

CURRICULUM

Bachelor of Science in Industrial and Systems Engineering (BSIE)

The following is designed to help you, the industrial and systems engineering student, see your path through the eight semesters of your BSIE degree. **ISE PROTIP:** *This guide is a template and doesn't have to be followed exactly. The BSIE is highly flexible so you can move courses around to fit your schedule. Talk with your advisor regularly about your progress.*

Starting in your fifth semester, you will see courses, labeled with a "CP"; known as critical path courses. These courses represent specific major requirements that are predictive of your success in the BSIE program.

1st Semester		Hours	2nd Semester		Hours
CH 101	Chemistry, A Molecular Science	3		GEP Requirement ⁷	3
CH 102	General Chemistry Lab	1	E 101	Intro to Engineering and Problem Solving ¹	1
E 102	Engineering in the 21st Century (GEP-IP) ¹	2	EC 205	Economic ³	3
E 115	Intro to Computing Environments	1	HES ***	Health and Exercise Studies Course ⁸	1
ENG 101	Academic Writing and Research	4	MA 241	Calculus II	4
HES ***	Health and Exercise Studies Course ⁸	1	PY 205	Physics for Engineers and Scientists I	3
MA 141	Calculus I	4	PY 206	Physics for Engineers and Scientists I Lab	1
Total Credits		16	Total Credits		16

3rd Semester		Hours	4th Semester		Hours
ISE 135	Computer Modeling and Engineers	3		GEP Requirement ⁷	3
MA 242	Calculus III	4	CE 214 <i>or</i> MAE 206	Engineering Mechanics - Statics Engineering Statics	3
MSE 200 <i>or</i> MSE 201	Mechanical Properties of Structural Materials Structure and Properties of Engineering Materials	3	MA 303 <i>or</i> MA 341	Linear Analysis Applied Differential Equations I	3
PY 208	Physics for Engineers and Scientists II	3	ISE 311	Engineering Economic Analysis	3
PY 209	Physics for Engineers and Scientists II Lab	1	ST 372	Intro to Stat Inference and Regression	3
ST 371	Intro to Probability and Distribution Theory	3	Total Credits		15
Total Credits		17			

5th Semester		Hours	6th Semester		Hours
	Ethics ²	3		Engineering Science Elective ⁵	3
ISE 215	Introduction to Computer-Aided Design	1	ISE 315	Computer-Aided Manufacturing	1
ISE 216	Product Development and Rapid Prototyping	3	ISE 316	Manufacturing Engineering I - Processes	3
	First Pick from ISE Group A	3	Second Pick from ISE Group A		3
ISE 361	Deterministic Models in IE (CP)	3	First Pick from ISE Group B		3
ISE 362	Stochastic Models in IE (CP)	3	Second Pick from ISE Group B		3
Total Credits		16	Total Credits		16

7th Semester		Hours	8th Semester		Hours
	Technical Elective ⁶	3		GEP Requirement ⁷	3
ECE 331	Principles of Electrical Engineering	3		GEP Requirement ⁷	3
ENG 331	Technical Writing	3		GEP Requirement ⁷	3
	Third Pick from ISE Group B	3		Technical Elective ⁶	3
ISE 520	Healthcare Systems Performance Improvement I ⁴ <i>or</i> Technical Elective ⁶	3	ISE 398	Lean Six Sigma for Industrial Engineers	1
Total Credits		15	ISE498 / ISE 521	Senior Design Project (CP) / Healthcare Systems Performance Improvement II (CP) ⁴	3
			Total Credits:		16

Minimum Credit Hours Required for Graduation 127

ISE Group A		Hours
ISE 352	Fundamentals of Human-Machine Systems Design	3
ISE 443	Quality Control	3

ISE Group B		Hours
ISE 408	Control of Production and Service Systems (CP)	3
ISE 441	Introduction to Simulation (CP)	3
ISE 453	Modeling and Analysis of Supply Chains (CP)	3

Major/Program Requirements and Footnotes

1 E 101 and **E 102** - If you are a transfer student, see your advisor about this course.

2 Ethics - You may choose from the following ethics courses:

IDS 201 Environmental Ethics	PHI 325 Bio-Medical Ethics	STS 304 Ethical Dimensions of Progress
IDS 303 Humans & the Environment	STS 214 Introduction to Science, Technology & Society	STS 322 Technological Catastrophes
NR 303 Humans & the Environment	STS 302 Contemporary Science, Technology & Human Values	STS 325 Bio-Medical Ethics
PHI 214 Issues in Business Ethics		

3 EC 205 - You may also take EC 201 or ARE 201.

4 Healthcare Systems Performance Improvement

To earn a Health Systems Engineering Certificate (HSECP), you will need approved admission to the HSECP. You will take this course ISE 520 as a technical elective and ISE 521 instead of ISE 498.

