbered years
IE 545	Rapid Prototyping and Manufacturing	I E 248 or similar manufacturing engineering course, MATH 265. Undergraduates: permission of instructor	VARIES
I E 570	Systems Engineering and Project Management	Coursework in basic statistics	VARIES
I E 571	Occupational Biomechanics	E M 274, STAT 231	VARIES
I E 572	Design and Evaluation of Human-Computer Interaction	I E 577 or instructor's permission	VARIES
I E 576	Human Factors in Product Design	I E 572 or I E 577	VARIES
I E 577	Human Factors	I E 271 or graduate classification	VARIES
I E 582	Enterprise Modeling and Integration	3 credits in information technology or information systems	VARIES
I E 585	Requirements Engineering	3 credits in information technology or information systems	VARIES

I E 588	Information Systems for Manufacturing	I E 148, I E 448	VARIABLES
MAT E 214	Structural Characterization of Materials	MAT E 215, credit or enrollment in PHYS 221	F.S.
MAT E 216	Introduction to Materials Science and Engineering II	MAT E 215, CHEM 178, credit or enrollment in PHYS 222	F.S.
MAT E 311	Thermodynamics in Materials Engineering	CHEM 178, credit or enrollment in MAT E 216, PHYS 222, and MATH 267	F.
MAT E 321	Introduction to Ceramic Science	MAT E 216	F.
MAT E 322	Introduction to Ceramic Processing	MAT E 216, MAT E 321	S.
MAT E 332	Semiconductor Materials and Devices (E E)	PHYS 222; MAT E majors: MAT E 317; CPR E and E E majors: E E 230	S.
MAT E 351	Introduction to Polymeric Materials	MAT E 216, CHEM 331	S.
MAT E 362	Principles of Nondestructive Testing (E M)	PHYS 112 or PHYS 222	S.
MAT E 362L	Nondestructive Testing Laboratory (E M)	Credit or enrollment in MAT E 362	S.
MAT E 418	Mechanical Behavior of Materials	MAT E 216	F.
MAT E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, E E, ENGR, I E, M E)	Student must be within two semesters of graduation and permission of instructor.	F.S.
MAT E 467	Multidisciplinary Engineering Design II (AER E, CPR E, E E, ENGR, I E, M E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F. Alt. S. (offered irregularly)
M E 324	Manufacturing Engineering	M E 270, E M 324, MAT E 273 and M E 324L or permission of instructor	F.S.SS.
M E 332	Engineering Thermodynamics II	M E 231	F.S.SS.
M E 370	Engineering Measurements	E E 442, STAT 305	F.S.SS.
M E 410	Mechanical Engineering Applications of Mechatronics	E E 442, E E 448, credit or enrollment in M E 421	Alt. S. (offered irregularly)
M E 411	Automatic Controls	M E 421	F.
M E 413	Fluid Power Engineering (A B E)	Credit or enrollment in E M 378 or M E 335, A B E 216 or M E 270	F.
M E 415	Mechanical Systems Design	M E 324, M E 325	F.S.
M E 418/518	Mechanical Considerations in Robotics	Credit or enrollment in M E 421	S.
M E 419	Computer-Aided Design	M E 325	F.
M E 421	System Dynamics and Control	E E 442, E E 448, E M 345, MATH 267	F.S.SS.
M E 433	Alternative Energy	PHYS 221/PHYS 222 and CHEM 167	F.
M E 436	Heat Transfer	M E 335	F.S.SS.
M E 437	Introduction to Combustion Engineering	Credit in M E 332 or equivalent and credit or enrollment in M E 335 or equivalent	S.
M E 441	Fundamentals of Heating, Ventilating, and Air Conditioning	Credit or enrollment in M E 436	F.
M E 442	Heating and Air Conditioning Design	M E 441	S.
M E 444	Elements and Performance of Power Plants	M E 332, credit or enrollment in M E 335	S.
M E 449	Internal Combustion Engines	M E 335	F.
M E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, E E, ENGR, I E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	F.S.
ME 467	Multidisciplinary Engineering Design II (AER E, CPR E, E E, ENGR, I E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F. Alt. S. (offered irregularly)

M E 530	Advanced Thermodynamics	M E 332	F.
M E 542	Advanced Combustion	M E 332 or CH E 381	S.
M E 545	Thermal Systems Design	M E 436	Alt F., offered even-numbered years
MSE 520	Thermodynamics and Kinetics in Multicomponent Materials	MAT E 311 or CHEM 321, MATH 266 or MATH 267	F.
NUC E 401	Nuclear Radiation Theory and Engineering	PHYS 222, MATH 266 OR 267	F.
NUC E 402	Nuclear Reactor Engineering	NUC E 401, permission of Nuclear Engineering program director	S.
NUC E 441	Probabilistic Risk Assessment	STAT 305 or equivalent	S.
NUC E 461	Ratiation Detection, Measurement and Simulation	NUC E 401	S.

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NOTE: Verify all prerequisites with current course catalog.	F. - Fall S. - Spring SS. - Summer
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Social Sciences and Humanities Electives

The Industrial Engineering program has created a list of Social Science and Humanities (SSH) courses for students to choose from to meet the 12 credits required for graduation. Six credits in the SSH area must be 200-level or above, and six credits must form a sequence of prerequisite or related courses. This list contains numerous US Diversity and International Perspectives courses: students must have 3 credits in each for graduation as a part of the 12 credit SSH requirement. Please check these courses with your advisor prior to completing the course.

**** Be sure to check the current catalog for prerequisites.****

African-American Studies (AF AM):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Intro to African American Studies	✓		
330 - Ethnic and Race Relations (SOC)	✓		
334 - African American Religious Experience (RELIG)	✓		
347 - Studies in African American Literature (ENGL)	✓		
350 - Women of Color in the U.S. (W S)	✓		
353 - History of African Americans I (HIST)	✓		
354 - History of African Americans II (HIST)	✓		
460 - Seminar in African American Culture	✓		

Agronomy (AGRON):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
342 - World Food Issues: Past & Present (ENV S, FS HN, T SC)		✓	

Apparel, Merchandising and Design (A M D): formerly Textiles and Clothing (T C)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
165 - Dress and Diversity in Society	✓		
354 - History of European & North American Dress		✓	
362 - Cultural Perspectives of Dress		✓	

American Indian Studies (AM IN):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
210 - Introduction to American Indian Studies	✓		
240 - Introduction to American Indian Literature (ENGL)	✓		
310 - Topics in American Indian Studies	✓		
315 - Archaeology of North America (ANTHR)	✓		
322 - Peoples & Cultures of Native North America (ANTHR)	✓		
323 - Topics in Latin American Anthropology (ANTHR)			✓
332 - Current Issues in Native North America (ANTHR)	✓		
342 - American Indian Women Writers (W S) (ENGL)	✓		
346 - American Indian Literature (ENGL)	✓		

Anthropology (ANTHR):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Cultural Anthropology		✓	
230 - Globalization and the Human Condition		✓	

306 - Cultural Anthropology		✓	
308 - Archaeology			✓
309 - Introduction to Culture and Language (LING)		✓	
313 - Kinship and Marriage in a Global Perspective		✓	
315 - Archeology of North America (AM IN)	✓		
322 - Peoples and Cultures of Native North America (AM IN)	✓		
323 - Topics in Latin American Anthropology (AM IN)			✓
332 - Current Issues in Native North America (AM IN)	✓		
333 - Asian American Material Cultures	✓		
340 - Magic, Witchcraft, and Religion (RELIG)		✓	
376 - Classical Archeology (CL ST, RELIG)		✓	
411 - Applied Anthropology		✓	
444 - Sex and Gender in Cross-cultural Perspective (W S)		✓	

Architecture (ARCH):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
221 - History of Architecture I (DSN S)		✓	
222 - History of Architecture II		✓	
321 - History of the American City	✓		
427 - History, Theory, & Criticism of Chinese Architecture		✓	

Art History (ART H):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
280 - History of Art I		✓	
281 - History of Art II		✓	
382 - Art and Architecture of Asia		✓	
383 - Greek & Roman Art (CL ST)			✓
385 - Renaissance Art			✓
388 - Modern Art and Theory			✓
395 - Art and Theory Since 1945	✓		
396 - History of Photography			✓
481 - Art and Architecture of India		✓	
487 - 19th Century Art			✓
494 - Women/Gender in Art (W S)	✓		

Biology (BIOL):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
307 - Women in Science and Engineering (W S)	✓		

Classical Studies (CL ST):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
273 - Greek and Roman Mythology		✓	
275 - The Ancient City		✓	
310 - Ancient Philosophy (PHIL)			✓
353 - World Literature: Western Foundations Through Renaissance (ENGL)		✓	
372 - Greek and Roman Tragedy and Comedy		✓	
373 - Heroes of Greece, Rome, and Today		✓	
374 - Sex, Gender, and Culture in the Ancient Mediterranean World (HIST, W S)		✓	
376 - Classical Archaeology (ANTHR, RELIG)		✓	

383 - Greek & Roman Art (ART H)			✓
394 - The Archaeology of Greece: An Introduction		✓	
395 - Study Abroad: The Archaeology of Greece		✓	
402 - Greek Civilization (HIST)			✓
403 - Roman Civilization (HIST)			✓
430 - Foundations of Western Political Thought (POL S)			✓

Communication Studies (COMST):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
101 - Introduction to Communication Studies			✓
310 - Intercultural Communication		✓	
311 - Studies in Interpersonal Communication			✓
314 - Organizational Communication			✓
325 - Nonverbal Communication			✓

Criminal Justice Studies (CJ ST):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
241 - Youth and Crime (SOC)			✓
320 - American Judicial Process (POL S)			✓
332 - Philosophy of Law (PHIL)			✓
340 - Deviant and Criminal Behavior (SOC)			✓
484 - Topical Studies in Criminal and Juvenile Justice (SOC)			✓

Community and Regional Planning (C R P)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
291 - World Cities and Globalization		✓	
376 - Rural, Urban and Regional Economics (ECON)			✓

Design Studies (DSN S)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
181 - Origins and Evolution of Modern Design			✓
183 - Design Cultures			✓

Economics (ECON):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
101 - Principles of Microeconomics			✓
102 - Principles of Macroeconomics			✓
230 - Farm Business Management			✓
235 - Introduction to Agricultural Markets			✓
301 - Intermediate Microeconomics			✓
302 - Intermediate Macroeconomics			✓
313 - Economics of Sports			✓
320 - Labor Economics		✓	
321 - Economics of Discrimination (W S)	✓		
332 - Cooperatives			✓
353 - Money, Banking & Financial Institutions			✓
355 - International Trade and Finance		✓	
362 - Applied Ethics in Agriculture (SOC)			✓
370 - Comparative Capitalism and Economic Transitions		✓	

371 - Introductory Econometrics			✓
376 - Rural, Urban and Regional Economics (C R P)			✓
378 - Retirement Planning and Employee Benefits (GERON, HD FS)	✓		
380 - Environmental and Resource Economics (ENV S)			✓
385 - Economic Development (GLOBE)		✓	
387 - Economics of China and India		✓	
401 - Topics in Microeconomics			✓
402 - Topics in Macroeconomics			✓
416 - Industrial Organization			✓
418 - Introduction to Game Theory			✓
455 - International Trade		✓	
457 - International Finance		✓	
458 - Economic Systems for Electric Power Planning (E E)			✓
460 - Agricultural, Food, and Trade Policy			✓
466 - Agricultural Finance			✓
480 - Intermediate Environmental and Resource Economics			✓

