

INDUSTRIAL ENGINEERING

ELECTIVES LISTS

2022-2023

The IMSE curriculum provides students with the opportunity to obtain a greater depth of knowledge through several different elective areas: Management, Focus, Engineering

Topic, and Social Sciences and Humanities.

* Students who entered ISU prior to Fall '14 must select two courses from each of the Management, Focus, and Engineering Topic elective lists. Students must also choose four Social Sciences and Humanities electives.

*Students who entered ISU in or after Fall '14 must select two courses from each of the Focus and Engineering Topic elective lists and one from the Management elective list. Students must also choose four Social Sciences and Humanities electives.

MANAGEMENT ELECTIVES

*Students who entered ISU prior to Fall '14 will choose two courses from the Management elective list.

*Students who entered ISU in or after Fall '14 will choose one course from the Management elective list.

Class	Description	Prerequisites	Semester
ACCT 284	Financial Accounting		F.S.SS.
AFAS 341	Air Force Leadership Studies I		F.
CON E 222	Contractor Organization and Management of Construction	Completion of basic program within current semester	F.S.
ECON 320	Labor Economics	ECON 101	VARIES
ECON 334	Entrepreneurship in Agriculture	ECON 101	F.S.
ECON 337	Agricultural Marketing	ECON 101 required, ECON 235 recommended	VARIES
ECON 344	Public Finance	ECON 101	VARIES
IE 450	Technical Sales for Engineers I	Credit or enrollment in IE 305	F.
MGMT 310	Entrepreneurship and Innovation (ENTSP)	Sophomore classification	F.S.
MGMT 370	Management of Organizations	ECON 101 or ECON 102	F.S.SS.
MGMT 414	International Management	MGMT 370 or MGMT 371	F.S.
MIS 301	Management Information Systems	COM S 113 or ENGR 160 equivalent	VARIES
MKT 340	Principles of Marketing	Credit or current enrollment in ECON 101	F.S.SS.
PSYCH 250	Psychology of the Workplace		VARIES
PSYCH 450	Industrial Psychology	2 courses in psychology including PSYCH 101, STAT 101	F.S.
SP CM 312	Business and Professional Speaking	SP CM 212	F.S.

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NOTE: Verify all prerequisites with current course catalog.

F. – Fall
S. – Spring
SS. – Summer

FOCUS ELECTIVES

Students will choose **two classes (6 credits total)** from the five focus areas: **Systems Engineering & Engineering Management, Human Factors, Operations Research & Analytics, Manufacturing, & Enterprise Computing.**

Systems Engineering and Engineering Management - focuses on the strategies necessary for solving internal and external problems of a company in areas such as production, quality, project management, sales, and marketing strategies.

Class	Description	Prerequisites	Semester
ACCT 215	Legal Environment of Business	Sophomore classification	F.S.SS.
ACCT 285	Managerial Accounting	ACCT 284	F.S.SS.
AER E 452	Introduction to Systems Engineering & Analysis (I E)	Junior Classification in Engineering	SS
CON E 380	Engineering Law	Junior Classification	F.S.
ECON 355	International Trade and Finance *	ECON 101, ECON 102	VARIES
ECON 371	Introductory Econometrics	ECON 301, ECON 302 or ECON 353, STAT 326	F.S.
ECON 416	Industrial Organization	ECON 301	VARIES
ECON 431	Managerial Economics	ECON 301	VARIES
ECON 437	Commodity Marketing and Risk Management	ECON 235, ECON 301, STAT 326	VARIES
ECON 455	International Trade *	ECON 301	VARIES
ECON 457/557	International Finance *	ECON 302	VARIES
ECON 532	Managerial Economics for the Global Organization	Enrollment in MBA or BAS program, not for ECON majors	VARIES
ECON 571	Intermediate Econometrics	ECON 500	S.
ENGR 430	Entrepreneurial Product Engineering (IE)	Junior Classification	F. Alt S., offered irregularly.
ENGR 434X	Entrepreneurial Product Engineering Design Project (IE)	I E 430 or ENGR 430	S.
FIN 301	Principles of Finance	ACCT 284, ECON 101, and STAT 226 (or STAT 231)	F.S.SS.
I E 430	Entrepreneurial Product Engineering (ENGR)	Junior Classification	F. Alt S., offered irregularly.
I E 434X	Entrepreneurial Product Engineering Design Project (ENGR)	I E 430 or ENGR 430	S.
I E 451	Technical Sales for Engineers II	I E 450	S.
I E 452	Introduction to Systems Engineering & Analysis (AER E)	Junior Classification in Engineering	SS
I E 463X	Introduction to Engineering and Systems Management	STAT 231 or STAT 305 or equivalent, upperclassman standing and permission of instructor	S.
I E 470/570	Systems Engineering and Project Management	I E 305 and course in basic statistic	VARIES
I E 560	Engineering Risk Analysis	Course in basic probability and statistics	VARIES
I E 561	Total Quality Management	Course in quality control	VARIES
I E 563	Engineering and Systems Management	I E 305 and course in basic statistics	VARIES
I E 564	Decision Analysis	Course in probability and statistics	VARIES
MGMT 371	Organizational Behavior	Sophomore classification	F.S.
MGMT 471	Personnel and Human Resource Management	MGMT 371	F.S.
MGMT 472	Management of Diversity	Junior classification	F.S.
MKT 368	Marketing Analytics (MIS)	MKT 340	F.S.
MKT 442	Sales Management	MKT 340	F.S.
SCM 301	Supply Chain Management	ECON 101, STAT 226 (or STAT 231)	VARIES

SCM 450	Enterprise Resource Planning Systems in Supply Chain (MIS)	SCM 301, MIS 301 or I E 148, I E 341	VARIES
SCM 461	Principles of Transportation	SCM 301	VARIES
SCM 466	Global Trade Management	SCM 301	F.S.

* Meets International Perspectives Requirement.

Human Factors - focuses on with the relationships between people and their work tasks, machines, information, environment, engineering as well as technology.