5 Engineering Science Elective - You may choose between CE 225, CE 282, MAE 201, MAE 208, MAE 214, MAE 308 or MSE 355.

6 Technical Electives

BAE 455/555 R Coding for Data Management and Analysis	ISE 511 Supply Chain Economics and Decision Making
BEC 475 Global Regulatory Affairs for Medical Products	ISE 513 Humanitarian Logistics
BEC 575 Global Regulatory Affairs for Medical Products	ISE 519 Database Applications in Industrial and Systems Engineering
E 304 Introduction to Nano Science and Technology	ISE 520 Healthcare Systems Performance Improvement I (ONLY when taken after approved admission to Health Systems Engineering Certificate Program)
ECE 482 Engineering Entrepreneurship & New Product Development I (ONLY when taken with ECE 483)	ISE 525 Medical Decision Making
FB 476 Environmental Life Cycle Analysis	ISE 533 Service Systems Engineering
FB 576 Environmental Life Cycle Analysis	ISE 540 Human Factors in Systems Design
ID 240 Human-Centered Design	ISE 541 Occupational Safety Engineering
ISE 411 Supply Chain Economics and Decision Making	ISE 544 Occupational Biomechanics
ISE 413 Humanitarian Logistics	ISE 547 Applications of Data Science in Healthcare
ISE 416 Manufacturing Engineering II - Automation	ISE 552 Design and Control of Production and Service Systems
ISE 417 Database Applications in Industrial and Systems Engineering	ISE 553 Modeling and Analysis of Supply Chain
ISE 425 Medical Decision Making	MAE 482 Engineering Entrepreneurship & New Product Development I
ISE 433 Service Systems Engineering	MSE 465 Introduction to Nanomaterials
ISE 435 Python for Industrial and Systems Engineers	MSE 545 Ceramic Processing
ISE 437 Data Analytics for Industrial Engineering	MSE 565 Introduction to Nanomaterials
ISE 447 Application of Data Science in Health Care	OR 425 Medical Decision Making
ISE 452 Advanced Human-Machine Systems Design	OR 433 Service Systems Engineering
ISE 489 Special Topics in Industrial and Systems Engineering (1-3 Units)	PSY 420 Cognitive Processes
ISE 495 Project Work in Industrial Engineering (ONLY with permission from Director of Undergraduate Programs after securing a Faculty Sponsor)	ST 430 Introduction to Regression Analysis
	ST 431 Introduction to Experimental Design
	ST 432 Introduction to Survey Sampling

7 General Education Program (GEP) Requirements

To complete the requirements for graduation and the General Education Program, the following credit hours and co-requisites must be satisfied. University approved GEP course lists for each category can be found at <http://oucc.dasa.ncsu.edu/general-education-program/>.

HUMANITIES – Six (6) credits to be selected in two different disciplines (two different course prefixes) from the approved GEP Humanities list.

SOCIAL SCIENCES – Three (3) credits to be selected in a discipline other than economics from the approved GEP Social Sciences list. EC 205 taken as part of the Major requirements satisfies three (3) credit hours of the six (6) credit hours needed to fulfill the GEP Social Sciences requirement.

ADDITIONAL BREADTH – Three (3) credits to be selected from the approved GEP Humanities, Social Sciences or Visual and Performing Arts lists.

U.S. DIVERSITY AND GLOBAL KNOWLEDGE co-requisites must be satisfied to complete the General Education requirements. Choose the course(s) that are identified on the approved GEP course lists as meeting the U.S. Diversity and Global Knowledge co-requisites. In Fall 2022, the U.S. DIVERSITY AND GLOBAL KNOWLEDGE course (now called U.S. DIVERSITY, EQUITY AND INCLUSION) will be a requirement not a co-requisite.

FOREIGN LANGUAGE PROFICIENCY at the FL_102 level will be required for graduation.

8 HEALTH AND EXERCISE STUDIES – Two (2) hours to be selected from the approved GEP Health & Exercise Studies list.

- One fitness and wellness course (any Health and Exercise Studies 100-level course).
- One additional credit hour of Health and Exercise Studies activity courses.