Integrated Business and Engineering Honors Program

INTEGRATED BUSINESS AND ENGINEERING HONORS PROGRAM

After four years and a minimum of 136 credits, students will receive a Bachelor of Science Degree in Integrated Business and Engineering. The program meets the accreditation standards of AACSB International. Students are required to maintain a minimum GPA of 3.25 in order to remain in the program.

Students in the IBE Honors Program can major in any area of business or engineering that Lehigh offers. After freshman year, each student will elect a major in either the College of Business or the P. C. Rossin College of Engineering and Applied Science.

Students wanting to major in an area of business can select from:

- Accounting
- Business Analytics
- Business Information Systems
- Economics
- Finance
- Marketing
- Management
- Supply Chain Management

Students wanting to major in an area of engineering can select from:

- Biocomputational Engineering
- Bioengineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Computer Science
- Electrical Engineering
- Environmental Engineering
- Financial Engineering
- Industrial and Systems Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Structural Engineering

DEGREE REQUIREMENTS (MINIMUM 136 CREDITS)

Writing, Humanities, and Social Science

WRT 001	Academic and Analytical Writing	3
or WRT 003	Composition and Literature I for Multilingual Writers	
BUS 003	Business Communication I	1.5
BUS 203	Business Communication II	1.5
Humanities and Social Science Requirements (HSS)		**6**
Courses to fulfill this requirement can be from any of these Disciplinary Perspectives:		
Interpreting and Understanding Human Experience (HE)		
Investigating the Social World (SW)		
Creating & Expressing through Arts & Languages (AL)		
Total Credits		**12**

Math and Science Core

CHM 030	Introduction to Chemical Principles	4
PHY 011	Introductory Physics I	4
PHY 012	Introductory Physics Laboratory I	1
PHY 021	Introductory Physics II	4
PHY 022	Introductory Physics Laboratory II	1
MATH 021	Calculus I	4
MATH 022	Calculus II	4
MATH 023	Calculus III	4
Probability and Statistics		3-6
MATH 231 (3 credits)		
OR ISE 111 and ISE 121 (6 credits total)		
NOTE: IBE-FinE and ISE-ISE should take ISE 111/ISE 121		
ENGR 010	Applied Engineering Computer Methods	3
Total Credits		**32-35**

Business and Economics Core

ECO 001	Principles of Economics	4
ECO 146	Intermediate Microeconomic Analysis	3
or ECO 119	Intermediate Macroeconomic Analysis	
ACCT 151	Introduction to Financial Accounting	3
ACCT 152	Introduction to Managerial Accounting	3
FIN 125	Introduction to Finance	3
BIS 111	Introduction to Information Systems	3
or ISE 224	Information Systems Analysis and Design	
OR CSE 241		
MKT 111	Principles of Marketing	3
LAW 201	Legal Environment of Business	3
MGT 043	Organizational Behavior	3
MGT 243	Leadership in Organizations	3
BUAN 044	Business Analytics I	1.5
BUAN 244	Business Analytics II	1.5
Total Credits		**34**

Required IBE Courses

IBE 010	Integrated Business and Engineering Seminar	1
or ENGR 005	Introduction to Engineering Practice	
or BUS 001		
IBE 050	Integrated Business and Engineering Workshop	3
IBE 150	Integrated Business and Engineering Sophomore Laboratory	1
IBE 250	Integrated Business and Engineering Junior Laboratory	1
IBE 380	Integrated Business and Engineering Capstone Project I	3
IBE 385	Integrated Business and Engineering Capstone Project II	3
IBE Internship Req.		0
Total Credits		**12**

IBE MAJORS

In addition to the core IBE Degree requirements, students must complete their chosen major requirements to meet the minimum credits for the degree.

Engineering and Business majors will follow different guidelines as outlined in the Engineering Majors and Business Majors sections below.