Electrical Engineering (E E)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
458 - Economic Systems for Electrical Power Planning (ECON)			✓

English (ENGL):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Literature			✓
227 - Survey of American Literature to 1865			✓
228 - Survey of American Literature since 1865			✓
237 - Survey of Film History			✓
240 - Introduction to American Indian Literature (AM IN)	✓		
330 - Science Fiction			✓
335 - Studies in Film			✓
339 - Literary Theory & Criticism			✓
340 - Women's Literature (W S)	✓		
342 - American Indian Women Writers (AM IN, W S)	✓		
344 - U.S. Latino/a Literature (US LS)	✓		
345 - Women & Literature: Selected Topics (W S)	✓		
346 - American Indian Literature (AM IN)	✓		
347 - Studies in African American Literature (AF AM)	✓		
349 - Topics in Multicultural Literatures of the United States	✓		
353 - World Literature: Western Foundations through Renaissance (CL ST)		✓	
354 - World Literature: 17th Century to Present		✓	
358 - Myth and Fairytale			✓
360 - Studies in American Literature to 1800			✓
362 - Studies in 19th Century American Literature			✓
364 - Studies in American Literature: 1900 to Present			✓
370 - Shakespeare		✓	
373 - Studies in British Literature: The Middle Ages			✓
375 - Studies in British Literature: The Restoration & 18th Century		✓	
376 - British Literature: Romantic (376A), Victorian (376B)		✓	

389 - Postcolonial Literature		✓	
393 - The History of Children's Literature			✓
420 - History of the English Language (LING)			✓
422 - Women, Men, and the English Language (LING, W S)	✓		

Environmental Science (ENSCI)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
324 - Energy and the Environment (ENV S, GEOL, MTEOR)			✓

Environmental Studies (ENV S):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
324 - Energy and the Environment (ENSCI, GEOL, MTEOR)			✓
334 - Environmental Ethics (PHIL)			✓
342 - World Food Issues: Past and Present (AGRON, FS HN, T SC)		✓	
345 - Population and Society (SOC)		✓	
380 - Environmental and Resource Economics (ECON)			✓
382 - Environmental Sociology (SOC)			✓
383 - Environmental Politics and Policies (POL S)			✓
384 - Religion and Ecology (RELIG)		✓	
442 - The Policy and Politics of Coastal Areas (POL S)			✓
472 - U.S. Environmental History (HIST)			✓

Foreign Languages & Literatures (F LNG):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
CHIN 101 - Elementary Mandarin Chinese I			✓
CHIN 102 - Elementary Mandarin Chinese II		✓	
CHIN 201 - Intermediate Mandarin Chinese I		✓	
CHIN 202 - Intermediate Mandarin Chinese II		✓	
CHIN 272 - Introduction to Chinese Culture		✓	
CHIN 301 - Advanced Mandarin Chinese I		✓	
CHIN 302 - Advanced Mandarin Chinese II		✓	
CHIN 304 - Chinese for Business and Professions		✓	
CHIN 370 - Chinese Literature in English Translation		✓	
CHIN 375 - China Today		✓	
FRNCH 101 - Elementary French I			✓
FRNCH 102 - Elementary French II		✓	
FRNCH 201 - Intermediate French I		✓	
FRNCH 202 - Intermediate French II		✓	
FRNCH 301 - French Writing and Grammar		✓	
FRNCH 304 - French for Business and Professions		✓	
FRNCH 320 - France Today		✓	
FRNCH 370 - French Studies in English		✓	
FRNCH 378 - French Film Studies in English		✓	
GER 101 - Elementary German I			✓
GER 102 - Elementary German II		✓	
GER 201 - Intermediate German I		✓	
GER 202 - Intermediate German II		✓	
GER 301 - Reading: Problems of the Early Twentieth Century		✓	
GER 305 - Conversation: The City in Contemporary Europe		✓	

GER 320 - Germany Today		✓	
GER 330 - German Literature and Culture		✓	
GER 370 - German Studies in English		✓	
GER 371 - The Holocaust in Text, Image, and Memory		✓	
GER 375 - Grimm's Tales		✓	
GER 378 - German Film and Media Studies		✓	
GER 395 - Study Abroad		✓	
GER 476 - Topics in German Cultural Studies		✓	
GREEK 101 - Elementary Ancient Greek I			✓
GREEK 102 - Elementary Ancient Greek II		✓	
GREEK 201 - Intermediate Classical Greek		✓	
GREEK 332 - Introduction to Classical Greek Literature		✓	
LATIN 101 - Elementary Latin I			✓
LATIN 102 - Elementary Latin II		✓	
LATIN 201 - Intermediate Latin		✓	
LATIN 332 - Introduction to Latin Literature		✓	
RUS 101 - Elementary Russian I			✓
RUS 102 - Elementary Russian II		✓	
RUS 201 - Intermediate Russian I		✓	
RUS 202 - Intermediate Russian II		✓	
RUS 301 - Composition and Conversation		✓	
RUS 304 - Russian for Global Professionals		✓	
RUS 314 - Reading Russian Literary and Cultural Texts		✓	
RUS 370 - Russian Studies in English Translation		✓	
RUS 375 - Russia Today		✓	
RUS 395 - Study Abroad		✓	
SPAN 101 - Elementary Spanish I			✓
SPAN 102 - Elementary Spanish II		✓	
SPAN 201 - Intermediate Spanish I		✓	
SPAN 202 - Intermediate Spanish II		✓	
SPAN 297 - Intensive Intermediate Spanish		✓	
SPAN 301 - Spanish Grammar and Composition		✓	
SPAN 303 - Spanish Grammar and Conversation		✓	
SPAN 304 - Spanish for Global Professionals		✓	
SPAN 314 - Introduction to Reading Hispanic Texts		✓	
SPAN 321 - Spanish Civilization		✓	
SPAN 322 - Latin American Civilization		✓	
SPAN 323 - Spain Today		✓	
SPAN 326 - Studies in Hispanic Art or Film		✓	
SPAN 330 - Survey of Spanish Literature to 1700		✓	
SPAN 331 - Survey of Spanish Literature from 1700 to the Present		✓	
SPAN 332 - Studies in Latin American Literature from Pre-Columbian Times through the 19th Century		✓	
SPAN 351 - Introduction to Spanish-English Translation (LING)		✓	
SPAN 352 - Introduction to Spanish Phonology (LING)		✓	
SPAN 370 - Hispanic Topics in English Translation		✓	
SPAN 395 - Study Abroad		✓	
SPAN 401 - Advanced Composition and Grammar		✓	

SPAN 440 - Seminar on the Literatures and Cultures of Spain		✓	
SPAN 441 - Seminar on Cervantes and the Golden Age		✓	
SPAN 445 - Seminar on the Literatures and Cultures of Latin America		✓	
SPAN 462 - Contrastive Analysis of Spanish/English for Translators (LING)			✓
SPAN 463 - Hispanic Dialectology (LING)		✓	
Note: Students having a native language(s) other than English may not use elementary, intermediate or advanced-level grammar, conversational or composition courses in that language(s).			

Geology (GEOL)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
324 - Energy and the Environment (ENSCI, ENV S, MTEOR)			✓

Gerontology (GERON)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
373 - Death as a Part of Living (HD FS)			✓
377 - Aging and the Family (HD FS)	✓		
378 - Retirement Planning and Employee Benefits (ECON, HD FS)	✓		

Global Resource Systems (GLOBE)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
385 - Economic Development (ECON)		✓	

History (HIST):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Western Civilization I		✓	
202 - Introduction to Western Civilization II		✓	
207 - Chinese Civilization		✓	
221 - Survey of United States History I			✓
222 - Survey of United States History II			✓
225 - Introduction to Asian American Studies	✓		
240 - Latina/o History (US LS)	✓		
280 - Introduction to History of Science I		✓	
281 - Introduction to History of Science II		✓	
284 - Wonders of the World, Global History of Innovation		✓	
307 - American Popular Culture			✓
325 - Society and Politics in England, 1525-1700			✓
336 - History of Modern China I		✓	
337 - History of Modern China II		✓	
338 - Modern Japanese History		✓	
340 - History of Latin America I			✓
341 - History of Latin America II		✓	
353 - History of African Americans I (AF AM)	✓		
354 - History of African Americans II (AF AM)	✓		
355 - Early American Republic			✓
356 - U.S. Civil War and Reconstruction Era			✓
374 - Sex, Gender, and Culture in the Ancient Mediterranean World (CL ST, W S)		✓	
380 - History of Women in Science, Technology & Medicine (W S)	✓		
386 - History of Women in America (W S)	✓		
389 - American Military History		✓	
390 - World Military History		✓	

402 - Greek Civilization (CL ST)			✓
403 - Roman Civilization (CL ST)			✓
405 - Transformations of the Early Medieval World			✓
406 - The Birth of Europe in the High Middle Ages			✓
408 - Europe, 1500-1648			✓
414 - European Cultural and Intellectual History			✓
421 - History of Russia I		✓	
422 - History of Russia II		✓	
424 - History of Modern Germany			✓
428 - Punishment, Mentalities, and Society in England, 1550-1868			✓
431 - Modern England			✓
441 - History of Modern Mexico and Central America			✓
450 - Colonial America			✓
451 - American Revolutionary Era			✓
456 - American Family History			✓
460 - The Great Plains			✓
461 - The Rural South			✓
465 - The American West			✓
468 - History of Rural America			✓
472 - U. S. Environmental History (ENV S)			✓
473 - Civil Rights and Ethnic Power (AF AM, US LS)	✓		
482 - Birth, Death, Medicine, and Disease			✓
488 - American Stuff, Colonial Times to the Present			✓

Human Development and Family Studies (HD FS):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
102 - Individual and Family Life Development			✓
239 - Housing & Consumer Issues	✓		
240 - Literature for Children	✓		
249 - Parenting and Family Diversity Issues	✓		
276 - Human Sexuality	✓		
373 - Death as a Part of Living (GERON)			✓
377 - Aging and the Family (GERON)	✓		
378 - Retirement Planning and Employee Benefits (ECON, GERON)	✓		

Journalism and Mass Communication (JL MC):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
101 - Mass Media and Society			✓
401 - Mass Communication Theory			✓
461 - History of American Journalism			✓
462 - Media Ethics, Freedom, Responsibility			✓
464 - Journalism and Literature			✓
474 - Communication Technology and Social Change (T SC)		✓	
476 - World Communication Systems		✓	
477 - Ethnicity, Gender, Class and the Media	✓		

Liberal Arts and Sciences (LAS)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
385 - The Holocaust		✓	

Landscape Architecture (L A)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
371 - History of Modern Landscapes, 1750 to Present			✓
373 - Gardens and Landscapes from Antiquity to 1750		✓	