Class	Description	Prerequisites	Semester
I E 437/537	Reliability and Safety Engineering	STAT 231 or STAT 305 or STAT 587	VARIES
I E 571	Occupational Biomechanics	C E 274, STAT 231	VARIES
I E 572	Design and Evaluation of Human-Computer Interaction	I E 271 or Graduate classification	VARIES
I E 576	Human Factors in Product Design	I E 572 or I E 577	VARIES
I E 577	Human Factors	I E 271 or Graduate classification	VARIES
KIN 355	Biomechanics	PHYS 111 or PHYS 115	F.S.SS.
PSYCH 350	Human Factors in Technology	PSYCH 101; Junior classification	F.

Operations Research and Analytics - focuses on the design and analysis of quantitative models and methods having applications in production and service systems such as inventory control, scheduling, transportation, and logistics.

Class	Description	Prerequisites	Semester
COM S 207	Fundamentals of Computer Programming (MIS) Credit may not be applied toward graduation for both Com S 207/MIS 207 and Com S 227.	MATH 150 or placement into MATH 140 or higher	F.S.SS.
ECON 207	Applied Economic Optimization	MATH 151, MATH 160, MATH 165 or equivalent	F.S.
I E 313X	Crisis Decision Making and Risk Management with Defense Applications	MATH 151, MATH 160, or MATH 166	VARIES
I E 403/503	Introduction to Sustainable Production Systems	Credit or enrollment in I E 341	VARIES
I E 405/505	Advanced Engineering Economy for Complex Engineering Projects	MATH 265, MATH 267, STAT 231 and I E 305, or instructor's permission	VARIES
I E 508	Design and Analysis of Allocation Mechanisms	I E 312 or MATH 307	VARIES
I E 510	Network Analysis	I E 312	VARIES
I E 513	Analysis of Stochastic Systems	STAT 231	VARIES
I E 514	Production Scheduling	I E 312, I E 341	VARIES
I E 519	Simulation Modeling and Analysis	COM S 311, STAT 401	VARIES
I E 534	Linear Programming	I E 312	VARIES
I E 541	Inventory Control and Production Planning	I E 341	VARIES
MATH 207	Matrices and Linear Algebra	2 semesters of calculus	F.S.SS.
MATH 317	Theory of Linear Algebra	Credit or enrollment in MATH 201 or COM S 230 or CPR E 310	F.S.
MATH 435	Geometry I	MATH 201 or COM S 230 or CPR E 310; MATH 207 or MATH 317	F.
MIS 207	Fundamentals of Computer Programming (COM S) Credit may not be applied toward graduation for both Com S 207/MIS 207 and Com S 227.	MATH 150 or placement into MATH 140 or higher	F.S.SS.

Manufacturing - focuses on the design, analysis, operation, and control of manufacturing processes and systems.

Class	Description	Prerequisites	Semester
A B E 363	Agri-Industrial Applications of Electric Power and Electronics	A B E 216	F.S.
A B E 404/504	Instrumentation for Agricultural and Biosystems	A B E 316 and A B E 363	F.

	Engineering		
A B E 451/551	Food and Bioprocess Engineering	A B E 216 and credit or enrollment in M E 436 or CH E 357; or FS HN 351 and MATH 266 or MATH 267	S.
A B E 469/569	Engineering for Grain Storage, Preservation, Handling, and Processing Systems	A B E 216	S.
AER E 423	Composite Flight Structures	E M 324, MAT E 273	S.
E E 332	Semiconductor Materials and Devices (MAT E)	CPR E and E E majors: E E 230; MAT E majors: MAT E 317	S.
E E 432/532	Microelectronics Fabrication Techniques (MAT E)	PHYS 232 and PHYS 232L; MAT E majors: MAT E 317; CPR E and E E majors: E E 230	VARIES
E M 362	Principles of Nondestructive Testing (MAT E)	PHYS 132 and PHYS 132L or PHYS 232 and PHYS 232L	S.
E M 362L	Nondestructive Testing Laboratory (MAT E)	Credit or enrollment in E M 362	S.
ENSCI 480	Engineering Analysis of Biological Systems (A B E, GLOBE)	A B E 380 or permission of the instructor	F.
I E 444/544	Micro/Nano Scale Additive Printing	I E 348 or equivalent manufacturing engineering course	F.
I E 445/545	Rapid Prototyping and Manufacturing	I E 248 or similar manufacturing engineering course, MATH 265. For I E 545: Undergraduates at Senior Standing if given permission by instructor.	VARIES
I E 446/546	Geometric Variability in Manufacturing	I E 348, or MAT E 216, or M E 324	VARIES
I E 447/547	Biomedical Design and Manufacturing (B M E)	Students with three semesters or less before graduation	VARIES
I E 449/549	Computer Aided Design and Manufacturing	I E 248 or similar manufacturing engineering course, MATH 265	VARIES
I E 543	Wind Energy Manufacturing	Undergraduate engineering degree or permission of instructor	Alt. S., offered even-numbered years.
I E 588	Information Systems for Manufacturing	I E 148, I E 448	VARIES
MAT E 214	Structural Characterization of Materials	MAT E 215, PHYS 231	F.S.
MAT E 321	Introduction to Ceramic Science	MAT E 216	F.
MAT E 322	Introduction to Ceramic Processing	MAT E 214, MAT E 321	S.
MAT E 332	Semiconductor Materials and Devices (E E)	CPR E and E E majors: E E 230; MAT E majors: MAT E 317	S.
MAT E 341	Metals Processing	MAT E 214 and either MAT E 215, 273 or 392	F.
MAT E 351	Introduction to Polymeric Materials	MAT E 216	F.
MAT E 362	Principles of Nondestructive Testing (E M)	PHYS 132 and PHYS 132L or PHYS 232 and PHYS 232L	S.
MAT E 362L	Nondestructive Testing Laboratory (E M)	Credit or enrollment in E M 362	S.
MAT E 418	Mechanical Behavior of Materials	MAT E 216; Credit or enrollment in MAT E 319	F.S.
M E 270	Introduction to Mechanical Engineering Design	M E 160 or equivalent, M E 170 or equivalent, PHYS 231 and PHYS 231L	F.S.
M E 324	Manufacturing Engineering	M E 270, E M 324, MAT E 273 and M E 324L	F.S.SS.
M E 370	Engineering Measurements	E E 442, STAT 305	F.S.SS.
M E 410	Mechanical Engineering Applications of Mechatronics	E E 442, E E 448, credit or enrollment in M E 421	Alt. S., offered irregularly.
M E 411	Automatic Controls	M E 370, and credit or enrollment in M E 421	F.
M E 418/518	Mechanical Considerations in Robotics	Credit or enrollment in M E 421	S.
M E 419	Computer-Aided Design	M E 325	F.S.
M E 421	System Dynamics and Control	E E 442, E E 448, M E 345, MATH 267	F.S.SS.