ENGINEERING MAJORS

- **IBE Core degree requirements: 90-93**
- **Engineering Major Requirements (credits vary by major): 33-40**
- **Free Elective credits: 6-14**
- **Total credit hours required for degree: 136**

BUSINESS MAJORS

- **IBE Core degree requirements: 90-93**
- **Business Major Requirements (credits vary by major): 15-21**
- **Credits of Engineering electives: 19**
- **Free Elective credits: 6-14**
- **Total credit hours required for degree: 136**

Engineering electives must have one of the following prefixes: BIOC, BIOE, CHE, CEE, CREG, CSE, ECE, ISE, MAT, ME, MECH

Courses excluded from engineering electives:

CHE 171	Fundamentals of Environmental Technology	4
CEE 010	Engineering/Architectural Graphics and Design	3
CSE 012	Introduction to Computing with Python	3
CSE 042	Game Design	3
CSE 252	Computing Ethics	3
ISE 224	Information Systems Analysis and Design	3
CSE 241	Database Systems and Applications	3
ME 010	Graphics for Engineering Design	3
The Business Core requires one of the following: BIS 111 or ISE 224 or CSE 241. Thus, ISE 224 and CSE 241 may not be taken in the engineering core for business majors.		
Due to course similarity, students may take one of the courses in these groups: CSE 003 OR MECH 003; CEE 059 OR MECH 012; ISE 215 AND ISE 216 OR ME 240		

Engineering Majors

BIOENGINEERING

BIOCOMPUTATIONAL ENGinEERINg

CSE 007	Introduction to Programming	4
CSE 017	Programming and Data Structures	3
MATH 205	Linear Methods	3
BIOS 041	Introduction to Cellular and Molecular Biology	3
BIOS 042	Introduction to Cellular and Molecular Biology Laboratory	1
BIOS 115	Genetics	3
PHY 380	Introduction to Computational Physics	3
or BIOE 363	Numerical Methods for Scientists and Engineers	
BIOE 210	Introduction to Engineering Physiology	4
BIOE 312	Fundamentals of Biomedical Signals	3
BIOC 237	Introductory Molecular Modeling and Simulation	3
or BIOS 339	Computational, Molecular Modeling and Simulation	
BIOC 309	Bioengineering Applications in Machine Learning	3
Technical Elective		3
Total Credits		**36**

For All Bioengineering Tracks AND Biocomputational Engineering Technical Elective

May be engineering courses (any program) at the 200-level or higher, and/or BIOS/CHM/PHY/MATH courses at the 200-level or higher.

Other classes that may contribute to technical electives (if not required for major): BIOE 020, BIOE 025, CSE 003, CSE 004, CSE 007, CSE 012, CSE 017, PHY 121, PHY 122, PHY 123, CHM 112, CHM 113, BIOS 115, BIOS 116 (Excluded courses: courses in professional development, writing, and other non-technical subjects; seminars; BIOS 235)

For All Bioengineering Tracks: List A Electives

CHE 341	Biotechnology I	3
ECE 337	Introduction to Micro- and Nanofabrication	3
ME 315	Bioengineering Statistics	3
BIOE 315	Bioengineering Statistics	3
BIOE 321	Biomolecular & Cellular Mechanics	3
BIOE 341	Biotechnology I	3
BIOE 345	Quantitative Biology	3
BIOE 349	Metabolic Engineering	3
BIOE 363	Numerical Methods for Scientists and Engineers	3

BIOENGINEERING - Biopharmaceutical Track

CHM 031	Chemical Equilibria in Aqueous Systems	4
CHM 110	Organic Chemistry I	3
BIOS 041	Introduction to Cellular and Molecular Biology	3
BIOS 042	Introduction to Cellular and Molecular Biology Laboratory	1
MATH 205	Linear Methods	3
CHE 031	Material and Energy Balances of Chemical Processes	3
BIOE 246	Bioengineering Thermodynamics	4
BIOE 247	Biological Fluid Mechanics	4
BIOE 110	Elements of Bioengineering	4
BIOE 210	Introduction to Engineering Physiology	4
List A Elective		3
Technical Elective		3
Total Credits		**39**