Linguistics (LING)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
309 - Introduction to Culture and Language (ANTHR)		✓	
351 - Introduction to Spanish-English Translation (SPAN)		✓	
352 - Introduction to Spanish Phonology (SPAN)		✓	
420 - History of the English Language (ENGL)			✓
422 - Women, Men, and the English Language (ENGL, W S)	✓		
462 - Contrastive Analysis of Spanish/English for Translators (SPAN)			✓
463 - Hispanic Dialectology (SPAN)		✓	

Meteorology (MTEOR)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
324 - Energy and the Environment (ENSCI, ENV S, GEOL)			✓

Military Science (M S)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
283 - The U. S. Army in American Society to 1917			✓

Music (MUSIC):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
102 - Introduction to Music Listening		✓	
383 - History of Music I		✓	
384 - History of Music II		✓	
472 - History of American Music	✓		
473 - Music of the Baroque and Classical Eras			✓
475 - Music of the Romantic Era			✓

Philosophy (PHIL):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Philosophy			✓
230 - Moral Theory and Practice			✓
235 - Ethical Issues in a Diverse Society	✓		
310 - Ancient Philosophy (CL ST)			✓
314 - 17th Century Philosophy			✓
315 - 18th Century Philosophy			✓
316 - 19th Century Continental Philosophy			✓
317 - 20th and 21st Century Continental Philosophy			✓
318 - 20th and 21st Century Anglo-American Philosophy			✓
320 - Existentialism and Its Critics			✓
330 - Ethical Theory			✓
331 - Moral Problems in Medicine			✓
332 - Philosophy of Law (CJ ST)			✓
334 - Environmental Ethics (ENV S)			✓
335 - Social and Political Philosophy			✓

336 - Bioethics and Biotechnology			✓
338 - Feminist Philosophy (W S)	✓		
340 - Aesthetics			✓
343 - Philosophy of Technology (T SC)			✓
350 - Philosophy of Religion (RELIG)			✓
364 - Metaphysics: God, Minds, and Matter			✓
366 - Truth, Belief and Reason			✓
380 - Philosophy of Science			✓
381 - Philosophy of the Social and Behavioral Sciences			✓
430 - Value Theory			✓
450 - Agency and Free Will			✓
480 - Controversies in Science			✓
483 - Philosophy of Biology			✓
485 - Philosophy of Physics			✓

Political Science (POL S):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
215 - Introduction to American Government			✓
235 - Introduction to Ethics and Politics			✓
241 - Introduction to Comparative Government and Politics		✓	
251 - Introduction to International Politics		✓	
301 - Introduction to Empirical Political Science Research			✓
305 - Political Behavior			✓
306 - Public Opinion and Voting Behavior			✓
310 - State and Local Government			✓
312 - Special Topics in American Government and Politics			✓
313 - Special Topics in Theory and Methods			✓
314 - Special Topics in Comparative Politics			✓
315 - Special Topics in International Relations		✓	
318 - Campaign and Elections			✓
319 - Law and Politics			✓
320 - American Judicial Process (CJ ST)			✓
334 - Politics and Society (SOC)			✓
335 - Science, Technology, and Public Policy			✓
340 - Politics of Developing Areas			✓
343 - Latin American Government and Politics (US LS)			✓
344 - Public Policy			✓
345 - Immigration Policy		✓	
346 - European Politics			✓
349 - Politics of Russia and the Soviet Successor States		✓	
350 - Politics of the Middle East		✓	
356 - Theories of International Politics			✓
357 - International Security Policy			✓
358 - United States Foreign Policy			✓
359 - Current Issues in American Foreign Policy			✓
360 - American Institutions: Congress			✓
361 - American Institutions: The Presidency			✓
370 - Religion and Politics (RELIG)			✓

371 - Introduction to Public Administration			✓
381 - International Political Economy			✓
383 - Environmental Politics and Policies (ENV S)			✓
385 - Women in Politics (W S)	✓		
413 - Intergovernmental Relations			✓
417 - Campaign Rhetoric (SP CM)			✓
420 - Constitutional Law			✓
421 - Constitutional Freedoms			✓
422 - International Law			✓
430 - Foundations of Western Political Thought (CL ST)			✓
431 - Modern Political Thought			✓
442 - The Policy and Politics of Coastal Areas (ENV S)			✓
452 - Comparative Foreign Policy		✓	
453 - International Organizations			✓
470 - Political Game Theory			✓
477 - Government, Business, and Society			✓
480 - Ethics and Public Policy			✓
485 - Comparative Public Administration			✓
487 - Electronic Democracy			✓

Psychology (PYSCH):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
101 - Introduction to Psychology			✓
230 - Developmental Psychology			✓
280 - Social Psychology			✓
314 - Motivation			✓
315 - Drugs and Behavior			✓
316 - Cognitive Psychology			✓
318 - Thinking and Decision Making			✓
346 - Psychology of Women (W S)	✓		
360 - Personality Psychology			✓
381 - Social Psychology of Small Group Behavior (SOC)			✓
401 - History of Psychology			✓
460 - Abnormal Psychology			✓

Religious Studies (RELIG):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
205 - Introduction to World Religions		✓	
210 - Religion in America	✓		
220 - Introduction to the Bible			✓
242 - History of Christianity: Beginnings to the Reformation		✓	
280 - Introduction to Catholicism			✓
321 - Old Testament			✓
322 - New Testament			✓
334 - African American Religious Experience (AF AM)	✓		

336 - Women and Religion (W S)	✓		
340 - Magic, Witchcraft, and Religion (ANTHR)		✓	
342 - Religion and U.S. Latino/a Literature (US LS)	✓		
350 - Philosophy of Religion (PHIL)			✓
352 - Religious Traditions of India		✓	
358 - Introduction to Islam		✓	
360 - Religious Ethics			✓
370 - Religion and Politics (POL S)			✓
376 - Classical Archaeology (ANTHR, CL ST)		✓	
377 - Social Dimensions of Religion (SOC)			✓
384 - Religion and Ecology (ENV S)		✓	
453 - Buddhism		✓	
485 - Theory and Method in Religious Studies			✓

Sociology (SOC):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
134 - Introduction to Sociology			✓
219 - Sociology of Intimate Relationships			✓
230 - Rural Society in Transition			✓
235 - Social Problems and American Values	✓		
241 - Youth and Crime n (CJ ST)			✓
305 - Social Psychology: A Sociological Perspective			✓
310 - Community			✓
325 - Transition in Agriculture			✓
327 - Sex and Gender in Society (W S)	✓		
328 - Sociology of Masculinities and Manhood	✓		
330 - Ethnic and Race Relations (AF AM)	✓		
331 - Social Class and Inequality	✓		
332 - The Latino/Latina Experience in U.S. Society (US LS)	✓		
334 - Politics and Society (POL S)			✓
340 - Deviant and Criminal Behavior (CJ ST)			✓
345 - Population & Society (ENV S)		✓	
362 - Applied Ethics in Agriculture (ECON)			✓
377 - Social Dimensions of Religion (RELIG)			✓
380 - Sociology of Work			✓
381 - Social Psychology of Small Group Behavior (PSYCH)			✓
382 - Environmental Sociology (ENV S)			✓
401 - Contemporary Sociological Theories			✓
411 - Social Change in Developing Countries		✓	
415 - Dynamics of Social Change			✓
484 - Topical Studies in Criminal and Juvenile Justice (CJ ST)			✓
485 - Sociology of the Family			✓

Speech Communication (SP CM)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
323 - Gender and Communication (W S)	✓		
417 - Campaign Rhetoric (POL S)			✓

Technology and Social Changes (T SC):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
341 - Technology: International, Social, & Human Issues			✓
342 - World Food Issues: Past and Present (AGRON, ENV S, FS HN)		✓	
343 - Philosophy of Technology (PHIL)			✓
474 - Communication Technology & Social Change (JL MC)		✓	

Theatre (THTRE):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
465 - History of Theatre I			✓
466 - History of Theatre II			✓

U.S. Latino/a Studies Program (US LS)	U.S. Diversity	Intl. Persp.	IE SSH ONLY
211 - Introduction to U.S. Latino/a Studies	✓		
332 - The Latino/Latina Experience in U.S. Society (SOC)	✓		
342 - Religion and U.S. Latino/a Literature (RELIG)	✓		
343 - Latin American Government and Politics (POL S)			✓

Women's Studies (W S):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Women's Studies	✓		
203 - Introduction to Lesbian Studies	✓		
301 - International Perspectives on Women and Gender		✓	
307 - Women in Science and Engineering (BIOL)	✓		
321 - Economics of Discrimination (ECON)	✓		
323 - Gender and Communication (SP CM)	✓		
327 - Sex and Gender in Society (SOC)	✓		
328 - Sociology of Masculinities and Manhood (SOC)	✓		
336 - Women and Religion (RELIG)	✓		
338 - Feminist Philosophy (PHIL)	✓		
340 - Women's Literature (ENGL)	✓		
342 - American Indian Women Writers (AM IN) (ENGL)	✓		
345 - Women & Literature: Selected Topics (ENGL)	✓		
346 - Psychology of Women (PSYCH)	✓		
350 - Women of Color in the U.S. (AF AM)	✓		
374 - Sex, Gender, and Culture in the Ancient Mediterranean World (CL ST, HIST)		✓	
380 - History of Women in Science, Technology, and Medicine (HIST)	✓		
385 - Women in Politics (POL S)	✓		
386 - History of Women in America (HIST)	✓		
401 - Feminist Theories			✓
422 - Women, Men, and the English Language (ENGL, LING)	✓		
444 - Sex and Gender in Cross-cultural Perspective (ANTHR)			✓
494 - Women/Gender in Art (ART H)	✓		

The following courses are worth 2 credits out of the total of 12 needed for the SSH requirement:			
	U.S. Diversity	Intl. Persp.	IE SSH ONLY
ENV S 201 - Introduction to Environmental Issues (BIOL, ENSCI)			✓
CL ST 394 - The Archaeology of Greece: An Introduction		✓	

**** Be sure to check the current catalog for prerequisites.****

Last Updated 8/2016 HMR

Courses Not Offered in 2016-2017 Catalog

The courses listed below are approved for Industrial Engineering majors, but are not being offered in the 2015-2016 academic year. If you took one of these courses in the past, it will still count towards your IE degree.

Engineering Electives not in 2016-2017 Catalog			
A B E 511	Bioprocessing and Bioproducts (C E)	A B E 216, C E 326 or equivalent, MATH 160 or MATH 165, CHEM 167 or higher, BIOL 173 or BIOL 211 or higher, senior or graduate classification	F.
A E 423x	Energy and the Environment	MATH 160 or higher, PHYS 221, A B E 216 or ME 270	F.
C E 430x	Aerobic Bioproducts	C E 326	VARIES
C E 511	Bioprocessing and Bioproducts (A B E)	A B E 216, C E 326 or equivalent, MATH 160 or MATH 165, CHEM 167 or higher, BIOL 173 or BIOL 211 or higher, senior or graduate classification	F.
CON E 454x	Building Energy Modeling	CON E 354	F.
ECON 333	Advanced Farm Business management	ECON 230	VARIES
I E 409	Interdisciplinary Systems Effectiveness	Junior or senior classification	FSS
MAT E 363	Materials for Wind Energy	ENGR 340	S
M E 446	Power Plant Design	M E 332, credit or enrollment in M E 335	F.
M E 540	Solar Energy Systems	ME 436	F.

