BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING - ADVANCED STUDIES IN OPERATIONS RESEARCH AND STATISTICS

Code	Title	Credit Hours
Wellness		
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 A - Essential Skills		
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
MATH 1552	Integral Calculus [1]	4
Core B - Institutional Options		
CS 1301	Introduction to Computing	3
Core C - Humanities		
Any HUM		6
Core D - Science, Math, & Technology		
PHYS 2211	Introductory Physics I	4
PHYS 2212	Introductory Physics II	4
MATH 1551	Differential Calculus [1]	2
MATH 1553	Introduction to Linear Algebra [1,2,3]	2
or MATH 1554	Linear Algebra	
or MATH 1564	Linear Algebra with Abstract Vector Spaces	
Core E - Social Sciences		
Select one of the following:		3
HIST 2111	The United States to 1877	
HIST 2112	The United States since 1877	
INTA 1200	American Government in Comparative Perspective	
POL 1101	Government of the United States	
PUBP 3000	American Constitutional Issues	
ECON 2100	Economic Analysis and Policy Problems	3
PSYC 1101	General Psychology	3
Any SS		3
Core F - Courses Related to Major		
CS 2316	Data Manipulation for Science and Industry	3
CS 4400	Introduction to Database Systems	3
MATH 2551	Multivariable Calculus [1,2]	4
or MATH 2550	Introduction to Multivariable Calculus	
or MATH 2561	Honors Multivariable Calculus	
MATH 2106	Foundations of Mathematical Proof	3
ISYE 3025	Essentials of Engineering Economy	1
Lab Science [5]		4
Ethics Requirement [6]		
Environmental Requirement [7]		

Major Requirements		
ACCT 2101	Accounting I: Financial Accounting	3
or MGT 300	Financial and Managerial Accounting	
MATH 3012	Applied Combinatorics	3
MATH 3406	A Second Course in Linear Algebra	3
ISYE 2027	Probability with Applications	3
ISYE 3030	Basic Statistical Methods	3
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 [8,9]		
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 at least 5 credits of the following: [10]		5
Group 1		
AE 2220	Dynamics	
AE 3450	Thermodynamics and Compressible Flow	
BMED 3100	Systems Physiology	
CHBE 2100	Chemical Process Principles	
CHBE 2130	Chemical Engineering Thermodynamics I	
CHBE 4763	Pulping and Chemical Recovery	
CHBE 4764	Bleaching and Papermaking	
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	
CS 6505	Computability, Algorithms, and Complexity	
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 3035	Mechanisms for Computing Systems	
ECE 3076	Computer Communications	
ECE 3090	Software Fundamentals for Engineering Systems	
ECE 3710	Circuits and Electronics	
ECE 3741	Instrumentation and Electronics Lab	

ECE 4606	Wireless Communications	
ECE 4823	Special Topics (Game Theory and Multiagent Systems)	
ME 2202	Dynamics of Rigid Bodies	
ME 3015	System Dynamics and Control	
ME 3322	Thermodynamics	
ME 3720	Introduction to Fluid and Thermal Engineering	
ME 4763	Pulping and Chemical Recovery	
ME 4764	Bleaching and Papermaking	
MSE 2001	Principles and Applications of Engineering Materials	
MSE 3012	Thermal and Transport Properties of Materials	
MSE 3015	Electrical, Optical, and Magnetic Properties	
NRE 3301	Radiation Physics	
Group 2 [11]		
AE 4370	Life Cycle Cost Analysis	
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 2300	Problems in Biomedical Engineering II	
BMED 3400	Introduction to Biomechanics	
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	
Advanced Studies in Operations Research & Statistics Concentration [12]		
ISYE 8813	Special Topics in Operations Research (Must have title Math of Operations Research)	3
or MATH 4317	Analysis I	
Select two of the following: [13]		6
ISYE 4133	Advanced Optimization	
ISYE 4232	Advanced Stochastic Systems	
ISYE 6661	Linear Optimization	
ISYE 6662	Discrete Optimization	
ISYE 6663	Nonlinear Optimization	
ISYE 6664	Stochastic Optimization	
ISYE 6761	Stochastic Processes I	
ISYE 6412	Theoretical Statistics	
Select two of the following:		6
ISYE 3103	Introduction to Supply Chain Modeling: Logistics	
ISYE 3104	Introduction to Supply Chain Modeling: Manufacturing and Warehousing	
ISYE 3106	Cornerstone Design for Industrial Engineers	
ISYE 3039	Methods of Quality Improvement	
ISYE 4034	Decision and Data Analytics	
ISYE 4045	Advanced Simulation	
ISYE 4111	Advanced Supply Chain Logistics	
ISYE 4134	Constraint Programming	
ISYE 4301	Supply Chain Economics	
ISYE 4311	Capital Investment Analysis	
ISYE 4501	Energy, Efficiency, and Sustainability	
ISYE 4803	Special Topics (Advanced Manufacturing)	
ISYE 4803	Special Topics (Facility Layout and Warehousing)	
ISYE 4803	Special Topics (Health Systems Engineering)	
ISYE 4803	Special Topics (Introduction to Machine Learning)	
ISYE 4803	Special Topics (Online Learn/Decision Making)	
ISYE 4803	Special Topics (Reliability Engineering)	
ISYE 4803	Special Topics (Systems Design for IEs)	
Free Electives [14]		
Free Electives		11
Total Credit Hours		**128**

Pass-fail only allowed for Free Electives, Humanities, and the Social Sciences elective.

Students must achieve a minimum GPA of 3.3 in the BSIE Major Requirements to graduate (Math beyond Calculus, BSIE required courses and concentration electives).

1. Students must earn a C or better in all required MATH courses in the BSIE curriculum.
2. MATH 1564 is preferred, but not required.
3. Students may also complete MATH 1554 or MATH 1564 and MATH 2550 to satisfy math requirements. If MATH 1554 or MATH 1564/MATH 2550 combination is taken, then two hours from MATH 1554 may be used in Area F to give Area F 18 hours.
4. Minimum grade of B in MATH 2106 is required to pursue the Advanced Studies for OR & Stat Concentration.
5. Only one EAS course can be used toward ISYE Lab Science Requirements.
6. PSYC 1101 will satisfy the Ethics requirement.

[7] 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.

[8] Students must complete courses from two different eligible engineering elective subjects.

[9] At most, one computing course (CS or CX) is allowed, including courses cross-listed with CS or CX courses.

[10] In addition to the three-credit ECE requirement, take at least one additional credit from Group 1 and no more than four credits from Group 2.

[11] To count toward the Engineering Elective Group 2 requirement, all Vertically-Integrated Projects (VIPS) courses must be approved by the ISyE Associate Chair. And, at least three, but no more than four, credits of VIP coursework may count toward the Engineering Elective requirement.

[12] Students must complete five concentration courses: A minimum of four of the five concentration courses must be ISYE courses. If ISYE 3106 Cornerstone Design is taken as a breadth elective, then it must be taken prior to ISYE 4106 Senior Design.

[13] The 6000-level ISYE course options are preferred, but not required.

[14] MATH 1113, MGT 2250, ISYE 3770, and PHYS 2XXX (AP credit) not allowed.