BIOENGINEERING - Bioelectronics & Biophotonics Track

CHM 031	Chemical Equilibria in Aqueous Systems	4
BIOS 041	Introduction to Cellular and Molecular Biology	3
BIOS 042	Introduction to Cellular and Molecular Biology Laboratory	1
MATH 205	Linear Methods	3
ECE 081	Principles of Electrical Engineering	4
ECE 108	Signals and Systems	4
ECE 123	Electronic Circuits	3
MAT 033	Engineering Materials and Processes	3
BIOE 110	Elements of Bioengineering	4
BIOE 210	Introduction to Engineering Physiology	4
List A Elective		3
Technical Elective		3
Total Credits		**39**

BIOENGINEERING - Biomechanics and Biomaterials Track

CHM 031	Chemical Equilibria in Aqueous Systems	4
BIOS 041	Introduction to Cellular and Molecular Biology	3
BIOS 042	Introduction to Cellular and Molecular Biology Laboratory	1
MATH 205	Linear Methods	3
MAT 033	Engineering Materials and Processes	3
MECH 003	Fundamentals of Engineering Mechanics	3
BIOE 110	Elements of Bioengineering	4
BIOE 210	Introduction to Engineering Physiology	4
BIOE 246	Bioengineering Thermodynamics	4
BIOE 247	Biological Fluid Mechanics	4
List A Elective		3
Technical Elective		3
Total Credits		**39**

CHEMICAL ENGINEERING

CHM 031	Chemical Equilibria in Aqueous Systems	4

CHM 110	Organic Chemistry I	3
CHM 343	Physical Chemistry Laboratory	2
BIOS 041	Introduction to Cellular and Molecular Biology	3
CHE 031	Material and Energy Balances of Chemical Processes	3
CHE 044	Fluid Mechanics	3
CHE 151	Heat and Mass Transfer	3
CHE 201	Methods of Analysis in Chemical Engineering	4
CHE 202	Chemical and Biomolecular Engineering Laboratory I	3
CHE 211	Chemical Reactor Design	3
CHE 203	Chemical and Biomolecular Engineering Laboratory II	3
CHE 210	Chemical Engineering Thermodynamics	3
CHE 244	Separation Processes	3
Total Credits		**40**

CIVIL ENGINEERING

MATH 205	Linear Methods	3
CEE 003	Engineering Statics	3
CEE 059	Strength of Materials	3
CEE 122	Fluid Mechanics	3
CEE 123	Civil Engineering Materials	3
CEE 142	Soil Mechanics	3
CEE 159	Structural Analysis I	4
CEE 170	Introduction to Environmental Engineering	4
CEE 222	Water Resources Engineering	3
CEE 242	Geotechnical Engineering	3
CEE 262	Fundamentals of Structural Steel Design	3
or CEE 264	Fundamentals of Structural Concrete Design	
Approved Elective		3
List Maintained by Civil and Environmental Engineering Department		
Total Credits		**38**

COMPUTER ENGINEERING

MATH 205	Linear Methods	3
ECE 033	Introduction to Computer Engineering	4
ECE 081	Principles of Electrical Engineering	4
ECE 123	Electronic Circuits	3
ECE 128	FPGA Laboratory	3
ECE 132	Microcontroller Laboratory	3
ECE 201	Computer Architecture	3
CSE 007	Introduction to Programming	4
CSE 017	Programming and Data Structures	3
CSE 109	Systems Software	4
CSE 216	Software Engineering	3
Total Credits		**37**

COMPUTER SCIENCE

CSE 007	Introduction to Programming	4
CSE 017	Programming and Data Structures	3
CSE 109	Systems Software	4
CSE 140	Foundations of Discrete Structures and Algorithms	3
CSE 202	Computer Organization and Architecture	3
CSE 216	Software Engineering	3
CSE 252	Computing Ethics	3
CSE 262	Programming Languages	3
CSE 303	Operating System Design	3
CSE 340	Design and Analysis of Algorithms	3
Technical Electives		6
List maintained by Computer Science and Engineering Department		
Total Credits		**38**