SSH Classes not in 2016-2017 Catalog	U.S. Diversity	Intl. Persp.	IE SSH ONLY
AF AM 325 - Peoples and Cultures of Africa		✓	
AF AM 348 - Cont. African American Literature	✓		
AM IN 328 - American Indian Religions (RELIG)	✓		
AM IN 432 - Current Issues in Native North America (now listed as AM IN 332)	✓		
ANTHR 325 - Peoples and Cultures of Africa		✓	
ANTHR 337 - Andean Archaeology		✓	
ANTHR 412 - Psychological Anthropology	✓		
ANTHR 432 - Current Issues in Nat. N. America (now listed as ANTHR 332)	✓		
ANTHR 439 - Medical Anthropology		✓	
ART H 181 - Origins and Evolution of Modern Design			✓
CL ST 404 - Roman Social History			✓
CRP 253 - Survey of Community and Regional Planning			✓
CRP 270 - Forces Shaping Our Metropolitan Env. (DSN S 270)	✓		
CZECH 101 - Elementary Czech			✓
CZECH 102 - Elementary Czech II		✓	
CZECH 201 - Intermediate Czech I		✓	
CZECH 202 - Intermediate Czech II		✓	
DSN S 221 - History of Architecture I (ARCH)		✓	
DSN S 222 - History of Architecture II (ARCH)		✓	
DSN S 270 - Forces Shaping Our Metropolitan Environment	✓		

DSN S 280 - History of Art I (ART H)		✓	
DSN S 281 - History of Art II (ART H)		✓	
DSN S 371 - History of Modern Landscapes, 1750 to Present			✓
DSN S 373 - Gardens and Landscapes from Antiquity to 1750		✓	
DSN S 382 - Art and Architecture in Asia		✓	
DSN S 383 - Greek and Roman Art			✓
DSN S 385 - Renaissance Art			✓
DSN S 388 - Modern Art and Theory			✓
DSN S 395 - Art and Theory Since 1945	✓		
DSN S 396 - History of Photography			✓
DSN S 481 - Art and Architecture in India		✓	
DSN S 487 - Nineteenth Century Art			✓
DSN S 494 - Women/Gender in Art	✓		
ECON 308 - Agent-Based Computational Economics			✓
ECON 312 - History of Economic Thought			✓
ENGL 205 - Popular Culture Analysis			✓
ENGL 231 - Readings in American Literature & Culture			✓
ENGL 301 - Cultural Studies			✓
ENGL 348 - Cont. African American Literature	✓		
ENGL 366 - Studies in Drama			✓
ENGL 374 - Studies in British Literature: The Renaissance		✓	
ENGL 378 - Studies in British Literature: 1900 to Present			✓
ENGL 384 - 20th Century & Contemporary Literature			✓
ENGL 482 - Environmental Politics & Policies			✓
FRNCH 310 - French Pronunciation and Phonetics			✓
FRNCH 314 - Textual Analysis			✓
FRNCH 333 - Modern French Literature		✓	
FRNCH 334 - The French Literary Tradition		✓	
FRNCH 375 - Contemporary France and the Francophone World		✓	
FRNCH 395 - Study Abroad		✓	
FRNCH 440 - Topics in French Studies		✓	
FRNCH 471 - Foundations of French Civilization		✓	
FRNCH 472 - Modern France and French Civilization		✓	
FS HN 432 - World Food Issues: Past and Present (AGRON, ENV S, T SC)		✓	
GER 471 - Foundations of German Civilization			✓
GER 472 - Topics in German Cultural Studies (now listed as GER 476)			✓
GREEK 441 - Advanced Readings in Greek Literature		✓	
GREEK 442 - Advanced Topics in Greek Literature		✓	
HIST 245 - Introduction to Latin American History		✓	
HIST 285 - Modern Wonders of the World			✓
HIST 323 - Science and Religion (RELIG)		✓	
HIST 388 - History of Modern Astronomy			✓
HIST 351 - Social and Cultural History of American People I			✓
HIST 352 - Social and Cultural History of American People II			✓
HIST 371 - The Holocaust in Text, Image, and Memory		✓	
HIST 305 - Cultural Heritage of the Modern World			✓
HIST 339 - U.S.-Asian Relations		✓	
HIST 404 - Roman Social History			✓

HIST 410 - 19th Century Europe			✓
HIST 419 - History of Modern France			✓
HIST 425 - History of Modern Germany II		✓	
HIST 441 - History of Modern Mexico and Central America			✓
HIST 454 - Slavery and the Crisis of Union (now listed as HIST 355)			✓
HIST 455 - The U.S. Civil War and Reconstruction (now listed as HIST 356)			✓
HIST 458 - U.S. World War I to 1945			✓
HIST 459 - U.S. 1945-1969			✓
HIST 460 - The Great Plains			✓
HIST 462 - History of American Thought I			✓
HIST 463 - History of American Thought II			✓
HIST 464 - Nineteenth Century America			✓
HIST 466 - North American Expansion			✓
HIST 469 - Contemporary America			✓
HIST 470 - The United States and the Cold War I			✓
HIST 471 - The United States and the Cold War II			✓
HIST 483 - History of Social and Behavioral Sciences			✓
HIST 484 - Science, Technology, Medicine, and Public Policy			✓
HIST 489 - History of American Science			✓
HD FS 349 - Parenting and Family Diversity Issues (now listed under HD FS 249)	✓		
LAS 211 - Introduction to U.S. Latino/a Studies	✓		
LAS 225 - Introduction to Asian American Studies	✓		
LAS 325 - Introduction to Asian American Studies	✓		
LAS 385 - The Holocaust		✓	
LATIN 441 - Advanced Readings in Latin Literature		✓	
LATIN 442 - Advanced Topics in Latin Literature		✓	
MUSIC 471 - Tones of Florence - A Study in Humanism		✓	
MUSIC 472 - History of American Music	✓		
PHIL 460 - Epistemology and Metaphysics			✓
POL S 311 - Municipal Government and Politics			✓
POL S 332X - Latino Politics	✓		
POL S 341 - Politics of Japan		✓	
POL S 406 - Public Opinion and Voting Behavior (now listed as POL S 306)			✓
POL S 410 - Iowa Government and Politics			✓
POL S 433 - American Political Thought			✓
POL S 451 - International Politics of Asia			✓
POL S 464 - Political Parties and Interest Groups			✓
POL S 483 - Law and Management			✓
POL S 486 - Science, Technology, and Public Policy (now listed as POL S 335)			✓
POLSH 101 - Elementary Polish I			✓
POLSH 102 - Elementary Polish II		✓	
POLSH 201 - Intermediate Polish I		✓	
POLSH 202 - Intermediate Polish II		✓	
PORT 101 - Elementary Portuguese I			✓
PORT 102 - Elementary Portuguese II		✓	
PORT 112 - Accelerated Portuguese II		✓	
PORT 202 - Intermediate Portuguese II			✓
PORT 301 - Advanced Grammar, Composition, and Conversation			✓

PORT 321 - Luso-Brazilian Civilization and Culture			✓
PORT 330 - Readings in Luso-			✓
PORT 370 - Luso-Brazilian Topics in English Translation			✓
RELIG 260 - Religious Ethics (now listed under RELIG 360)			✓
RELIG 323 - Science and Religion (HIST)		✓	
RELIG 328 - American Indian Religions (AM IN)	✓		
RELIG 333 - Introduction to Judaism		✓	
RELIG 338 - Latino/a Religious Experience			✓
RELIG 356 - African Religions		✓	
RUS 320 - Russia Today (now listed as RUS 375)			✓
RUS 376 - Topics in Russian, East European, and Eurasian Studies			✓
RUS 401 - Advanced Composition and Conversation			✓
RUS 440 - Seminar in Russian Studies			✓
SERBC 101 - Elementary Serbo-Croatian I			✓
SERBC 102 - Elementary Serbo-Croatian II		✓	
SOC 130 - Rural Institutions and Organizations			✓
SOC 264 - Small Group Dynamics			✓
SOC 420 - Complex Organizations			✓
SOC 431 - Chicanos/Chicanas in Contemporary Society	✓		
SOC 435 - Urban Sociology			✓
SOC 461 - Life Course Sociology			✓
T C 165 - Dress and Diversity in Society (now listed as AMD 165)	✓		
T C 354 - History of European & North American Dress (now listed as AMD 354)		✓	
T C 362 - Cultural Perspectives of Dress (now listed as AMD 362)		✓	
U ST 342 - World Food Issues: Past and Present		✓	
W S 394 - Women in Art	✓		

Last updated 8/2016 HMR

Part 4

PREPARING YOUR ACADEMIC PLAN

Step 1 – Review Important Resources

Step 2 – Understand the Student/Adviser
Relationship

Step 3 – Select a Catalog

Step 4 – Develop the Plan

Step 5 – Determine Your Electives

Step 6 – Choose a Focus Area

Tips for the Planning Process

Curriculum Planner

PART 4 – PREPARING YOUR ACADEMIC PLAN

Step 1 – Review Important Resources

Maintain these important resources while you are a student at Iowa State. They are especially helpful when registering for classes but also are excellent references whenever you have a question and want to find the answer yourself. The on-line versions are kept up-to-date and thus have more current information than the paper versions.

- *Orientation Notebook*

The red notebook you received at orientation is full of useful information on university policies, procedures, resources, jargon, history, and customs, plus some community information as well. This document is available only in its paper version.

New Student Programs (515)294-5492
2630 Memorial Union nsp@iastate.edu

- *Industrial and Manufacturing Systems Engineering Undergraduate Handbook*

The IMSE Handbook contains information about your degree requirements, policies and procedures, and the resources available through the IMSE Department, the College of Engineering, and the university.

Available online at: <http://www.imse.iastate.edu/undergraduate-program/advising/>

- *Undergraduate and Graduate Courses and Programs*

The catalog outlines your degree program. It also summarizes course content and prerequisites and co-requisites for courses. Information regarding a variety of policies and procedures is included.

Iowa State University Catalog; available online at: <http://catalog.iastate.edu/>

Office of the Registrar (515)294-1840
214 Enrollment Services Center registrar@iastate.edu

- *Schedule of Classes*

The *Schedule of Classes* provides a list of all current course offerings for the upcoming semester. Also included are an academic calendar, registration instructions, current fees, and other practical information. This document is published each semester and is currently available only in its on-line version.

Available online at: <http://classes.iastate.edu/>

Office of the Registrar (515)294-1840
214 Enrollment Services Center registrar@iastate.edu

- *Student Life Policies*

These are the policies and procedures that all ISU students are expected to know, understand, and follow while at Iowa State University. They include policies about student conduct, academics, and residence hall policies.

Available online at: <http://www.policy.iastate.edu/policy/student-life>.

Dean of Students Office (515)294-1020
1010 Student Services Building dsoweb@iastate.edu

Step 2 – Understand the Student/Adviser Relationship

In the relationship between a student and an academic adviser, each party has certain responsibilities.

The Adviser's Role

Your academic adviser in IMSE makes students the top priority and works as a student advocate. The adviser's role is to assist you in reaching your goal of acquiring an education and eventually a degree. While it is ultimately your responsibility to make sure you are meeting all graduation requirements, frequent contact with your adviser will help you in this process.