Enterprise Computing - focuses on the integration of information within the functional units of an enterprise as well as among multiple enterprises.

Class	Description	Prerequisites	Semester
COM S 207	Fundamentals of Computer Programming (MIS) Credit may not be applied toward graduation for both Com S 207/MIS 207 and Com S 227.	MATH 150 or placement into MATH 140 or higher	F.S.SS.
COM S 227	Object-oriented Programming Credit may not be applied toward graduation for both Com S 207 and 227.	Credit or Enrollment in MATH 143 or higher; COM S 127 or CPR E 185 or S E 185 or E E 285 or DS 201	F.S.SS.
COM S 228	Introduction to Data Structures	Minimum of C- in COM S 227, credit or enrollment in MATH 165	F.S.SS.
COM S 342	Principles of Programming Languages (S E)	Minimum of C- in COM S 228 and MATH 165; COM S 230 or CPR E 310	F.S.
E E 285	Problem Solving Methods and Tools for Electrical Engineering		VARIABLES
FIN 450	Analytical Methods in Finance	STAT 326, and ECON 301 or FIN 301	F.S.
I E 420/520	Engineering Problem Solving with R	An introductory statistics course: STAT 231 or equivalent	S.
I E 481/581	e-Commerce Systems Engineering	I E 148	VARIABLES
I E 483/583	Data Mining	I E 148, I E 312, and STAT 231	VARIABLES
I E 487/587	Big Data Analytics and Optimization	I E 312, STAT 231	S.
I E 582	Enterprise Modeling and Integration	3 credits in information technology or information systems	VARIABLES
I E 585	Requirements and Architecture Engineering	3 credits in information technology or information systems	VARIABLES
I E 588	Information Systems for Manufacturing	I E 148, IE 448	VARIABLES
MIS 207	Fundamentals of Computer Programming (COM S) Credit may not be applied toward graduation for both Com S 207/MIS 207 and Com S 227.	MATH 150 or placement into MATH 140 or higher	F.S.SS.
S E 342	Principles of Programming Languages (COM S)	Minimum of C- in COM S 228 and MATH 165; COM S 230 or CPR E 310	F.S.

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NOTE: Verify all prerequisites with current course catalog.

**F. – Fall
S. – Spring
SS. – Summer**

ENGINEERING TOPIC ELECTIVES

Students will choose two classes (6 credits total) from the Engineering Topic elective list.

Class	Description	Prerequisites	Semester
A B E 216	Fundamentals of Agricultural and Biosystems Engineering	A B E 160 or permission of the instructor	F.
A B E 363	Agri-Industrial Applications of Electric Power and Electronics	A B E 216	F.S.
A B E 380	Principles of Biological Systems Engineering	A B E 316	S.
A B E 404/504	Instrumentation for Agricultural and Biosystems Engineering	A B E 316 and A B E 363	F.
A B E 413	Fluid Power Engineering (M E)	Credit or enrollment in E M 378 or M E 335, A B E 216 or M E 270	F.
A B E 415	Agricultural & Biosystems Engineering Design I	A B E 316 (majors only)	F.S.
A B E 451/551	Food and Bioprocess Engineering	A B E 216 and credit or enrollment in M E 436 or CH E 357; or FS HN 351 and MATH 266 or MATH 267	S.
A B E 466	Multidisciplinary Engineering Design (AER E, B M E, CPR E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation; permission of instructor.	F.S.
A B E 469/569	Engineering for Grain Storage, Preservation, Handling, and Processing Systems	A B E 216	S.
A B E 472/572	Design of Environmental Modification Systems for Animal Housing	A B E 216, M E 231	Alt. S., offered even-numbered years.
A B E 480/580	Engineering Analysis of Biological Systems (ENSCI, GLOBE)	A B E 380 or permission of the instructor	F.
A B E 511	Bioprocessing and Bioproducts	A B E 216 or equivalent, CHEM 167 or higher, BIOL 173 or higher, senior or graduate classification	F.
AER E 261	Introduction to Performance and Design	MATH 166, PHYS 231, PHYS 231L, credit or enrollment in AER E 161	F.S.
AER E 310	Aerodynamics I: Incompressible Flow	Grade of C- or better in AER E 261 and MATH 265	F.S.
AER E 423	Composite Flight Structures	E M 324, MAT E 273	S.
AER E 452	Introduction to Systems Engineering & Analysis (I E)	Junior Classification in Engineering	SS.
AER E 466	Multidisciplinary Engineering Design (A B E, B M E, CPR E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation; permission of instructor.	F.S.
AER E 467	Multidisciplinary Engineering Design II (ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation or permission of instructor.	Alt. F., Alt. S., offered irregularly.
AER E 468/568	Large-Scale Complex Engineered Systems (I E)	Senior standing in College of Engineering or permission of AER E 468 instructor	S.
AER E 481	Advanced Wind Energy: Technology and Design	AER E 381 or Senior classification in Engineering or Junior in Engineering with a course in fluid mechanics	S.
CH E 210	Material and Energy Balances	CHEM 178, MATH 166, CH E 160	F.S.
CH E 310	Computational Methods in Chemical Engineering	CH E 160, CH E 205, CH E 210, MATH 265	F.S.
CH E 356	Transport Phenomena I	CH E 205, CH E 210, PHYS 231, PHYS 231L; credit or enrollment in MATH 267	F.S.
CH E 357	Transport Phenomena II	CH E 356	F.S.
CH E 358	Separations	CH E 310, CH E 357, CH E 381	F.S.
CH E 381	Chemical Engineering Thermodynamics	CH E 202, MATH 267, PHYS 232, CHEM 325; credit or enrollment in CH E 310, PHYS 232L	F.S.