ELECTRICAL ENGINEERING

MATH 205	Linear Methods	3
ECE 205	C/C++ Programming	3
ECE 132	Microcontroller Laboratory	3
ECE 033	Introduction to Computer Engineering	4
ECE 081	Principles of Electrical Engineering	4
ECE 108	Signals and Systems	4
ECE 121	Electronic Circuits Laboratory	2
ECE 123	Electronic Circuits	3
ECE 126	Fundamentals of Semiconductor Devices	3
ECE 125	Random Signals and Learning	3
ECE 182	Junior Laboratory	1
ECE 257	Senior Lab I	3
ECE 258	Senior Lab II	2
Total Credits		**38**

ENVIRONMENTAL ENGINEERING

MATH 205	Linear Methods	3
CEE 003	Engineering Statics	3
CEE 122	Fluid Mechanics	3
CEE 142	Soil Mechanics	3
CEE 170	Introduction to Environmental Engineering	4
CEE 222	Water Resources Engineering	3
CEE 272	Environmental Risk Assessment	2
CEE 274	Environmental Water Chemistry	3
CEE 275	Environmental, Geotechnics and Hydraulics Laboratory	2
CEE 375	Environmental Engineering Processes	3
CEE 377	Environmental Engineering Capstone Design Project	3
CEE 378	Hazardous Waste Treatment and Management	3
Approved Elective		3
List Maintained by Civil and Environmental Engineering Department		
Total Credits		**38**

FINANCIAL ENGINEERING

MATH 205	Linear Methods	3
ISE 230	Introduction to Stochastic Models in Operations Research	3
ISE 240	Introduction to Deterministic Optimization Models in Operations Research	3
ISE 308	Simulation	3
FIN 323	Investments	3
FIN 328	Corporate Financial Policy	3
FIN Electives		6
Choose 2 from: FIN 331, FIN 332, FIN 333, FIN 334, FIN 335, FIN 336, FIN 337, FIN 377, FIN 383		
FE Electives		6
Choose 2 from: ECO 357, ISE 309, ISE 339, ISE 226, ISE 372, ISE 347, ISE 358, or ECO 358		
Engineering Electives		6

Choose 2. Courses must have prefix CSE or ECE or CREG or ME or MECH or CEE or MAT or CHE or BIOE or BIOC. Excludes the following courses: CHE 171 (CEE 171, EMC 171, ES 171), CEE 010 (ARCH 010), CSE 012, CSE 042 (EMC 042), CSE 252 (EMC 252, GCP 252), ISE 224, CSE 241, CSE 379, ME 010.		
Students may take only one of the courses in the following groups: Statics (CEE 003 OR MECH 002 OR MECH 003); Strength of Materials (CEE 059 OR MECH 012); Manufacturing (ISE 215 AND ISE 216 OR ME 240)		
Total Credits		**36**

INDUSTRIAL AND SYSTEMS ENGINEERING

MATH 205	Linear Methods	3
ISE 131	Work Systems and Operations Management	3
ISE 230	Introduction to Stochastic Models in Operations Research	3
ISE 240	Introduction to Deterministic Optimization Models in Operations Research	3
ISE 251	Production and Inventory Control	3
ISE 308	Simulation	3
Technical Electives		6
Choose from any 300 level ISE course except ISE 305. One technical elective may be a 200 or 300 level CSE class (excluding CSE 241 and CSE 252).		
Engineering Electives		6
Choose 2. Courses must have prefix CSE or ECE or ME or MECH or CEE or MAT or CHE or BIOE or BIOC. Excludes the following courses: CHE 171 (CEE 171, EMC 171, ES 171), CEE 010 (ARCH 010), CSE 012, CSE 042 (EMC 042), CSE 252 (EMC 252, GCP 252), ISE 224, CSE 241, CSE 379, ME 010.		
Students may take only one of the courses in the following groups: Statics (CEE 003 OR MECH 002 OR MECH 003); Strength of Materials (CEE 059 OR MECH 012); Manufacturing (ISE 215 AND ISE 216 OR ME 240)		
Choose one of the two options		8-9
CSE 003 and MAT 033 and ISE 215 and ISE 216		
OR		
CSE 007 and ISE 172		
Total Credits		**38-39**