Your adviser listens to your concerns and questions. Often the adviser will explain policies and procedures or, if there are options, give you objective and practical advice to help you decide on a course of action.

If you have questions or are experiencing academic problems, please don't wait for your adviser to contact you. Call or email to make an appointment right away.

The Student's Role

It is your responsibility to know about all the policies and procedures that apply to you as a student. You are expected to consult with your adviser frequently and come prepared to your advising appointments. Above all, ignore rumors and avoid advice from other students – get accurate information from your adviser instead.

Here are some suggestions of what you can do to stay on top of your academic situation:

- Keep informed about all important dates and deadlines, such as the last day to drop a course, start dates for registration, and the deadline for paying fees.
- Each semester, review your degree audit and immediately resolve any questions you have about it.
- Plan your program of study, i.e., which semesters you will take the required courses, electives, study abroad experience (if you choose one), and co-op/intern experience (if you choose one).

- Know which catalog you are on and which degree requirements you must meet.
- Review the graduation requirements specific to Industrial Engineering, and make sure that your program of study satisfies all of them.

Caution: Your lack of awareness concerning the policies, procedures, and expectations of the College of Engineering and the university can result in a delayed graduation.

Step 3 – Select a Catalog

A student may choose to graduate under the catalog in effect at the time of graduation or a catalog for the previous five years, provided it covers a period of his or her enrollment. Full requirements of the chosen catalog must be met except that adjustments will be made in instances where courses are no longer available or where programs have been changed.

Step 4 – Develop the Plan

As early as possible, develop an academic plan, semester by semester, through graduation. The plan includes all the courses required to receive a degree and should follow a similar format to the “Suggested Course Sequence Guide” for your catalog.

You can use the “IMSE Required Course Offerings by Semester” to check the terms in which the courses are usually offered so that you can more easily fit them into your graduation plan.

Step 5 – Determine Your Electives

Your degree program contains a certain number of credits designated as electives. This means that you have a choice among courses within a given subject matter designation. Courses for elective credit may be chosen from the approved lists provided in this handbook: Management, Focus Areas, Engineering Topic, and Social Sciences and Humanities. It is your responsibility to check on the prerequisites for the courses you are interested in, making sure you are eligible and prepared to take them. Also, check the terms in which the courses are usually offered so that you can more easily fit them into your graduation plan.

Step 6 – Choose a Focus Area

The IMSE Department offers five focus areas: engineering management, manufacturing, operations research, human factors, and enterprise computing. You also have the option (“general”) which is a mixture of courses from any of the five areas.

Tips for the Planning Process

As you work on your academic plan, consider the following issues:

- Be aware that many IE courses have accompanying labs, and the number of credits awarded for a course may not reflect the amount of time you are actually in class.
- Strike a balance between the so-called “light” and “heavy” courses. Deferring all “heavy” courses to your senior year is a strategy that could backfire.
- Know when management and focus electives are offered and whether you have the prerequisites for them.
- Decide whether you will participate in a co-op or internship program so you can plan when to take the courses you might miss on campus that semester.

- Decide whether you will study abroad so that you and your adviser can plan what courses you will take at the other institution and how they will affect the rest of your plan.
- If you have a very low GPA, consider taking lighter course loads (no more than 12 credits) until you can build up your average.
- Few IE courses are offered during summer sessions, so it would be better not to rely on summer classes as you plan your program. If you want to take a class in the summer, check the course schedule for that term and consult with your adviser.
- Consider repeating a course and using “designated repeat credits” to your advantage. You are allowed to repeat up to 15 credits where the most current grade is used in your cumulative GPA instead of the previous grade. Talk with your adviser about judiciously using designated repeats.
- Co-op/internship participation, course drops, and repeats often require additional semesters.

Part 5

REGISTERING FOR CLASSES

Degree Audits

Registration Procedure

PART 5 – REGISTERING FOR CLASSES

Degree Audits

Students are able to view their individualized degree audit through the AccessPlus system at any time during the semester. The degree audit is an essential tool to have when developing your academic plan. Students are allowed to run 10 degree audits per day.

Because of periodic changes in offerings, the courses you have taken may not conform exactly to those required on your degree audit. If there are differences, ask your adviser to fill out a form called Petition for Degree Audit Course Adjustments, requesting that the college office make minor adjustments to your degree audit.

YOU are ultimately responsible for your academic plan. It would be devastating to find out in your last semester that you do not have enough credits in the right areas to graduate.

Therefore, you must monitor your degree audit carefully. Each semester, make sure that the credits you have taken and the credits remaining to be taken add up to the subtotal on the degree audit and that courses appear in the correct areas.

The degree audit is divided into the following seven areas of study:

1. International Perspectives
2. U. S. Diversity
3. Communication Proficiency and Remaining Communication Courses
4. Foreign Language
5. Social Sciences and Humanities
6. Basic Program
7. Math and Physical Science
8. Industrial Engineering Core
9. Other Remaining Courses
 - 6A. Other General Engineering Courses
 - 6B. Focus Electives
 - 6C. Management Electives
 - 6D. Engineering Topic Electives
10. Required Seminar
11. Courses Not Applied to Degree Program

DARS (Degree Audit Reporting System)

Beginning in Fall 2007 the College of Engineering changed the degree audit system to DARS (Degree Audit Reporting System). The degree audit system produces individualized reports that reflect a student's academic progress toward a specified degree. It will compare the student's course work, both here and transfer work, with the requirements of the Industrial Engineering academic degree program and prepares a report, or audit, which details the student's progress toward meeting those requirements.

What's on a degree audit?

- Courses you've completed, with the grade and term taken
- Courses you're currently enrolled in (CUR) or registered for in future terms (REG)
- Courses and requirements not yet completed
- Updates to other important information (number of drops, probation status, etc.)
Includes minors, double majors, & honors

What does a DARS audit look like?

Divided into categories:

- Student information
- University requirements
- College requirements
- Department requirements
- "Courses Not Applied"
- Common sections
- "Legend" & disclaimer

Terms to Remember

Requirement

- OK
- NO
- IN-PROGRESS

Sub-requirement (subgroup)

- + means Completed
- means incomplete

Use the Legend to decipher other markings.

Messages Examples:

- Your application for graduation has been received
- 2.00 ISU cum required for Basic Program completion
- Engl 150/250 min grade C, Minimum GPA 2.0

Check your degree audits carefully every semester

ALWAYS CONSULT YOUR ADVISER!

Registration Procedure

Here's what to do:

1. Go into AccessPlus; review your registration start date and time. It will be listed under Student Information.
2. Check your degree audit in AccessPlus.
3. Make an advising appointment by e-mailing imseappt@iastate.edu with available times and the name of your adviser.
4. Make sure that you have completed a Graduation Plan. There **must** be one on file to receive your RAN#.
5. Check out the registration information on the IMSE web site:
<http://www.imse.iastate.edu/undergraduate-program/advising/>
6. Once you have your RAN, you will register yourself through AccessPlus on your start date.

Certain groups of students need to meet with the academic adviser due to special circumstances, namely,

1. New students in the department (new freshmen, transfers, major changes)
2. Students on academic warning or probation
3. Graduating seniors
4. Students planning co-ops or internships
5. Students planning to study abroad

Part 6

POLICIES & PROCEDURES

Academic Dishonesty
Auditing a Course
Calculating Your GPA
Curriculum/Major Changes
Designated Repeats
Drops – Maximum Number
English Proficiency
Independent Study (IE 490)
Minimum GPAs
Minors
Pass/Not Pass
Schedule Changes
Social Sciences & Humanities Electives
Substitutions to the Curriculum
Academic Probation
Transfer Credits
Validation of Enrollment

PART 6 – POLICIES & PROCEDURES

Academic Dishonesty

The faculty of the IMSE Department will not tolerate unethical and dishonest practices in the classroom or laboratory. Students in violation of this policy will be treated according to Iowa State University policies on academic dishonesty.

(<http://www.dso.iastate.edu/ja/academic/misconduct.html>)

Auditing a Course

Auditing means you are enrolling in a course without receiving a grade or credit for that course. An audit counts for credit in terms of ISU billing, but it does not count towards maintaining full-time status. This option generally should be used only to take a course for which you have some interest, but that has no impact on your degree plan, or you are totally unfamiliar with the subject area and want a “trial run.”

Audits do not count towards your degree program, and the course can be taken again for credit. Audited courses do not appear on your permanent record, unless you make a special request through your academic adviser and can demonstrate active participation in the course. Audits do give you the same rights and privileges of any other student taking the course.

Audits cannot be added through AccessPlus: You must have the instructor’s signature on an Add/Drop Slip. Audits must be declared within the first 10 days of class.

If you change a class from credit to audit, you are officially dropping the class and adding it as an audit. This means you will use one of your drops if you change to an audit after the first week of the semester.

Calculating Your GPA

1. Multiply the number of credits by the numerical value of the grade you earned to determine quality points. For example, PHYS 221 is a 5-credit course. If you earned a B+ in PHYS 221, you would acquire $(5 \times 3.33) = 16.67$ quality points (QP).
2. Add in the numerical value of grades (See ‘Basic Program Requirements’ in this handbook).
3. Sum all quality points.
4. Sum all credits.
5. Divide total quality points by total credits to get your term GPA.

Note: Grades transferred from another institution are used only for Basic Program and Core GPA purposes. Transfer grades do not affect your cumulative GPA at Iowa State.

Curriculum/Major Changes

Before making a change of curriculum or major, please take the time to investigate your proposed area of study by visiting with an adviser in the department of interest or with other students currently enrolled in that curriculum.

A curriculum change implies that you are staying within the College of Engineering but are selecting a different discipline. For example, if you are presently an IE student and want to change your curriculum to Chemical Engineering (CH E), you would go through the sequence of steps outlined below.

1. Begin with your current adviser in Industrial Engineering. The IE adviser provides you with a File Transmittal form and your advising file.
2. Proceed with the File Transmittal form and advising file to the Engineering Classification office in 1300 Marston Hall. The Classification office records the change on your permanent file.
3. Proceed from Classification to your new departmental office. In this example, that would be the main office of the Department of Chemical Engineering. Your advising file stays in the new departmental office, and you are assigned a new adviser.

If you are leaving the College of Engineering for a department in another college, then you are making a major change. In that case, there is an additional step between steps 2 and 3:

- 2A. After leaving the College of Engineering Classification office, proceed to the Student Services office in your new college. Usually someone in the Engineering Classification office tells you the location of that office.

If you are on Academic Probation and want to change to another college, you must first receive permission from the college and department you wish to enter. If you proceed with the change and at a later time decide that you would like to transfer back to the College of Engineering, you must receive permission from the College of Engineering Academic Standards Committee.

Designated Repeats

You may repeat classes to improve your grades, up to a limit of 15 credits. The most recent grade and credits will be used in computing your cumulative GPA, but all grades will remain on your record. You may NOT repeat a course under Pass/Not Pass.

If more than three semesters of enrollment have elapsed since you first took the course or if the course number or credits has changed, you must fill out the Designated Repeat form available from your adviser.

