BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING - ARTIFICIAL INTELLIGENCE/ OPERATIONS RESEARCH FOR DECISIONS

Code	Title	Credit Hours
Wellness Requirement		
APPH 1040	Scientific Foundations of Health	2
or APPH 10	The Science of Physical Activity and Health	
or APPH 10	Flourishing: Strategies for Well-being and Resilience	
Core IMPACTS		
Institutional Priority		
CS 1301	Introduction to Computing	3
Mathematics and Quantitative Skills		
MATH 1552	Integral Calculus [1]	4
Political Science and U.S. History		
HIST 2111	The United States to 1877	3
or HIST 2112	The United States since 1877	
or INTA 1200	American Government in Comparative Perspective	
or POL 1101	Government of the United States	
or PUBP 3000	American Constitutional Issues	
Arts, Humanities, and Ethics		
Any HUM		6
Communicating in Writing		
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
Technology, Mathematics, and Sciences		
PHYS 2211	Principles of Physics I	4
PHYS 2212	Principles of Physics II	4
MATH 1551	Differential Calculus [1]	2
MATH 1553	Introduction to Linear Algebra [1,2]	2
Social Sciences		
Any SS		9
Field of Study		
CS 2316	Data Manipulation for Science and Industry	3
MATH 2551	Multivariable Calculus [1,2]	4
or MATH 25	Introduction to Multivariable Calculus	
or MATH 25	Honors Multivariable Calculus	
ACCT 2101	Accounting I: Financial Accounting	3
or MGT 3000	Financial and Managerial Accounting	
ISYE 2027	Probability with Applications	3
Lab Science [3]		4
Major Requirements		
Economics Requirement [12]		
Ethics Requirement [4]		
Environmental Requirement [5]		
Human Factors Requirement [13]		
System Design Requirement [14]		
CS 4400	Introduction to Database Systems	3
ISYE 3030	Basic Statistical Methods	3
ISYE 3025	Essentials of Engineering Economy	1
ISYE 3133	Engineering Optimization	3
ISYE 3232	Stochastic Manufacturing and Service Systems	3
ISYE 3044	Simulation Analysis and Design	3
ISYE 4031	Regression and Forecasting	3
ISYE 4106	Senior Design	4
Engineering Electives [6]		
Select one of the following:		3
ECE 2020	Digital System Design	
ECE 2026	Introduction to Signal Processing	
ECE 3710 & ECE 3741	Circuits and Electronics and Instrumentation and Electronics Lab	
Select 6 credits of the following: [7,8]		6
Group 1:		
AE 2220	Dynamics	
BMED 3100	Systems Physiology	
CHBE 2100	Chemical Process Principles	
COE 2001	Statics	
COE 3001	Mechanics of Deformable Bodies	
CEE 2040	Dynamics	
CEE 2300	Environmental Engineering Principles	
CEE 3010	Geomatics	
CEE 4100	Construction Engineering and Management	
CEE 4300	Environmental Engineering Systems	
CEE 4600	Transportation Planning, Operations, and Design	
CS 2110	Computer Organization and Programming	
CS 4641	Machine Learning	
CX 4010	Computational Problem Solving for Scientists and Engineers	
CX 4240	Introduction to Computing for Data Analysis	
CX 4242	Data and Visual Analytics	
ECE 2020	Digital System Design	
ECE 2026	Introduction to Signal Processing	
ECE 2040	Circuit Analysis	
ECE 3710	Circuits and Electronics	
ECE 3741	Instrumentation and Electronics Lab	
ECE 4606	Wireless Communications	
ME 2202	Dynamics of Rigid Bodies	
ME 3322	Thermodynamics	
ME 3720	Introduction to Fluid and Thermal Engineering	
MSE 2001	Principles and Applications of Engineering Materials	
MSE 3015	Electrical, Optical, and Magnetic Properties	
NRE 3301	Radiation Physics	
Group 2: [9]		
AE 4701	Wind Engineering	
AE 4793	Composite Materials and Processes	
ARCH 6271	Healthcare Design of the Future	