MATERIALS SCIENCE AND ENGINEERING

MATH 205	Linear Methods	3
MECH 002	Elementary Engineering Mechanics	3
MAT 010	Materials Laboratory	3
MAT 033	Engineering Materials and Processes	3
MAT 201	Physical Properties of Materials	3
MAT 203	Materials Structure at the Nanoscale	3
MAT 205	Thermodynamics of Macro/Nanoscale Materials	3
MAT 216	Diffusion and Phase Transformations	3
MAT 218	Mechanical Behavior of Macro/ Nanoscale Materials	3
MAT 220	Materials Informatics for Materials Science and Engineering	3
Approved Elective		3
List maintained by the Materials Science and Engineering Department		
Total Credits		**33**

MECHANICAL ENGINEERING

MATH 205	Linear Methods	3
ECE 083	Introduction to Electrical Engineering	3
MECH 003	Fundamentals of Engineering Mechanics	3
MECH 012	Strength of Materials	3
MECH 102	Dynamics	3
ME 010	Graphics for Engineering Design	3
ME 021	Mechanical Engineering Laboratory I	1
ME 104	Thermodynamics I	3
ME 121	Mechanical Engineering Laboratory II	1
ME 207	Mechanical Engineering Laboratory III	2
ME 231	Fluid Mechanics	3
ME 240	Manufacturing	3
ME 242	Mechanical Engineering Systems	3
or ME 245 or ME 252		
ME 321	Introduction to Heat Transfer	3
Total Credits		**37**

STRUCTURAL ENGINEERING

MATH 205	Linear Methods	3
CEE 003	Engineering Statics	3
CEE 059	Strength of Materials	3
CEE 089	Professional Development I	1
CEE 117	Numerical Methods in Civil Engineering	2
CEE 123	Civil Engineering Materials	3
CEE 142	Soil Mechanics	3
CEE 159	Structural Analysis I	4
CEE 262	Fundamentals of Structural Steel Design	3
CEE 264	Fundamentals of Structural Concrete Design	3
CEE 289	Professional Development II	1
CEE 361	Bridge Systems Design	3
or CEE 363	Building Systems Design	
Approved Electives		6
Approved Elective Options: CEE 207, CEE 259, CEE 266, CEE 365		
Total Credits		**38**

BUSINESS MAJORS

ACCOUNTING

ACCT 311	Accounting Information Systems	3
ACCT 315	Intermediate Accounting I	3
ACCT 316	Intermediate Accounting II	3
ACCT 324	Advanced Managerial Accounting	3
Concentration, 3 courses - See below		9
Concentrations		
Public Accounting Assurance and Tax Services		
Complete the following courses: ACCT 307, ACCT 320, ACCT 317		
Financial Services and Corporate Accounting		
Complete the following courses: FIN 323, FIN 328, ACCT 318		
Information Technology		
Complete the following courses: ACCT 320, ACCT 330, and one 300-level BIS course (3 credits)		
Total Credits		**21**

BUSINESS ANALYTICS

BIS 342	e-Business Enterprise Applications	3
BUAN 346	Python Applications for Business	3
BUAN 348	Predictive Analytics in Business	3
BUAN 352	Business Analytics and Modelling	3
Business Analytics Electives		**6**

Choose 2 courses from BUAN 357, SCM 309, SCM 345, ACCT 330, ECO 301, ECO 357, ECO 367, MKT 325/ ECO 325, MKT 326, FIN 331, CSB 242		
Total Credits		**18**

BUSINESS INFORMATION SYSTEMS

Business Core		
BUAN 346	Python Applications for Business	3
BIS 311	Managing Information Systems Analysis and Design	3
BIS 324	Business Data Management	3
BIS 335	Application Development for Business	3
Business Information Systems Electives		**9**
Choose 3 courses from the following: ACCT 311, BIS 333, BIS 334, BIS 342, BIS 344, BUAN 348, BUAN 352, BUAN 357, BUAN 368, CSB 242, FIN 331 ENTP 304		
Total Credits		**21**