CH E 382	Chemical Reaction Engineering	CH E 310, CH E 381; credit or enrollment in CH E 357	F.S.
CH E 415/515	Biochemical Engineering	CH E 357, CHEM 331; BBMB 301 or BBMB 303 or BBMB 404	VARIES
CON E 352	Mechanical Systems in Buildings	CON E 222, CON E 251, PHYS 232 and PHYS 232L; or permission of instructor	F.S.
CON E 353	Electrical Systems in Buildings	PHYS 232 and PHYS 232L and credit or enrollment in CON E 352; or permission of instructor	F.S.
CON E 354	Building Energy Performance	CON E 352 or permission of instructor	F.
CPR E 281	Digital Logic	Sophomore classification	F.S.
CPR E 288	Embedded Systems I: Introduction	CPR E 281, COM S 207 or COM S 227 or E E 285	F.S.
CPR E 308	Operating Systems: Principles and Practice	CPR E 381 or COM S 321	F.S.
CPR E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation; permission of instructor.	F.S.
CPR E 489	Computer Networking and Data Communications	CPR E 288 or COM S 327	F.S.
E E 224	Signals and Systems I	E E 201, MATH 267	F.S.
E E 230	Electronic Circuits and Systems	E E 201, MATH 267	F.S.
E E 303	Energy Systems and Power Electronics	MATH 267, PHYS 232; credit or enrollment in E E 230	F.S.
E E 311	Electromagnetic Fields and Waves	E E 201, MATH 265, PHYS 232, credit or enrollment in MATH 267	F.S.
E E 332	Semiconductor Materials and Devices (MAT E)	CPR E and E E majors: E E 230; MAT E majors: MAT E 317	S.
E E 333	Electronic Systems Design	E E 230, CPR E 281	F.
E E 351	Analysis of Energy Systems	PHYS 232	VARIES
E E 432/532	Microelectronics Fabrication Techniques (MAT E)	PHYS 232 and PHYS 232L; MAT E majors: MAT E 317; CPR E and E E majors: E E 230	VARIES
E E 448	Introduction to AC Circuits and Motors (2 credits)	E E 442	F.S.
E E 452	Electrical Machines and Power Electronic Drives	E E 303, E E 324	S.
E E 455	Introduction to Energy Distribution Systems	E E 303, credit or enrollment in E E 324	F.
E E 456	Power System Analysis I	E E 303, credit or enrollment in E E 324	F.
E E 457	Power System Analysis II	E E 303, credit or enrollment in E E 324	S.
E E 459/559	Electromechanical Wind Energy Conversion and Grid Integration	Credit or enrollment in E E 452, E E 456	VARIES
E E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation; permission of instructor.	F.S.
E E 554	Power System Dynamics	E E 456, E E 457, E E 475	S.
E E 555	Advanced Energy Distribution Systems	E E 455	VARIES
E E 556	Power Electronic Systems	E E 452	VARIES
E M 324	Mechanics of Materials	C E 274	F.S.SS.
E M 362	Principles of Nondestructive Testing (MAT E)	PHYS 132 and PHYS 132L or PHYS 232 and PHYS 232L	S.
E M 362L	Nondestructive Testing Laboratory (MAT E)	Credit or enrollment in E M 362	S.
ENGR 340	Intro to Wind Energy: System Design & Delivery	MATH 166, PHYS 222	F.
ENGR 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, E E, I E, M E, MAT E)	Student must be within two semesters of graduation; permission of instructor.	F.S.
ENGR 467	Multidisciplinary Engineering Design II (AER E, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F., Alt. S., offered irregularly.
I E 313X	Crisis Decision Making and Risk Management with Defense Applications	MATH 151, MATH 160, or MATH 166	VARIES
I E 403/503	Introduction to Sustainable Production Systems	Credit or enrollment in I E 341	VARIES
I E 405/505	Advanced Engineering Economy for Complex Engineering Projects	MATH 265, MATH 267, STAT 231, and IE 305, or permission by instructor	VARIES

I E 420/520	Engineering Problem Solving with R	An introductory statistics course STAT 231 or equivalent	VARIES
I E 422X	Design and Analysis Applications for System Improvement	IE 222, IE 271, IE 305, IE 361 and credit or enrollment in IE 413 OR permission of instructor	VARIES
I E 437/537	Reliability and Safety Engineering	STAT 231 or STAT 305 or STAT 587	VARIES
I E 444/544	Micro/Nano Scale Additive Printing	I E 348 or equivalent manufacturing engineering course	F.
I E 445/545	Additive Manufacturing and Rapid Production Methods	I E 248 or similar manufacturing engineering course, MATH 265. Undergraduates at Senior standing if given permission by instructor	VARIES
I E 446/546	Geometric Variability in Manufacturing	I E 348, or MAT E 216, or M E 324	VARIES
I E 447/547	Biomedical Design and Manufacturing	Students with three semesters or less before graduation	VARIES
I E 449/549	Computer Aided Design and Manufacturing	I E 248 or similar manufacturing engineering course, MATH 265	VARIES
I E 452	Introduction to Systems Engineering & Analysis (AER E)	Junior Classification in Engineering	SS.
I E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, E E, ENGR, M E, MAT E)	Student must be within two semesters of graduation; permission of instructor.	F.S.
I E 467	Multidisciplinary Engineering Design II (AER E, ENGR, M E, MAT E)	Student must be within two semesters of graduation or permission of instructor.	Alt. F., Alt. S., offered irregularly.
I E 468/568	Large-Scale Complex Engineered Systems (AER E)	Senior standing in College of Engineering or permission of AER E 468 instructor	S.
I E 470/570	Systems Engineering and Project Management	I E 305 and course in basic statistics.	VARIES
I E 481/581	e-Commerce Systems Engineering	I E 148	VARIES
I E 483/583	Data Mining	I E 148, I E 312, and STAT 231	VARIES
I E 487/587	Big Data Analytics and Optimization	I E 312, STAT 231	S.
I E 508	Design and Analysis of Allocation Mechanisms	I E 312 or MATH 307	VARIES
I E 510	Network Analysis	I E 312	VARIES
I E 513	Analysis of Stochastic Systems	STAT 231	VARIES
I E 514	Production Scheduling	I E 312, I E 341	VARIES
I E 519	Simulation Modeling and Analysis	COM S 311, STAT 401	VARIES
I E 534	Linear Programming	I E 312	VARIES
I E 541	Inventory Control and Production Planning	I E 341	VARIES
I E 543	Wind Energy Manufacturing	Undergraduate engineering degree or permission of instructor	Alt. S., offered even-numbered years
I E 560	Engineering Risk Analysis	Course in basic probability and statistics	VARIES
I E 561	Total Quality Management	Course in quality control	VARIES
I E 563	Engineering and Systems Management	I E 305 and course in basic statistics	VARIES
I E 564	Decision Analysis	Course in probability and statistics	VARIES
I E 571	Occupational Biomechanics	E M 274, STAT 231	VARIES
I E 572	Design and Evaluation of Human-Computer Interaction	I E 271 or Graduate classification	VARIES
I E 576	Human Factors in Product Design	I E 572 or I E 577	VARIES
I E 577	Human Factors	I E 271 or Graduate classification	VARIES
I E 582	Enterprise Modeling and Integration	3 credits in information technology or information systems	VARIES
I E 585	Requirements and Architecture Engineering	3 credits in information technology or information systems	VARIES
I E 588	Information Systems for Manufacturing	I E 148, I E 448	VARIES
MAT E 214	Structural Characterization of Materials	MAT E 215, PHYS 231	F.S.