Drops – Maximum Number

Whenever you think about dropping a course, carefully weigh the consequences. Dropping a single course can significantly change the remainder of your academic plan.

If you enter Iowa State as a freshman, the maximum number of courses that may be dropped after the first week of classes is five. Course drops during your first semester as a freshman are not included in this limit, and summer session is not counted as a first semester. Transfer students entering at the sophomore level or above are allowed four drops. Students who have already earned a bachelor's degree are allowed two drops. Note: Courses changed to "audit" status during a semester count as drops.

English Proficiency

The department requires a C grade (2.0) or better in both ENGL 150 and 250.

Independent Study (I E 490)

Students who are in good standing may earn credit under a 490 number by studying independently under the direction of an IMSE professor. Credits taken under the 490 number must have an Independent Study Proposal form approved before you register for the course. This proposal must carry the signed approval of the faculty member under whom the work will be done, your adviser, and the IMSE Department Chair. After the proposal is approved, a copy will be returned to you and another will be filed with the adviser.

A maximum of three credits of I E 490 may be counted toward the degree, although you may request more if you can demonstrate extenuating circumstances (see your adviser about this process). I E 490 courses are usually graded as Satisfactory/Fail.

Minimum GPAs

A minimum GPA of 2.00 must be earned for both the Basic Program and the Iowa State cumulative GPA before you are eligible to take 200-level (or higher) engineering courses.

To graduate, you need a 2.00 grade point average in Industrial Engineering core courses and a cumulative GPA of at least 2.00.

Minors

If you are interested in studying another area of interest, you might consider declaring a minor in that area. In the College of Engineering, the minors available are Bioengineering, Engineering Sales, Nondestructive Evaluation, and Nuclear Engineering. However, engineering students may also take minors in other departments that offer minors.

A minor consists of at least 15 credits. Nine credits must be used only in the minor, but the remaining credits may be counted toward requirements in both the minor and the major, if possible.

Check with the minor department and the Catalog about specific requirements for obtaining the minor.

Pass/Not Pass

Pass/Not Pass (not to be confused with Satisfactory/Fail) means you are enrolled in a course for credit, but are being graded on a Pass/Not Pass basis instead of a normal letter grade. Pass/Not Pass counts as credit for both ISU billing and for maintaining full-time status. This option should be used only to take a course for which you have some interest, but do not intend on using for your degree program.

There are many rules governing taking courses on a Pass/Not-Pass basis, but most students can decide whether or not to consider this option by asking two questions:

- Do I want to apply this course to my degree program?
- Is this class required for my major? Once you have taken a course Pass/Not Pass, you can never retake it for credit. This means you can't take any required courses on a Pass/Not Pass basis.

If you answered no to both of those questions, then you should consult with your academic adviser about taking a course Pass/Not Pass. Courses can be changed to Pass/Not Pass basis until the drop deadline (see the [ISU Academic Calendar](#)), and you need only your academic adviser's signature.

Your instructor will not know you are taking the course Pass/Not Pass; they will still consider you a student taking the course for credit.

Once final grades are submitted, the registrar's office will change your letter grade to P or NP. A D- or higher grade is required to receive a P.

Pass/Not Pass courses do appear on your permanent record.

Schedule Changes

The procedure for adding or dropping courses depends on when you want to make the change. Basically, there are four stages where the deadlines, signature requirements, and fee vary:

Before the first day of classes

Use AccessPlus to add or drop a class. These changes are not shown on your permanent record. If you want to cancel your registration completely, you must do so before classes begin. Otherwise, you are assessed tuition and fees, which accumulate until you notify the Registrar's Office about the cancellation.

Period 1 (during the first five days of the semester)

Use AccessPlus to add or drop a class. The schedule changes you make during the first five days of classes do not count against your permanent record. In general, no additional signatures are needed. However, if a class is closed or if permission is required to add the class, you will need the instructor's signature on an add/drop slip, which you will take to 10 Enrollment Services Center.

Period 2 (after the fifth day of classes)

Follow this procedure:

1. Pick up an add/drop slip from your adviser.
2. Have your adviser approve the change with a signature on the add/drop slip.
3. Take the slip to the instructor of the class you wish to add or drop, and have the instructor approve the change with a signature.
4. Finally, take the slip to 10 Enrollment Services Center. A scheduling fee is added to your university bill.

Changes made after the fifth day of classes count against your permanent record. During your first term at Iowa State, drops processed after the first week of classes are shown on your permanent record but are not deducted from the total number of drops allowed. (See Drops–Maximum number.)

Period 3 (after the drop deadline)

The last day to drop a class will always be noted in the Academic Calendar. After the drop deadline has passed, a drop or add will not be approved except for unusual circumstances beyond the student's control. Such changes MUST be supported by the adviser and approved by the Engineering Student Services Office, 1300 Marston Hall. In some cases, review by the College of Engineering Academic Standards Committee may be required.

Social Sciences & Humanities Electives

The IMSE Department has the following requirements for Social Sciences and Humanities (SSH) electives:

- You must complete 12 credits of SSH electives.
- You must include at least six credits (two courses) that are 200-level or above.
- You must include at least one six-credit sequence. A sequence is defined as at least two courses (usually three credits each) from the same or related discipline. Typically, a sequence consists of one course which is a prerequisite for the second.
- The list of approved SSH classes is included in this handbook. Please check these courses with your adviser prior to completing the course.
- You must include one International Perspectives course, and it must be selected from the university list of approved International Perspective courses*.
- You must include one U.S. Diversity course, and it must be selected from the university list of approved U.S. Diversity courses*.
- The International Perspectives and U.S. Diversity lists may be viewed on-line at <http://www.iastate.edu/~registrar/courses/div-ip-guide.html>

*Ideally, IE students will choose International Perspectives and U.S. Diversity courses from the approved IE SS/H list.

Substitutions to the Curriculum

On occasion, you may wish to deviate from the prescribed curriculum. Some flexibility may be allowed, particularly if you can demonstrate extenuating circumstances. All substitutions must be petitioned through the IMSE Curriculum, Assessment, and Standards Committee, (CASCOM; the curriculum committee). The role of the committee is to review substitutions to the prescribed curriculum in terms of university policies and ABET requirements. It is advisable to receive approval for your proposed change before taking a course outside the usual parameters. Talk to your adviser about this process.

Academic Probation Policy

Students are placed on academic probation status as a warning that their academic progress is not satisfactory and that they should take steps to improve their academic performance to avoid dismissal from the university.

Students who are placed on academic probation should immediately seek assistance in academic improvement from such sources as academic advisers, instructors, the Student Counseling Service, and the Academic Success Center. Additionally, students on academic probation and warning are required to meet with their advisor and to complete the Academic Intervention Self-Assessment form, which can be accessed through Access Plus. For more information, see <http://www.dso.iastate.edu/asc/ai/students/>.

Academic Warning, Probation, and Dismissal

Continued enrollment at Iowa State University depends upon an undergraduate student maintaining satisfactory academic progress toward attaining a degree. To assist students in maintaining satisfactory progress, Iowa State University has adopted academic standards designed to provide early identification of students who are experiencing academic difficulty, and to provide timely intervention through academic advising and academic support programs.

Academic standing at Iowa State University is dependent upon the total number of credits a student has attempted or earned, the student's semester grade point average (GPA), the student's cumulative ISU GPA, and the student's transfer GPA (if below 2.00.)

Academic Warning

While a warning (W) is the least severe of the negative academic actions, it serves as a reminder that future academic performance below 2.00 could result in more serious consequences. In fact, a student on warning whose subsequent term GPA is below a 2.00 will be placed on probation (P) the following term.

Students who receive an academic warning are required to develop a plan for academic improvement in consultation with their academic adviser or the Academic Success Center. A student who is subject to both academic warning and academic probation will be placed on academic probation. The academic warning is not a part of the student's permanent academic record.

Students will receive an academic warning (W) at the end of any fall or spring semester when they earn a GPA of 1.00 – 1.99 for that semester. At the end of the next fall or spring semester of enrollment, one of the following actions will be taken for students on academic warning status:

- Students will be placed on academic probation if they earn less than a 2.00 GPA for the next fall or spring semester, or
- They will be removed from warning status if they earn at least a 2.00 semester GPA for the next fall or spring semester and they are not subject to academic probation based on cumulative GPA (over 75 credits).

See Summer Academic Standards Regulations section for how summer grades affect warning, probation, or dismissal status.

Academic Probation

Academic probation is an indication of very serious academic difficulty which may result in dismissal from the university. Students may be placed on academic probation as a result of either semester GPA, cumulative GPA, or both.

Students who are placed on academic probation are required to develop a plan for academic improvement in consultation with their academic adviser which may include referral to the Academic Success Center. Academic probation status is not a part of the student's permanent academic record.

Students will be placed on academic probation (P) at the end of a semester/term for either of the following two reasons:

1. Semester GPA: Students who earn less than a 1.00 at the end of any fall or spring semester, or less than a 2.00 two consecutive semesters, will be placed on academic probation. Students will not be placed on academic probation at the end of the summer term due to summer term GPA only.
2. Cumulative GPA: Students with 75 or more credits attempted or earned, whichever is greater, will be placed on academic probation at the end of any fall or spring semester or summer term when their cumulative GPA is less than 2.00. Students with 75 or more credits attempted or earned who have a transfer GPA < 2.00 will be placed on academic probation at the end of any fall or spring semester or summer term when their combined transfer/ISU cumulative GPA is less than 2.00.

At the end of the next fall or spring semester of enrollment, one of the following actions will be taken for students on academic probation status:

- Students will be academically dismissed if they fail to earn at least a 2.00 semester GPA. At the end of any spring semester, students in dismissal status may enroll for summer term. (See Summer Option for Students in Dismissal Status in the Summer Academic Standards Regulations section.)
- Students will continue on academic probation if they earn at least a 2.00 semester GPA but are subject to continued academic probation based on their cumulative GPA (over 75 credits).
- Students will be removed from probation if they earn at least a 2.00 semester GPA and are not subject to continued academic probation based on their cumulative GPA (over 75 credits).
-

See Summer Academic Standards Regulations section for how summer grades affect warning, probation, or dismissal status.

Academic Dismissal

Students who do not meet the requirements of their academic probation are academically dismissed from the university. Each College Academic Standards Committee is responsible for final decisions regarding the academic status of students in that college, and any appeals to academic dismissal actions are considered by the college committee. Once dismissed, students are not allowed to reenroll at Iowa State University until they have been academically reinstated. (See section on reinstatement.) Academic dismissal is placed on the student's academic record as a permanent notation. The official transcript of a student who has been dismissed includes a "not in good standing" notation.

Summer Academic Standards Regulations

Students who are newly placed or continued on academic probation (P) at the end of the previous semester may enroll for the summer term without being in jeopardy of academic dismissal from the university at the end of that summer term.

Summer Combined Term GPA:

All students who attend summer session will have their academic status reassessed at the end of the summer based on the combined (not averaged) grade summaries of their previous term of attendance and summer term. Academic status (warning or probation) after summer session will be based on the resulting combined term GPA. The academic status resulting from the summer combined term GPA supersedes the academic status at the end of the previous term.

For students who have remaining designated repeat credits, courses taken in the previous semester and repeated in summer will be calculated as designated repeats in the combined term GPA.