ECONOMICS

Common Economics Core		
ECO 119	Intermediate Macroeconomic Analysis	3
ECO 146	Intermediate Microeconomic Analysis	3
Quantitative Economics Core		
ECO 157	Statistical Methods II	3
Economics Electives		**12**
One course must be taken from each list, and at least two of the four courses must be at the 300 level.		
Electives - Field Courses		
Select from: ECO 209, ECO 229, ECO 303, ECO 304, ECO 311, ECO 312, ECO 322, ECO 338, ECO 339, ECO 352, ECO 353, ECO 358, ECO 363, ECO 365, ECO 368		
Electives - Applying Economics		
Select from: ECO 201, ECO 203, ECO 234, ECO 259, ECO 273, ECO 274, ECO 301, ECO 314, ECO 324, ECO 325, ECO 328, ECO 333, ECO 335, ECO 336, ECO 342, ECO 345, ECO 357, ECO 360, ECO 362, ECO 366, ECO 367, ECO 371, ECO 389		
Total Credits		**21**

FINANCE

Foundation Course Requirement		
FIN 323	Investments	3
FIN 328	Corporate Financial Policy	3
Elective Requirement - Choose 4 courses, at least two with a FIN prefix		**12**
FIN electives: FIN 331, FIN 332, FIN 333, FIN 334, FIN 335, FIN 336, FIN 337, FIN 383, FIN 377		
MATH electives: MATH 205, MATH 241, MATH 263, MATH 310		
ISE electives: ISE 339		
ACCT electives: Any 300 level , 3 credit ACCT course (except ACCT 371 and ACCT 372)		
ECO electives: Any 200 level 3 credit ECO course (except ECO 201, ECO 259, ECO 273, ECO 274, ECO 300, ECO 362, ECO 371, and ECO 389),		
REAL electives: Any 300 level 3 credit Real Estate course (REAL) (Can only count 1 REAL course if also taking FIN 336)		
Total Credits		**18**

MANAGEMENT

Choose one track (15 credits)		**15**
General Management		
Required Courses: MGT 333, MGT 328 (SCM 328), MGT 363		
Plus two courses chosen from the following list: MGT 374, MGT 342, MGT 379, MGT 381.		
Management Consulting Track		
Required Courses: MGT 306 (ENTP 306), MGT 328 (SCM 328), MGT 314		
Plus two courses chosen from the following list: MGT 346, MGT 374, MGT 333, MGT 342, FIN 328, MKT 319 (ENTP 319), MGT 363, BIS 335, ENTP 304		
Entrepreneurship and Innovation Track		
Required Courses: ENTP 201 (MGT 201), MGT 302 (ENTP 302), ENTP 311 (MGT 311)		
Plus two courses chosen from the following list: ENTP 312 (MGT 312), ENTP 306 (MGT 306), ENTP 319 (MKT 319), MGT 374, MGT 346, MGT 328 (SCM 328)		

MARKETING

Required Courses		
MKT 311	Consumer Behavior	3
MKT 312	Marketing Research	3
MKT 387	Marketing Strategy	3
Elective Courses: Select 3 of the following list:		**9**
MKT 313, MKT 314, MKT 315, MKT 319, MKT 320, MKT 325, MKT 326, MKT 327, MKT 347, MKT 330, MKT 332, MKT 366, MKT 371, MKT 372		
Total Credits		**18**

SUPPLY CHAIN MANAGEMENT

SCM 309	Supply, Cost, and Risk Managment	3
SCM 330	Analytics for Service Operations	3
SCM 340	Demand and Supply Chain Planning	3
SCM 345	Analytics for Supply Chain Management	3
SCM 354	Integrated Logistics and Transportation Management	3
Choose 1 elective from BIS, BUAN, MGT, or SCM courses		**3**
BIS 311, BIS 324, BIS 333, BIS 334, BIS 342, BIS 344		
BUAN 315, BUAN 346, BUAN 348, BUAN 352, BUAN 357, BUAN 368		
SCM 328, MGT 328, SCM 342, SCM 372 *SCM 372 requires approval of chair of DATA department		
Total Credits		**18**

Admission to the Integrated Business and Engineering Honors Program is highly selective. The University's Office of Admissions (610-758-3100) can explain the procedure for applying to the program.