MAT E 216	Introduction to Materials Science and Engineering II	MAT E 215, MAT E 273 or MAT E 392; credit or enrollment in PHYS 232	F.S.
MAT E 311	Thermodynamics in Materials Engineering	CHEM 178, MAT E 215 or MAT E 273 or MAT E 392, and credit or enrollment in MAT E 216 and MATH 267	F.
MAT E 321	Introduction to Ceramic Science	MAT E 216	F.
MAT E 322	Introduction to Ceramic Processing	MAT E 214, MAT E 321	S.
MAT E 332	Semiconductor Materials and Devices (E E)	CPR E and E E majors: E E 230; MAT E majors: MAT E 317	S.
MAT E 341	Metals Processing	MAT E 214 and either MAT E 215, 273 or 392	F.
MAT E 351	Introduction to Polymeric Materials	MAT E 216	F.
MAT E 362	Principles of Nondestructive Testing (E M)	PHYS 132 and PHYS 132L or PHYS 232 and PHYS 232L	S.
MAT E 362L	Nondestructive Testing Laboratory (E M)	Credit or enrollment in MAT E 362	S.
MAT E 418	Mechanical Behavior of Materials	MAT E 216; credit or enrollment in MAT E 319	F.S.
MAT E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, E E, ENGR, I E, M E)	Student must be within two semesters of graduation; permission of instructor.	F.S.
MAT E 467	Multidisciplinary Engineering Design II (AER E, ENGR, I E, M E)	Student must be within two semesters of graduation or permission of instructor.	Alt. F., Alt. S., offered irregularly.
M E 324	Manufacturing Engineering	M E 270, E M 324, MAT E 273 and M E 324L	F.S.SS.
M E 332	Engineering Thermodynamics II	M E 231	F.S.SS.
M E 345	Engineering Dynamics	C E 274, credit or enrollment in MATH 266 or MATH 267	F.S.SS.
M E 370	Engineering Measurements	E E 442, STAT 305	F.S.SS.
M E 410	Mechanical Engineering Applications of Mechatronics	E E 442, E E 448, credit or enrollment in M E 421	Alt. S., offered irregularly.
M E 411	Automatic Controls	M E 370, and credit or enrollment in M E 421	F.
M E 413	Fluid Power Engineering (A B E)	Credit or enrollment in E M 378 or M E 335, A B E 216 or M E 270	F.
M E 415	Mechanical Systems Design	M E 324, M E 325	F.S.
M E 418/518	Mechanical Considerations in Robotics	Credit or enrollment in M E 421	S.
M E 419	Computer-Aided Design	M E 325	F.S.
M E 421	System Dynamics and Control	E E 442, E E 448, M E 345, MATH 267	F.S.SS.
M E 433	Alternative Energy	PHYS 232 and PHYS 232L and CHEM 167	F.
M E 436	Heat Transfer	M E 335	F.S.SS.
M E 437	Introduction to Combustion Engineering	Credit in M E 332 or equivalent	S.
M E 441	Fundamentals of Heating, Ventilating, and Air Conditioning	Credit or enrollment in M E 436	F.
M E 442	Heating and Air Conditioning Design	M E 441 or with instructor permission	S.
M E 444	Elements and Performance of Power Plants	M E 332, credit or enrollment in M E 335	S.
M E 449	Internal Combustion Engines	M E 332	F.
M E 466	Multidisciplinary Engineering Design (A B E, AER E, B M E, CPR E, E E, ENGR, I E, MAT E)	Student must be within two semesters of graduation; permission of instructor.	F.S.
M E 467	Multidisciplinary Engineering Design II (AER E, ENGR, I E, MAT E)	Student must be within two semesters of graduation or permission of instructor.	Alt. F., Alt. S., offered irregularly.
M E 530	Advanced Thermodynamics	M E 332	F.

M E 542	Advanced Combustion	M E 332 or CH E 381	Alt. F., offered odd- numbered years.
M E 545	Thermal Systems Design	M E 436	Alt S., offered odd- numbered years
M S E 520	Thermodynamics and Kinetics in Multicomponent Materials	MAT E 311 or CHEM 321, MATH 266 or MATH 267	F.

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NOTE: Verify all prerequisites with current course catalog.

F. – Fall
S. – Spring
SS. – Summer

Social Sciences and Humanities Electives

The Industrial Engineering program has created a list of Social Science and Humanities (SSH) courses for students to choose from to meet the 12 credits required for graduation. Six credits in the SSH area must be 200-level or above, and six credits must form a sequence of prerequisite or related courses. This list contains numerous US Diversity and International Perspectives courses: students must have 3 credits in each for graduation as a part of the 12 credit SSH requirement. Please check these courses with your adviser prior to completing the course.