BIOS 2400	Math Models in Biology	
BIOS 4740	Biologically-Inspired Design	
BMED 4751	Introduction to Biomaterials	
CHBE 4793	Composite Materials and Processes	
COE 3002	Intro to Microelectronics and Nanotechnology Revolution	
CEE 4225	Introduction to Coastal Engineering	
CEE 4330	Air Pollution Engineering	
CEE 4793	Composite Materials and Processes	
CP 4310	Urban Transportation and Planning	
CP 4510	Fundamentals of Geographic Information Systems	
ECE 2031	Digital Design Laboratory	
ECE 4755	Electronic Packaging Substrate Fabrication	
ISYE 4740	Bio-Inspired Design	
MATH 4755	Mathematical Biology	
ME 2110	Creative Decisions and Design	
ME 3057	Experimental Methodology and Technical Writing	
ME 4740	Biologically Inspired Design	
ME 4793	Composite Materials and Processes	
MSE 2021	Materials Characterization	
MSE 3720	Introduction to Polymer/Fiber Enterprise	
MSE 4751	Introduction to Biomaterials	
MSE 4755	Electronic Packaging Substrate Fabrication	
MSE 4793	Composite Materials and Processing	
Artificial Intelligence and Operations Research for Decisions [10]		
MATH 2603	Introduction to Discrete Mathematics [1]	4
Lab Science		4
Group A: Required Core		3
ISYE 3803	Special Topics (Foundations of AI for Decision Systems)	
ISYE 4600	Methods and Applications of Machine Learning	
Group B: Decision-Focused AI/OR		6
ISYE 4600	Methods and Applications of Machine Learning	
ISYE 4601	Online Learning & Decision Making	
ISYE 4232	Advanced Stochastic Systems	
ISYE 4133	Advanced Optimization	
ISYE 4034	Decision and Data Analytics	
ISYE 4045	Advanced Simulation	
ISYE 4134	Constraint Programming	
ISYE 4135	Optimization Foundations for Machine Learning and Artificial Intelligence	
ISYE 4803	Special Topics (Foundations of Modern Data Science)	
Breadth Electives (select two of the following):		6
ISYE 3039	Methods of Quality Improvement	
ISYE 3103	Introduction to Supply Chain Modeling: Logistics	
ISYE 3106	Cornerstone Design for Industrial Engineers	
ISYE 4111	Advanced Supply Chain Logistics	
ISYE 4112	Workflow Modeling, Analysis & Design in Manufacturing & Service	
ISYE 4301	Supply Chain Economics	
ISYE 4311	Capital Investment Analysis	
ISYE 4501	Energy, Efficiency, and Sustainability	
ISYE 4510	Public Health Systems	
ISYE 4113	Advanced Modeling and Analysis of Workflow Systems	
ISYE 4515	Intelligent Healthcare Delivery Systems	
ISYE 4803	Special Topics (Facility Layout and Warehousing)	
Free Electives [11]		
Free Electives		11
Total Credit Hours		**128**

Pass-fail only allowed for Free Electives.

Students must achieve a minimum GPA of 2.0 in the BSIE Major Requirements to graduate.

1. Students must earn a C or better in all required MATH courses in the BSIE curriculum.
2. Students may also complete MATH 1554 and MATH 2550 to satisfy math requirements. If MATH 1554/MATH 2550 combination is taken, then two hours from MATH 1554 may be used in Field of Study to give area 18 hours.
3. Only one EAS course can be used toward ISYE Lab Science requirements.
4. It is strongly recommended that students complete PSYC 1101 to satisfy the Ethics requirement. PSYC 1101 will also satisfy 3 hours of Core IMPACTS Social Sciences hours and help in follow up classes.
5. Students must choose from the following to meet the Environmental requirement: BIOS 1107 and BIOS 1107L, BIOS 2300 , CEE 2300, CEE 4300, EAS 1600, EAS 1601, EAS 2600,EAS 2750, EAS 3110, EAS 4480, ECON 4440, ISYE 4803 titled “Energy and Environmental Analysis,” ISYE 4501, SLS 3120, or PHYS 2750.
6. Students must complete courses from two different eligible engineering elective subjects.
7. At most, one computing course (CS or CX) is allowed, including courses cross-listed with CS or CX courses.
8. Students must take at least 9 credits of engineering electives. Three credits must be chosen from ECE 2020, ECE 2026, or ECE 3710/ECE 3741. For the remaining 6 credits, at least 2 credits must be from Group 1.
9. To count toward the Engineering Elective Group 2 requirement, all Vertically-Integrated Projects (VIP) courses must be approved by the ISyE Associate Undergraduate Chair. And, at least three, but no more than four, credits of VIP coursework may count toward the Engineering Elective requirement.
10. Students must complete 5 concentration courses: at least 3 courses will be ISYE courses chosen from the Depth table, plus any 2 other courses in the whole table, with a maximum of one 3000-level course (ISYE 3039 and ISYE 3103 are exceptions). Of the 5 courses, no more than 3 can be listed as depth courses from the same concentration. If ISYE 3106 Cornerstone Design is taken as a breadth elective, it must be taken prior to ISYE 4106 Senior Design.
11. MATH 1113, MGT 2250, ISYE 3770, and PHYS 2XXX (AP credit) not allowed.
12. Engineering students must complete one of the following economics classes: ECON 2100, ECON 2101, ECON 2105, ECON 2106. The course will also satisfy 3 hours of Core IMPACTS Social Science courses.

[13] Students must choose from the following to meet the Human Factors requirement: ISYE 4803 (System Design for Humans, Environment and Economy), ISYE 4009, CS 3751/PSYC 3751, CS 3790/PSYC 3790/ISYE 3790, ID 2320, PSYC 2220, or PSYC 2270.

[14] Students must choose from the following to meet the System Design requirement: ISYE 3039, ISYE 3103, ISYE 3106, ISYE 4009, ISYE 4111, ISYE 4112, ISYE 4113, ISYE 4301, ISYE 4311, ISYE 4501, ISYE 4510, ISYE 4515, or ISYE 4803 (System Design for Humans Environment and Economy, Facilities Layout and Warehousing, or System Design for IE).