The IBE program has a Five-Year Dual Degree Program. For additional information, visit ibe.lehigh.edu/about/dual-degrees (https://ibe.lehigh.edu/about/dual-degrees/)

It is possible that a small number of exceptional students may be admitted to the program following the completion of their freshman year. Admission at this point would be highly competitive and based upon freshman year GPA, faculty recommendations, and space availability.

The Academic Advisor for the IBE Honors Program is Jessica Scott (jes819@lehigh.edu). The co-directors of the IBE Honors Program are Richard J. Kish, Professor of Finance (rjk7@lehigh.edu), and Ana Alexandrescu, Professor of Industrial and Manufacturing Systems Engineering (aia210@lehigh.edu). For additional information, visit the IBE web site at ibe.lehigh.edu/ (https://ibe.lehigh.edu/).

Courses

IBE 010 Integrated Business and Engineering Seminar 1 Credit
Introduction to the various business and engineering professions through a series of presentations and demonstrations. Emphasis is on the diversity of business and engineering career opportunities and the associated curricular choices. Students also create their web page with four-year curriculum plan and an updated resume, learn Cad-Cam and presentation software, and explore career opportunities. Open only to first-year students in the Integrated Business and Engineering Honors Program.

IBE 050 Integrated Business and Engineering Workshop 3 Credits
The course introduces students to the interaction and interdependence of business planning and engineering design in the context of entrepreneurial new product development. Students develop skills in communication, teamwork and critical thinking while working in such areas as competitive strategy, financial modeling, marketing mix, prototyping, product testing, and the development of technical specifications. Open only to students in the Integrated Business & Engineering Honors Program.

IBE 150 Integrated Business and Engineering Sophomore Laboratory 1 Credit
A series of cases that integrate elements of business and engineering. Example topics include, but are not limited to, introduction to cost benefit analysis, introduction to modeling and optimization, team dynamics, and international negotiation and joint ventures. Oral presentations and written reports. Open only to students in the Integrated Business and Engineering Honors Program.

IBE 171 Integrated Business and Engineering Independent Study 1 Credit
Students address a technical issue in a business context from an entrepreneurial focus. Students pursue their own business start-up idea, either a product or a service, and develop a business plan that includes prototypes and testing (engineering) as well as a marketing plan and a base case financial model (business). The goal of the course is for students to enter a business plan or entrepreneurial competition in a local, regional or national level. Open only to students in the Integrated Business and Engineering Honors Program.
Prerequisites: IBE 050

IBE 250 Integrated Business and Engineering Junior Laboratory 1 Credit
A semester-long simulation game in which interdisciplinary teams of IBE students compete against each other. Topics include market analysis, working capital management, capital budgeting, raising long-term capital, plant location, and inventory control. Oral presentations and written reports. Open only to students in the Integrated Business and Engineering Honors Program.

IBE 271 Independent Study 1 Credit

IBE 380 Integrated Business and Engineering Capstone Project I 3 Credits
IBE students work in cross-disciplinary teams of 5 to 6 business and engineering majors with a faculty mentor on the marketing, financial and economic planning, and technical and economic feasibility of actual new product concepts initiated by the course's corporate sponsors. These sponsors are incubator start-up firms to ensure that the projects have both business and engineering elements. Written reports and oral presentations to sponsors and invited venture capitalists are required. Open only to students in the Integrated Business and Engineering Honors Program.

IBE 385 Integrated Business and Engineering Capstone Project II 3 Credits
IBE students continue to work with the detailed design including the fabrication and testing of working prototypes of their new products designed in IBE Capstone Project I course. In addition to the technical design of the products, detailed financial and marketing plans are required. Written reports and oral presentations to sponsors and invited venture capitalists are required. Open only to students in the Integrated Business and Engineering Honors Program.