**** Be sure to check the current catalog for prerequisites. ****

African American Studies (AF AM):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to African American Studies	X		
325 - Peoples and Cultures of Africa (ANTHR)		X	
330 - Ethnic and Race Relations (SOC)	X		
334 - Africana Religions (RELIG)	X		
347 - Studies in African American Literature (ENGL)	X		
350 - Women of Color in the U.S. (WGS)	X		
353 - History of African Americans I (HIST)	X		
354 - History of African Americans II (HIST)	X		
460 - Seminar in African American Culture	X		

Agronomy (AGRON):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
342 - World Food Issues: Past and Present (ENV S, FS HN)		X	

Apparel, Merchandising and Design (A M D):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
165 - Dress, Appearance, and Diversity in U.S. Society	X		
354 - Fashion History I: Prehistoric to Mid-19 th Century		X	
362 - Cultural Perspectives of Global Dress		X	

American Indian Studies (AM IN):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
210 - Introduction to American Indian Studies	X		
240 - Introduction to American Indian Literature (ENGL)	X		
310 - Contemporary Topics in American Indian Studies	X		
315 - Archaeology of North America (ANTHR)	X		
322 - Peoples and Cultures of Native North America (ANTHR)	X		
332/532 - Current Issues in Native North America (ANTHR)	X		
346 - American Indian Literature (ENGL)	X		

Anthropology (ANTHR):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Cultural Anthropology		X	
230 - Globalization and the Human Condition		X	
306 - Cultural and Interpretation		X	
308 - Archaeology			X
309 - Introduction to Culture and Language (LING)		X	
313/513 - Kinship and Marriage in a Global Perspective		X	
315/515 - Archeology of North America (AM IN)	X		
322/522 - Peoples and Cultures of Native North America (AM IN)	X		
323/523 - Topics in Latin American Anthropology (US LS)			X

325 - Peoples and Cultures of Africa (AF AM)		X	
332/532 - Current Issues in Native North America (AM IN)	X		
340/540 - Magic, Witchcraft, and Religion (RELIG)		X	
369 - Ancient Egypt (CL ST)		X	
376 - Classical Archeology (CL ST)		X	
411/511 - Anthropology for Global Professionals		X	
444/544 - Cross-cultural Perspective on Gender and Sexuality (WGS)		X	

Architecture (ARCH):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
221 - Histories and Theories of Architecture to 1750		X	
321 - History of the American City	X		
420 - Topics in American Architecture	X		
427/527 - History, Theory, and Criticism of Chinese Architecture		X	

Art History (ART H):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
280 - History of Art I		X	
281 - History of Art II		X	
382 - Art and Architecture of Asia		X	
383 - Greek and Roman Art (CL ST)			X
385 - Renaissance Art			X
388 - Modern Art and Theory			X
395 - Art and Theory Since 1945	X		
396 - History of Photography			X
487 - Nineteenth-Century Art			X
494 - Women/Gender in Art (WGS)	X		

Biology (BIOL):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
307 - Women in Science and Engineering (WGS, WISE)	X		

Classical Studies (CL ST):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
273 - Greek and Roman Mythology		X	
275 - The Ancient City		X	
310 - Ancient Philosophy (PHIL)			X
353 - World Literature: Western Foundations through Renaissance (ENGL)		X	
369 - Ancient Egypt (ANTHR)		X	
372 - Greek and Roman Tragedy and Comedy		X	
373 - Heroes of Greece, Rome, and Today		X	
374 - Sex, Gender, and Culture in the Ancient Mediterranean World (HIST, WGS)		X	
376 - Classical Archaeology (ANTHR)		X	
383 - Greek and Roman Art (ART H)			X
394 - The Archaeology of Greece: An Introduction (Only 2 credit course)		X	
395 - Study Abroad: The Archaeology of Greece		X	
402 - Greek Civilization (HIST)			X
403 - Roman Civilization (HIST)			X
430/530 - Foundations of Western Political Thought (POL S)			X

Communication Studies (COMST):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
101 - Introduction to Communication Studies			X
210 - Communication and U.S. Diversity	X		

211 - Interpersonal Communication			X
310 - Intercultural Communication		X	
314 - Organizational Communication			X
325 - Nonverbal Communication			X

Community and Regional Planning (C R P):	U.S Diversity	Intl. Persp.	IE SSH ONLY
291 - World Cities and Globalization		X	
376 - Rural, Urban and Regional Economics (ECON)			X

Criminal Justice (C J):	U.S Diversity	Intl. Persp.	IE SSH ONLY
241 - Youth and Crime (SOC)			X
320 - American Judicial Process (POL S)			X
332 - Philosophy of Law (PHIL)			X
340 - Deviant and Criminal Behavior (SOC)			X
484 - Topical Studies in Criminal and Juvenile Justice			X

Design Studies (DSN S):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
183 - Design in Context			X

Economics (ECON):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
101 - Principles of Microeconomics			X
102 - Principles of Macroeconomics			X
230 - Farm Business Management			X
235 - Introduction to Agricultural Markets			X
301 - Intermediate Microeconomics			X
302 - Intermediate Macroeconomics			X
313 - Economics of Sports			X
320 - Labor Economics		X	
321 - Economics of Discrimination (WGS)	X		
332 - Cooperatives			X
353 - Money, Banking, and Financial Institutions			X
355 - International Trade and Finance		X	
362 - Applied Ethics in Agriculture (SOC)			X
371 - Introductory Econometrics			X
376 - Rural, Urban and Regional Economics (C R P)			X
380 - Energy, Environmental and Resource Economics (ENV S)			X
385 - Economic Development (GLOBE)		X	
387 - Economies of China and India		X	
401 - Topics in Microeconomics			X
402 - Topics in Macroeconomics			X
416 - Industrial Organization			X
418 - Introduction to Game Theory			X
455 - International Trade		X	
457/557 - International Finance		X	
460/560 - Agricultural, Food, and Trade Policy			X
466 - Agricultural Finance			X
480/580 - Intermediate Environmental and Resource Economics			X

Electrical Engineering (E E):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
458 - Economic Systems for Electrical Power Planning			X

