2015 - 2016 Major Map
Industrial Engineering, BSE

School/College: Ira A. Fulton Schools of Engineering
ESIEEBSE

Term 1 0 - 15 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
MAT 265: Calculus for Engineers I (MA)	3	C	• An SAT, ACT, Accuplacer, TOEFL or IELTS score determines placement into first-year composition courses • ASU Math Placement Exam score determines placement in Mathematics course • ASU 101 or College specific equivalent First Year Seminar required of all freshman students and should be taken the first semester. • If ENG 105 is taken, a three (3) credit hour applicable elective must also be taken prior to graduation. Contact CIDSE Advising. • Students taking CHM 113 for Basic Science Elective need to earn a "C" minimum grade and complete CHM 116 for the degree
ASU 101-IEE: The ASU Experience	1		
ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition	3	C	
FSE 100: Introduction to Engineering	2	C	
Basic Science Elective	3-4		
Social-Behavioral Sciences (SB) AND Global Awareness (G)	3		
Minimum 2.00 GPA ASU Cumulative.			
Term hours subtotal:	15-16		

Term 2 15 - 31 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
CSE 110: Principles of Programming with Java (CS)	3	C	• Students with credit for CHM 113 must take CHM 116.
MAT 266: Calculus for Engineers II (MA)	3	C	
CHM 114: General Chemistry for Engineers (SQ) OR CHM 116: General Chemistry II (SQ)	4		
ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition	3	C	
Humanities, Arts and Design (HU) AND Historical Awareness (H)	3		
Complete ENG 101 OR ENG 105 OR ENG 107 course(s).			
Minimum 2.00 GPA ASU Cumulative.			
Term hours subtotal:	16		

Term 3 31 - 46 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
CSE 205: Object-Oriented Programming and Data Structures (CS)	3	C	
ECN 211: Macroeconomic Principles (SB)	3	C	
IEE 210: Introduction to Industrial Engineering	3	C	

	MAT 267: Calculus for Engineers III (MA)	3	C
	MSE 250: Structure and Properties of Materials	3	
!	Minimum 2.00 GPA ASU Cumulative.		
	Complete Mathematics (MA) requirement.		
	Term hours subtotal:	15	

Term 4 46 - 62 Credit Hours Critical course signified by !	**Hours**	**Minimum Grade**	**Notes**
! IEE 380: Probability and Statistics for Engineering Problem Solving (CS)	3	C	
! PHY 121: University Physics I: Mechanics (SQ)	3	C	
! PHY 122: University Physics Laboratory I (SQ)	1	C	
IEE 305: Information Systems Engineering (CS)	3	C	
MAT 275: Modern Differential Equations (MA)	3	C	
Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)	3		
Complete ECN 211 AND MAT 265 AND MAT 266 AND PHY 121 AND PHY 122 AND IEE 210 AND CSE 110 AND CSE 205 AND IEE 380 course(s).			
Term hours subtotal:	16		

Term 5 62 - 78 Credit Hours Necessary course signified by ★	**Hours**	**Minimum Grade**	**Notes**
★ IEE 385: Engineering Statistics: Probability	3	C	
IEE 300: Economic Analysis for Engineers	3	C	
MAE 212: Engineering Mechanics	4		
PHY 131: University Physics II: Electricity and Magnetism (SQ)	3		
PHY 132: University Physics Laboratory II (SQ)	1		
MAT 242: Elementary Linear Algebra OR MAT 342: Linear Algebra OR MAT 343: Applied Linear Algebra	2-3	C	
Term hours subtotal:	16-17		

Term 6 78 - 93 Credit Hours Necessary course signified by ★	**Hours**	**Minimum Grade**	**Notes**
★ IEE 376: Operations Research Deterministic Techniques/Applications	3	C	• Effective fall 2019, IEE 376 also requires IEE 210 with a C better as a prerequisite.
IEE 369: Work Analysis and Design (L)	3	C	

	Engineering Science Elective	3-4	
	Upper Division Career Focus Study Area	3	C
	Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)	3	
	Term hours subtotal:	15-16	

Term 7 93 - 108 Credit Hours Necessary course signified by ★		**Hours**	**Minimum Grade**	**Notes**
★	IEE 485: Systems Design Capstone I (L)	3	C	• Effective spring 2017, IEE 485 requires IEE 376 with a C or better as a prerequisite and IEE 475 or 477 as a pre- or corequisite with a C or better if completed. • Effective spring 2019, IEE 485 will additionally require IEE 321 with a C or better as a prerequisite. • Effective fall 2019, IEE 485 also requires IEE 369 with a C or better as a prerequisite. • Effective fall 2019, IEE 475 will require IEE 385 with a C or better as a prerequisite.
	IEE 470: Stochastic Operations Research	3	C	
	IEE 474: Quality Control	3	C	
	IEE 475: Simulating Stochastic Systems (CS)	3	C	
	Upper Division Career Focus Study Area	3	C	
	Term hours subtotal:	15		

Term 8 108 - 120 Credit Hours Necessary course signified by ★		**Hours**	**Minimum Grade**	**Notes**
★	IEE 486: Systems Design Capstone II (L)	3	C	• Effective fall 2017, IEE 486 requires IEE 369 and 485 with a C or better as prerequisites.
	IEE 461: Production Control	3	C	
	Upper Division IEE Technical Elective	3	C	
	Upper Division Career Focus Study Area	3	C	
	Term hours subtotal:	12		

- Visit the CIDSE website for additional information about Career Focus Study Area and Technical Elective courses.