The combined term GPA (summer plus preceding term) will not appear on the student's grade report or permanent record.

Summer term GPA alone cannot determine academic status. Students who initiate enrollment at Iowa State during the summer will not be placed on warning or probation regardless of their academic performance.

Summer Cumulative GPA:

A student who was on academic probation (P) at the beginning of summer term based only on cumulative GPA, who raises his or her cumulative GPA to over a 2.0 at the end of the summer term shall be removed from probation status at the end of the summer term.

A student with 75 or more credits attempted or earned, whichever is greater, will be placed on academic probation (P) at the end of the summer term if his or her cumulative GPA is less than 2.00.

A student with 75 or more credits attempted or earned who has a transfer GPA < 2.00 will be placed on academic probation (P) at the end of any summer term if his or her combined transfer/ISU cumulative GPA is less than 2.00.

Summer Option for Students in Dismissal Status:

A student considered for academic dismissal at the end of spring semester will be permitted to enroll for the summer term. The combined spring/summer GPA will be used to determine whether the student should be permitted to continue his/her enrollment after the summer term. If the resulting combined term GPA is not 2.00 or greater, the student will be academically dismissed.

Reinstatement

The procedures delineated in this section apply to students who were dismissed from Iowa State for academic reasons. Students who left Iowa State in good academic standing and who are seeking reentry should see Index, Reentry for more information.

1. Reinstatement is not automatic. Students who have been dismissed for academic reasons should contact the dean's office in the college they wish to enter for instructions specific to that college.
The college Academic Standards Committee reviews each petition and other relevant information, and reinstatement is based upon that review. As part of the petition process, students must submit a plan for academic success that identifies the causes of their poor academic performance and demonstrates that they have taken actions to avoid or eliminate these causes.
2. Students can only be reinstated after at least one academic semester has elapsed since they were academically dismissed. The summer session is not a semester for the purpose of being out of school one semester.
3. Students who have been dismissed from enrollment two or more times are not eligible for reinstatement until at least two academic semesters have elapsed since their last academic dismissal.
4. Students who were dismissed by one college and subsequently reinstated by another college cannot transfer back to the original college unless permission is granted by the Academic Standards Committee of the original college. This procedure applies regardless of the student's academic standing when the transfer is requested.
5. To be considered for reinstatement to the university, students must submit a petition to the Academic Standards Committee of the college in which they desire to enroll at least 45 days before the beginning of the semester. Students who have not been enrolled for a period of 12 or more months or who are international students must also file a reentry form prior to their return. For more information see the Reentry web site at <http://www.registrar.iastate.edu/info/reentry.html>. (Students dismissed for the second time and requesting reinstatement in the College of Liberal Arts and Sciences must submit their petition 70 days before the beginning of the semester.)
6. As a condition of reinstatement, students will reenter on academic probation and must accept whatever additional requirements are stipulated by the college Academic Standards Committee. Examples include full- or part-time status, specified credit hours, specific courses, specific GPAs, restriction on choice of major, and required counseling.

For more information on academic probation, academic dismissal, and reinstatement procedures, refer to the catalog. For reinstatement forms and information regarding deadlines, contact your adviser or the Engineering Undergraduate Programs Office in 1300 Marston Hall. (<http://www.engineering.iastate.edu/student-services/academic-standards/>)

Transfer Credits

If you have been admitted to Iowa State University from another institution or have taken classes at another school during the summer, it is likely that you have transfer credits. To have those credits become part of your academic record at Iowa State, ask the Registrar's Office at the other institution to send an official transcript to Iowa State. Make sure that you have the other school send your transcripts to Iowa State so that your classes can be evaluated in a timely manner. Credit cannot be awarded until a final grade from the other institution is submitted.

Prior Approval

Before taking a course for transfer credit, you will need to have the course evaluated by using TRANSIT: <https://transit.iastate.edu/>.

It is your responsibility to make sure the course you want to take can be designated as an acceptable substitute for a specific course at Iowa State. Likewise, it is your responsibility to ensure that any off-campus courses can be applied to your IE degree. See your adviser for help.

Transfer Credit Evaluation

When you have transfer credits from another institution, you receive a copy of the Transfer Credit Evaluation from the Office of Admissions. The Transfer Credit Evaluation lists how the courses you have taken at other schools transfer to Iowa State. It also lists the titles for each course, their respective credits, and the grade you earned in each one.

Courses will appear with first a department code, then the a number that stands for the course level, next the letter T for transfer, followed by the number of courses (i.e., Engr 1T22) are courses for which there is no direct equivalent at Iowa State. If you think a course sounds similar to one at Iowa State, you can request an evaluation by the appropriate department. You will need a course description from the catalog, a syllabus, and a Request for Department Review of a Transfer Course. To begin this process, see your adviser.

Policies

See your adviser about applying transferred credits toward your degree requirements. When requesting that transferred credits be applied to your degree, remember these policies:

1. Transfer credit with a grade less than a C will not be approved for application to the program.
2. Courses taken at other institutions may transfer even if they are offered for fewer credits than the comparable course at Iowa State. However, each such course must be listed by the Registrar's Office as an acceptable course for the specific requirement. For example, Physics 150 taken at Purdue for four credits might be acceptable if Iowa State

considers that course to be equivalent to Physics 221 for five credits. In that case, though, additional course work (in the same content area) would be required to make up the credit shortage before you graduate. In the case of credit deficiency in mathematics and basic sciences, appropriate engineering credits may be used to make up for the credit shortage. The total number of engineering credits used for such cases is limited to 2.

3. No more than 65 semester or 97 quarter credits earned at two-year colleges can be applied to a bachelor's degree from Iowa State University. While there is no limit to the number of credits that may be transferred from a four-year institution, the last 32 semester credits before receiving a degree from Iowa State University must be completed at Iowa State University.
4. In order to graduate, you must have earned at least 32 credits in residence at Iowa State University, and your final 32 credits must be taken at Iowa State. However, 6 of the last 32 credits may be transferred to Iowa State, with prior written permission of the IMSE Department. See your adviser regarding this written permission.
5. A transcript of your transfer work must be received by Iowa State by midterm of the term you plan to graduate.

Meeting Degree Requirements

When there is doubt as to whether transfer credit applies to the required curriculum, you may file a petition with the IMSE Curriculum, Assessment, and Standards Committee (CASCOMM). See your adviser to begin this process.

Transferred courses that are not applied towards your degree appear in the "Courses Not Applied" section at the bottom of your degree audit, along with any other non-applicable courses that you have completed. If you think that a transferred course should be applied to your degree but has not been, contact your adviser.

Validation of Enrollment

Your enrollment in a class must be validated by attendance at one of the first two class meetings following registration in the course. If enrollment is not validated, you may be asked to drop the course, and you must process the drop yourself. If you decide not to attend a course, it is your responsibility to get appropriate signatures on an add/drop slip. If you do not, you could earn a grade of "F" because the instructor will not automatically drop you from the class.

Part 7

WORK EXPERIENCES

Co-ops, Internships, & Summer Work

Engineering Career Services

PART 7 – WORK EXPERIENCES

Co-ops, Internships, & Summer Work

Engineering-related work experience gives you the unique opportunity of earning money while gaining valuable engineering experience. These programs allow you to apply what is learned in the classroom directly to industry. Upon returning from a work experience, you will find yourself better able to do the following:

- Understand your course work.
- See how engineering courses relate to the job.
- Determine if Industrial Engineering is the right major for you.
- Motivate yourself for better academic performance.
- Find permanent employment upon graduation.

For these reasons, a work experience during college is highly recommended, even though it is not required.

Here are definitions of three types of work experiences:

- Co-op – A twelve-month (minimum total) program in which you alternate between working on site and studying at Iowa State. Students are not allowed to be at a work site for twelve consecutive months. In general, students work for one semester, return to Iowa State for the next semester, and finish their co-op the following semester and the adjacent summer.
- Internship* – A work experience for one semester.
- Summer* – A work experience for the summer only.

* Students often combine the internship and summer work experience for a continuous work experience of seven to eight months.

For these types of work experience, you are still considered a full-time student at Iowa State but are not assessed tuition and fees while you are away. This allows you to maintain most of the benefits of being enrolled in college (such as parental health insurance coverage and deferred loan repayment). You maintain your full-time status by filling out paperwork with Engineering Career Services, Fourth Floor, Memorial Union and meeting with your adviser to discuss registration for the appropriate IE course. These are R-credit courses that are graded on a Satisfactory/Fail basis and do not affect your tuition.

Please note there is a mandatory evaluation process at the end of the co-op and internship experiences.

Engineering Career Services

Refer to the ECS web site (<http://www.engineering.iastate.edu/ecs/>) for information regarding ISU Career Management System, preparing resumes, interviewing for positions, letter writing, assessing and negotiating job offers and other items relating to career opportunities.

Engineering Career Services
3200 Marston Hall

(515) 294-2540
ecs@iastate.edu

Part 8

GRADUATION INFORMATION

General Requirements

32-Credit Rule

Graduation Checklist

PART 8 – GRADUATION INFORMATION

General Requirements

The semester before graduation is the time to resolve problems involving graduation requirements. You need to check with the Office of the Registrar's Graduation Office, 210 Enrollment Services Center to make sure that your program is in good standing.

To do that, submit an Undergraduate Application for Graduation form certifying your intent to graduate. You find it on-line in AccessPlus. The completed application must be submitted to the Graduation Office, 210 Enrollment Services Center, 515-294-9372, graduation@iastate.edu according to the following deadlines:

- Fall and Spring semesters: Last day of the semester prior to your graduation term.
- Summer Sessions: Last day of spring semester.

The application is valid for the term you have indicated on the application and certifies your intent to graduate. If you do not meet the graduation requirements, your application will be cancelled, and you will have to submit a new one for a future semester.

The Graduation Office notifies you of your graduation status by mail at your "in-session" address according to this timetable:

- Spring Semester – Approximately five weeks after classes
- Summer Semester – Approximately two weeks after classes begin
- Fall Semester – Approximately four weeks after classes begin

Detailed information about where, when, and how the ceremony will take place will be mailed to you after you have completed the Graduation Application Form. Your diploma is mailed to you two or three weeks after graduation.

32-Credit Rules

Iowa State University requires that all undergraduates earn at least 32 credits in residence, and your final 32 credits need to be taken in residence. However, 6 of the last 32 credits may be transferred to Iowa State, with prior written permission from the IMSE Department. Your transcript needs to be received at Iowa State by midterm of your graduation term.

If you are close to graduation and plan to take any course work at another institution, see your adviser before enrolling there.

GRADUATION CHECKLIST

During the semester before you graduate, make sure that you are on track by using this checklist.

OBJECTIVE	Yes	No
The graduation date on my degree audit is accurate. <i>(If not, see your adviser.)</i>		
I have registered for all the courses I need during the term I am graduating.		
My degree audit is accurate, and I have sufficient credits in each area to insure graduation. <i>(If not, see your adviser immediately.)</i>		
My cumulative GPA at Iowa State is at least 2.00. <i>(If you entered with a quality point deficiency, you must have earned sufficient quality points above a 2.00 to offset the deficiency.)</i>		
I have resolved any grades of "I" (incompletes) before midterm of the semester I plan to graduate.		
I have submitted all transcripts of courses taken at other institutions to the Office of Admissions.		
My final 32 credits have been taken at Iowa State. <i>(If not, see your adviser immediately.)</i>		
I submitted my graduation application to the Graduation Office in 210 Enrollment Services before the deadline <i>(see General Requirements above)</i> .		
I have resolved all outstanding financial aid obligations <i>(e.g., parking tickets, library fines, tuition, and fees)</i> .		