English (ENGL):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Literature			X
227 - Survey of American Literature to 1865			X
228 - Survey of American Literature since 1865			X
237 - Survey of Film History			X
240 - Introduction to American Indian Literature (AM IN)	X		
275 - Analysis of Popular Culture Texts (SP CM)			X
330 - Science Fiction			X
335 - Studies in Film			X
339 - Literary Theory and Criticism			X
340 - Women's Literature (WGS)	X		
344 - U.S. Latino/a Literature	X		
345 - Women and Literature: Selected Topics (WGS)	X		
346 - American Indian Literature (AM IN)	X		
347 - Studies in African American Literature (AF AM)	X		
349 - Topics in Multicultural Literatures of the United States	X		
353 - World Literature: Western Foundations through Renaissance (CL ST)		X	
354 - World Literature: Seventeenth Century to the Present		X	
358 - Myth and Fairytale			X
360 - Studies in American Literature to 1800			X
362 - Studies in 19th Century American Literature			X
364 - Studies in American Literature: 1900 to the Present			X
370 - Shakespeare		X	
373 - Studies in British Literature: The Middle Ages			X
375 - Studies in British Literature: The Restoration and 18th Century		X	
376 - Studies in British Literature		X	
389 - Postcolonial Literature		X	
393 - The History of Children's Literature			X
420 - History of the English Language (LING)			X
422 - Women, Men, and the English Language (LING, WGS)	X		

Environmental Science (ENSCI):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
324 - Energy and the Environment (ENV S, GEOL, MTEOR)			X

Environmental Studies (ENV S):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Environmental Issues (BIOL, ENSCI) (Only 2 credit course)			X
324 - Energy and the Environment (ENSCI, GEOL, MTEOR)			X
334 - Environmental Ethics (PHIL)			X
342 - World Food Issues: Past and Present (AGRON, FS HN)		X	
345 - Population and Society (SOC)		X	
380 - Energy, Environmental and Resource Economics (ECON)			X
382 - Environmental Sociology (SOC)			X
383 - Environmental Politics and Policies (POL S)			X
384 - Religion and Ecology (RELIG)		X	
484 - Sustainable Communities (C R P)			X

Foreign Languages & Literatures:	U.S. Diversity	Intl. Persp.	IE SSH ONLY
ASL 101 - American Sign Language I	X		
ASL 102 - American Sign Language II	X		
CHIN 101 - Elementary Mandarin Chinese I			X
CHIN 102 - Elementary Mandarin Chinese II		X	
CHIN 201 - Intermediate Mandarin Chinese I		X	
CHIN 202 - Intermediate Mandarin Chinese II		X	
CHIN 272 - Introduction to Chinese Culture		X	
CHIN 301 - Advanced Mandarin Chinese I		X	
CHIN 302 - Advanced Mandarin Chinese II		X	
CHIN 304 - Chinese for Global Professionals		X	
CHIN 370 - Chinese Literature in English Translation		X	
CHIN 375 - China Today		X	
FRNCH 101 - Elementary French I			X
FRNCH 102 - Elementary French II		X	
FRNCH 201 - Intermediate French I		X	
FRNCH 202 - Intermediate French II		X	
FRNCH 301 - French Writing and Grammar		X	
FRNCH 304 - French for Global Professionals		X	
FRNCH 320 - France Today		X	
FRNCH 370 - French Studies in English		X	
FRNCH 378 - French and/or Francophone Film Studies in English		X	
GER 101 - Elementary German I			X
GER 102 - Elementary German II		X	
GER 201 - Intermediate German I		X	
GER 202 - Intermediate German II		X	
GER 301 - Reading		X	
GER 305 - Conversation		X	
GER 320 - Germany Today		X	
GER 330 - German Literature and Culture		X	
GER 370 - German Studies in English		X	
GER 371 - The Holocaust in Text, Image, and Memory		X	
GER 375 - Grimms' Tales		X	
GER 378 - German Film and Media Studies		X	
GER 395 - Study Abroad		X	
GER 476 - Topics in German Cultural Studies		X	
LATIN 101 - Elementary Latin I			X
LATIN 102 - Elementary Latin II		X	
PORT 101 - Elementary Portuguese I			X
PORT 102 - Elementary Portuguese II		X	
PORT 112 - Elementary Portuguese, Accelerated II		X	
RUS 101 - Introduction to Russian Language Culture I			X
RUS 102 - Introduction to Russian Language Culture II		X	
RUS 201 - Intermediate Russian I		X	
RUS 202 - Intermediate Russian II		X	
RUS 301 - Composition and Conversation		X	
RUS 304 - Russian for Global Professionals		X	
RUS 314 - Reading Russian Literary and Cultural Texts		X	
RUS 370 - Russian Studies in English Translation		X	
RUS 375 - Russia Today		X	
RUS 395 - Study Abroad		X	
SPAN 101 - Elementary Spanish I			X

SPAN 102 - Elementary Spanish II		X	
SPAN 201 - Intermediate Spanish I		X	
SPAN 202 - Intermediate Spanish II		X	
SPAN 297 - Intensive Intermediate Spanish		X	
SPAN 303 - Spanish Conversation and Composition		X	
SPAN 304 - Spanish for Global Professionals		X	
SPAN 314 - Textual and Media Analyses		X	
SPAN 321 - Spanish Civilization		X	
SPAN 322 - Latin American Civilization		X	
SPAN 323 - Spain Today		X	
SPAN 326 - Studies in Hispanic Art or Film		X	
SPAN 330 - Studies in Spanish Literature		X	
SPAN 332 - Studies in Latin American Literature		X	
SPAN 351 - Introduction to Spanish-English Translation (LING, US LS)		X	
SPAN 352 - Spanish Pronunciation (LING)		X	
SPAN 370 - Hispanic Topics in English Translation		X	
SPAN 395 - Study Abroad		X	
SPAN 401/501 - Advanced Composition and Grammar		X	
SPAN 440/540 - Seminar on the Literatures and Cultures of Spain		X	
SPAN 441/541 - Seminar on Cervantes and the Golden Age		X	
SPAN 445/545 - Seminar on the Literatures and Cultures of Latin America		X	
SPAN 462 - Contrastive Analysis of Spanish/English for Translators (LING)			X
SPAN 463/563 - Contemporary Spanish Linguistics (LING)		X	
Note: Students having a native language(s) other than English may not use elementary, intermediate or advanced-level grammar, conversational or composition courses in that language(s).			