  The curriculum updates referred to in some terms of the major map occurred because the Ira A. Fulton Engineering programs are **required** by our accreditation agency ABET to follow a curriculum continuous improvement process to keep up with technology changes and feedback from industry constituents. The changes were made to better prepare students for future success in the capstone courses for the degree.

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Hide Course List(s)/Track Group(s)

Engineering Science Elective	Basic Science Elective	Career Focus Study Area (Global Industrial Engineering Leadership)
	BIO 181: General Biology I (SQ)	

CEE 384: Numerical Methods for Engineers (CS)

CSE 120: Digital Design Fundamentals

CSE 240: Introduction to Programming Languages

EEE 202: Circuits I

MAE 240: Thermofluids I

BIO 182: General Biology II (SG)

BME 111: Engineering Perspectives on Biological Systems

CHM 113: General Chemistry I (SQ)

GLG 101: Introduction to Geology I (Physical) (SQ & G)

GLG 102: Introduction to Geology II (Historical) (SG & H)

GLG 110: Dangerous World (SG & G)

PHY 111: General Physics (SQ) AND PHY 113: General Physics Laboratory (SQ)

ECN 306: Survey of International Economics (SB & G)

MGT 302: Principles of International Business (G)

MGT 459: International Management (G)

Career Focus Study Area (Health Care Systems Engineering)

IEE 421: Urban Operations Research

IEE 426: Operations Research in Healthcare

IEE 431: Engineering Administration (L)

Career Focus Study Area (Industrial Statistics)

IEE 381: Lean Six Sigma Methodology

STP 425: Stochastic Processes

STP 429: Experimental Statistics (CS)

Career Focus Study Area (Financial Engineering)

IEE 412: Introduction to Financial Engineering

IEE 454: Risk Management

IEE 431: Engineering Administration (L)

Career Study Focus Area (Electronics Manufacturing)

EEE 352: Properties of Electronic Materials

EEE 435: Fundamentals of CMOS and MEMS

EEE 436: Fundamentals of Solid-State Devices

Career Focus Study Area (Operations Research)

IEE 421: Urban Operations Research

IEE 426: Operations Research in Healthcare

MAT 300: Mathematical Structures (L)

Career Focus Study Area (Computer/Information Systems Engineering)

CSE 310: Data Structures and Algorithms

CSE 360: Introduction to Software Engineering

CSE 430: Operating Systems

IEE 456: Introduction to Systems Engineering

Career Focus Study Area (Engineering Management)

IEE 456: Introduction to Systems Engineering

IEE 454: Risk Management

IEE 458: Project Management

IEE 431: Engineering Administration (L)

Career Study Focus Area (Industrial Engineering 4+1 Program)

Note: Students must be admitted into the 4+1 Program. See your academic advisor for details.

Three graduate-level courses (IEE 5**) of which two or more are from the Master's Core Class list.

IEE Technical Electives (May not be duplicated with Career Focus Study Area requirement courses)

IEE 431: Engineering Administration (L)

IEE 437: Human Factors Engineering

IEE 381: Lean Six Sigma Methodology

IEE 454: Risk Management

IEE 456: Introduction to Systems Engineering

IEE 458: Project Management

IEE 412: Introduction to Financial Engineering

IEE 421: Urban Operations Research

IEE 426: Operations Research in Healthcare

FSE 301: Entrepreneurship for Engineers

Any 300-level or higher approved engineering or business course with Program Chair approval.

Total Hours: 120
Upper Division Hours: 45 minimum
Major GPA: 2.00 minimum
Cumulative GPA: 2.00 minimum
Total hrs at ASU: 30 minimum
Hrs Resident Credit for Academic Recognition: 56 minimum
Total Community College Hrs: 64 maximum

General University Requirements Legend

General Studies Core Requirements:

- Literacy and Critical Inquiry (L)
- Mathematical Studies (MA)
- Computer/Statistics/Quantitative Applications (CS)
- Humanities, Arts and Design (HU)
- Social-Behavioral Sciences (SB)
- Natural Science - Quantitative (SQ)
- Natural Science - General (SG)

General Studies Awareness Requirements:

- Cultural Diversity in the U.S. (C)
- Global Awareness (G)
- Historical Awareness (H)

First-Year Composition

> General Studies designations listed next to courses on the major map were valid for the 2015 - 2016 academic year. Please refer to the course catalog for current General Studies designations at time of class registration. General Studies credit is applied according to the designation the course carries at the time the class is taken.