Part 9

MORE RESOURCES

Academic Services

Computer Help

Honors Program

IDEAL Learning Community

Scholarships

Student Organizations

Study/Work Abroad Opportunities

PART 9 – MORE RESOURCES

Academic Services

Iowa State students are eligible to receive a number of services sponsored by the Dean of Students Office (DSO) or the College of Engineering. Services offered by the DSO are designed to help you make the most of your time while earning your degree at Iowa State University. For academic assistance, tutoring, counseling, or information about the services offered by the DSO, you are encouraged to visit the DSO in 1010 Student Services Building or online at: <http://www.dso.iastate.edu/>. Contact information: (515)294-1020, dsoweb@iastate.edu.

LEAD Program

The Leadership through Engineering Academic Diversity (LEAD) Program is committed to improving the educational experience and academic success, retention, and graduation of minority engineering students at Iowa State University. Services available to minority students through the LEAD Program include tutoring, peer mentoring, and engineering learning communities. For more information about the LEAD Program, contact the LEAD Program Coordinator in 1300 Marston Hall. Website: <http://www.engineering.iastate.edu/lead/>

Computer Help

The following is a list of resource offices and websites that will help you find answers to your questions about technology at Iowa State.

IMSE Department contact: Mike Renze, System Support Specialist, mdrenze@iastate.edu

College of Engineering Technology Support: <http://it.engineering.iastate.edu/>

Computation Advisory Committee: <http://www.cio.iastate.edu/committees/cac/>

IT for Students: <http://www.it.iastate.edu/foryou/students/>

University Book Store: <http://www.isubookstore.com/home.aspx>

Tech CYte: <http://www.techcyte.isubookstore.com/home.aspx>

Honors Program

The University Honors Program at Iowa State (<http://www.honors.iastate.edu/>) promotes an enriched academic environment for students of high ability, regardless of major, who are interested in taking advantage of educational and intellectual opportunities and challenges. These include the pursuit of a broad liberal education, the ability to individualize the student's program of study, access to graduate-level courses, and the opportunity to be involved in research projects.

University Honors Program
2130 Jischke Honors Building

(515)294-4371
honors@iastate.edu

The academic advisers in IE will advise IE Honors Program members on their requirements.

IDEAL Learning Community

Learning communities provide an opportunity for students to improve their interactive, problem solving, and study skills. In addition to taking a cluster of courses together, students enjoy other academic, service, and social activities that enrich their learning. Participating students benefit from peer, faculty, and alumni mentoring.

For freshmen and transfer students who are majoring in Industrial Engineering, the learning community is called InDustrial Engineers Are Leaders (IDEAL).

For more information, contact Heather Robinson at (515) 294-7797 (IDEAL Freshmen) or Devna Popejoy-Sheriff at (515) 294-1603 (IDEAL Transfer).

Scholarships

Many students qualify for scholarships from ISU. Each year the College of Engineering awards about \$1,400,000 in scholarships to engineering students. The generous support of hundreds of individuals and corporations allows us to recognize the academic accomplishments of outstanding, hard-working students.

If you have questions, contact:

Scholarships and Awards Committee
Engineering Undergraduate Programs
1300 Marston Hall

(515)294-8355
engineering scholarships@iastate.edu

Student Organizations

A good way to feel connected on campus is to join a student organization. At Iowa State, there are hundreds to choose from across campus as well as those within the IMSE Department and the College of Engineering.

IMSE Department

Your department has several of student organizations that you can become involved with. For more information, contact your academic adviser.

- ATIM (Alpha Pi Mu) <https://www.stuorg.iastate.edu/site/alphapimu>
-
- IIE (Institute of Industrial Engineers) <http://www.imse.iastate.edu/iie/>
- INFORMS (Institute for Operations Research and Management Science)
Contact Dr. Jo Min (jomin@iastate.edu).

College of Engineering

The College of Engineering sponsors many student organizations:
<https://www.stuorg.iastate.edu/orgtype/6>.

Iowa State University

For a complete listing of all campus student clubs and organizations:
<http://www.sac.iastate.edu/>

Study/Work Abroad Opportunities

Studying abroad provides opportunities for students to challenge themselves academically, intellectually, and emotionally. You have the chance to go virtually anywhere in the world. Visit the Study Abroad Center, 3224 Memorial Union or on-line at <http://www.studyabroad.iastate.edu/>.

The College of Engineering has an additional resource for students who want to study in countries where programs have been established specifically for engineering students. Contact the Engineering International Programs office, 1300 Marston Hall, or online at: <http://www.engineering.iastate.edu/studyabroad/>.

Once you select an institution abroad, consult with your adviser about how courses will transfer back to Iowa State and therefore what courses are appropriate to take.

For opportunities to work abroad, please contact the Engineering International Programs office in 1300 Marston Hall or Engineering Career Services, 3200 Marston Hall.

Part 10

WHERE TO FIND US

Contact Information

IMSE Faculty

IMSE Staff

Facilities in Black Engineering

PART 10 – WHERE TO FIND US

Contact Information

<u>Name</u>	<u>Office</u>	<u>Phone</u>	<u>E-mail</u>
Dr. Gül Kremer Department Chair	3004 Black	294-1682	gkremer@iastate.edu
Dr. Jo Min Director of Undergraduate Studies & Co-op Education Internship Adviser	3034 Black	294-8095	jomin@iastate.edu
Dr. Gary Mirka Director of Graduate Studies	3025 Black	294-8661	mirka@iastate.edu
Dr. Dave Sly Director of Graduate Studies, Systems Engineering and Engineering Management	3015 Black	450-2335	davesly@iastate.edu
Devna Popejoy-Sheriff Academic Adviser	3038 Black	294-1603	devna@iastate.edu
Heather Robinson Academic Adviser	3034 Black	294-7797	hrobins@iastate.edu

IMSE Faculty

<u>Name</u>	<u>Office/Email</u>	<u>Phone</u>
Scott Berry	3013 Black Engineering saberry@iastate.edu	319-213-7311
Dr. Michael Dorneich	3028 Black Engineering dorneich@iastate.edu	294-8018
Dr. Matt Frank	3023 Black Engineering mfrank@iastate.edu	294-0389
Dr. Stephen Gilbert	3026 Black Engineering gilbert@iastate.edu	294-6782
Dr. Michael Helwig	3033 Black Engineering mhelwig@iastate.edu	410-212-0351
Dr. Mingyi Hong	3019 Black Engineering mingyi@iastate.edu	294-2943
Dr. Guiping Hu	3014 Black Engineering gphu@iastate.edu	294-8638
Dr. John Jackman	3025 Black Engineering jkj@iastate.edu	294-0126
Dr. Caroline Krejci	3031 Black Engineering ckrejci@iastate.edu	294-4867
Dr. Gül Kremer	3004 Black Engineering gkremer@iastate.edu	294-6668
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Quenten Meyer	3013 Black Engineering qmeyer@iastate.edu	202-340-4536
Dr. Jo Min	3034 Black Engineering jomin@iastate.edu	294-8095
Dr. Gary Mirka	4565 memorial Union mirka@iastate.edu	294-5933
Dr. Sigurdur Olafsson	3018 Black Engineering olafsson@iastate.edu	294-8908

Dr. Frank Peters	3024 Black Engineering fpeters@iastate.edu	294-3855
Leslie Potter	3012 Black Engineering potter@iastate.edu	294-5835
Dr. Iris Rivero	3021 Black Engineering rivero@iastate.edu	294-7944
Dr. Sarah Ryan	3017 Black Engineering smryan@iastate.edu	294-4347
Dr. Dave Sly	3031 Black Engineering davesly@iastate.edu	450-2335
Dr. Richard Stone	3027 Black Engineering rstone@iastate.edu	294-3644
Dr. Stephen Vardeman	3022 Black Engineering vardeman@iastate.edu	294-9068
Dr. Lizhi Wang	3016 Black Engineering lzwang@iastate.edu	294-1757

IMSE Staff

<u>Name</u>	<u>Office</u>	<u>Phone</u>	<u>E-mail</u>
Claire Barker Administrative Specialist, Center for e-Design	3004 Black Engineering	294-9095	chbarker@iastate.edu
Krista Briley Administrative Specialist; Assistant to the Chair	3004 Black Engineering	294-0127	kbriley@iastate.edu
Kevin Brownfield Sr. ERD Machinist	1051 Black Engineering	294-5271	kjb@iastate.edu
Jeff Eichorn Administrative Specialist	3011 Black Engineering	294-9112	jeichorn@iastate.edu
Laurie Hoifeldt Graduate Student Services	3038 Black Engineering	294-4702	hoifeldt@iastate.edu
Aaron Jordan Lab Supervisor	3013 Black Engineering	294-7247	ajjordan@iastate.edu
Deborah McDonough Graduate Student Services	3038 Black Engineering	294-0129	deborahm@iastate.edu
Dennis Mowery Managing Director, Center for e-Design	2624 Howe Hall	294-2624	dmowery@iastate.edu
Devna Popejoy-Sheriff Academic Adviser	3038 Black Engineering	294-1603	devna@iastate.edu
Alex Rausch Communications Specialist	3004 Black Engineering	294-1054	arausch@iastate.edu
Mike Renze Systems Support Specialist	No office, can be reached at (515)450-3775 (cell).		mdrenze@iastate.edu
Heather Robinson Academic Adviser	3034 Black Engineering	294-9979	hrobins@iastate.edu
Holly Twedt Administrative Specialist	3004 Black Engineering	294-3004	hstwedt@iastate.edu
TA Offices	0010 Black Engineering		

Laboratory Facilities

Location

Student Study Area

Operations Research & Production Systems Lab

Industrial Design Lab

Computing Lab

Metrology Lab

Human Performance and Cognitive Engineering Lab

Adaptive Cognitive Systems Lab

Industrial Assessment Center

Operations Research and Production Systems Research Lab

Interdisciplinary Manufacturing Engineering & Design (iMED) Lab

Polymer Processing Lab

Machining Processes Lab

Material Testing and Forming

Computer Aided Manufacturing

CNC Machining

Welding and Robotics

Metalcasting Lab

Industrial Automation Lab

Rapid Manufacturing and Prototyping Lab

Wind Energy Manufacturing Lab

Center for e-Design

*Computer Lab Hours

Monday – Thursday

Friday

Saturday

Sunday

7:00 a.m. – Midnight

7:00 a.m. – 5:00 p.m.

Noon – 7:00 p.m.

Noon – Midnight

Appendix

1. The Industrial Engineering Program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.
2. Further information on the program is available at <http://www.imse.iastate.edu/undergraduate-program/>.
3. The Program Educational Objectives and Student Outcomes are available at <http://www.imse.iastate.edu/undergraduate-program/educational-objectives-and-outcomes/> .