Geology (GEOL):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
324 - Energy and the Environment (ENSCI, ENV S, MTEOR)			X

Gerontology (GERON):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
373 - Death as a Part of Living (HD FS)			X
377 - Aging and the Family (HD FS)	X		
378 - Retirement Planning and Employee Benefits (HD FS)	X		

Global Resource Systems (GLOBE):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
385 - Economic Development (ECON)		X	

History (HIST):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Western Civilization I		X	
202 - Introduction to Western Civilization II		X	
207 - Chinese Civilization		X	
221 - Survey of United States History I			X
222 - Survey of United States History II			X
280 - Introduction to History of Science I		X	
281 - Introduction to History of Science II		X	
284 - Wonders of the World, Global History of Innovation		X	
307 - American Popular Culture			X
325 - Society and Politics in England, 1525-1700			X
336 - History of Modern China I		X	
337 - History of Modern China II		X	

338 - Modern Japanese History		X	
340 - History of Latin America I			X
341 - History of Latin America II		X	
353 - History of African Americans I (AF AM)	X		
354 - History of African Americans II (AF AM)	X		
374 - Sex, Gender, and Culture in the Ancient Mediterranean World (CL ST, WGS)		X	
380 - History of Women in Science, Technology, and Medicine (WGS)	X		
386 - History of Women in America (WGS)	X		
389 - American Military History		X	
390 - World Military History		X	
402 - Greek Civilization (CL ST)			X
403 - Roman Civilization (CL ST)			X
405 - Transformations of the Early Medieval World			X
406 - The Birth of Europe in the High Middle Ages			X
408 - Europe, 1500-1648			X
414 - European Cultural and Intellectual History			X
419 - History of Modern France			X
421 - History of Russia I		X	
422 - History of Russia II		X	
424 - History of Modern Germany			X
428 - Punishment, Mentalities, and Society in England, 1550-1868			X
431 - Modern England		X	
441 - History of Modern Mexico and Central America			X
450 - Colonial America			X
451 - American Revolutionary Era			X
455 - U.S. Civil War and Reconstruction Era			X
458 - U.S. 1900 to 1945			X
459 - U.S. 1945 to the Present			X
460 - The Great Plains			X
461 - The Rural South			X
465 - The American West			X
468 - History of Rural America			X
473 - Civil Rights and Ethnic Power (AF AM, US LS)	X		
482 - Birth, Death, Medicine, and Disease			X
488 - American Stuff, Colonial Times to the Present			X

Human Development and Family Studies (HD FS):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
102 - Individual and Family Development, Health, and Well-being			X
239 - Consumer Issues	X		
240 - Literature for Children	X		
249 - Parenting and Family Diversity Issues	X		
276 - Human Sexuality	X		
373 - Death as a Part of Living (GERON)			X
377 - Aging and the Family (GERON)	X		
378 - Retirement Planning and Employee Benefits (GERON)	X		

International Studies (INTST):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
235 - Introduction to International Studies		X	

Journalism and Mass Communication (JL MC):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
101 - Mass Media and Society			X
401 - Mass Communication Theory			X
461 - History of American Journalism			X
462 - Media Ethics, Freedom, Responsibility			X
464 - Journalism and Literature			X
474 - Communication Technology and Social Change		X	
476/576 - World Communication Systems		X	
477 - Diversity in the Media	X		

Landscape Architecture (L A):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
371 - History of Modern Landscapes, 1750 to Present			X
373 - Gardens and Landscapes from Antiquity to 1750		X	

Linguistics (LING):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
309 - Introduction to Culture and Language (ANTHR)		X	
351 - Introduction to Spanish-English Translation (SPAN, US LS)		X	
352 - Spanish Pronunciation (SPAN)		X	
420 - History of the English Language (ENGL)			X
422 - Women, Men, and the English Language (ENGL, WGS)	X		
462 - Contrastive Analysis of Spanish/English for Translators (SPAN)			X
463/563 - Contemporary Spanish Linguistics (SPAN)		X	

Meteorology (MTEOR):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
324 - Energy and the Environment (ENSCI, ENV S, GEOL)			X

Music (MUSIC):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
102 - Introduction to Music Listening		X	
383 - History of Music I		X	
384 - History of Music II		X	
472 - History of American Music	X		
473 - Topics in Advanced Music History			X
475 - Music of the Romantic Era			X

Philosophy (PHIL):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Philosophy			X
230 - Moral Theory and Practice			X
235 - Ethical Issues in a Diverse Society	X		
310 - Ancient Philosophy (CL ST)			X
314 - 17th Century Philosophy			X
315 - 18th Century Philosophy			X
316 - 19th Century Continental Philosophy			X
317 - 20th and 21st Century Continental Philosophy			X

318 - History of Analytic Philosophy			X
320 - Existentialism			X
330 - Ethical Theory			X
331 - Moral Problems in Medicine			X
332 - Philosophy of Law (C J)			X
334 - Environmental Ethics (ENV S)			X
335 - Social and Political Philosophy			X
336 - Bioethics and Biotechnology			X
338 - Feminist Philosophy (WGS)	X		
340 - Aesthetics			X
343 - Philosophy of Technology			X
350 - Philosophy of Religion (RELIG)			X
364 - Metaphysics: God, Minds, and Matter			X
366 - Truth, Belief, and Reason			X
380 - Philosophy of Science			X
430 - Value Theory			X
450 - Agency and Free Will			X
485 - Philosophy of Physics			X

Political Science (POL S):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
111 - Introduction to American Government			X
121 - Introduction to International Politics		X	
125 - Democracy and Dictatorship: Introduction to Comparative Politics		X	
235 - Introduction to Ethics and Politics			X
301 - Introduction to Empirical Political Science Research			X
305 - Comparative Political Behavior			X
306 - Public Opinion and Voting Behavior			X
310 - State and Local Government			X
312 - Special Topics in American Government and Politics (Only 2 credit course)			X
313 - Special Topics in Theory and Methods (Only 2 credit course)			X
314 - Special Topics in Comparative Politics (Only 2 credit course)			X
315 - Special Topics in International Relations (Only 2 credit course)		X	
318 - Campaign and Elections			X
319 - Law and Politics			X
320 - American Judicial Process (C J)			X
334 - Politics and Society (SOC)			X
335 - Science, Technology, and Public Policy			X
340 - Politics of Developing Areas		X	
343 - Latin American Government and Politics (US LS)		X	X
344 - Public Policy			X
346 - European Politics		X	
349 - Politics of Russia and Eastern Europe		X	
350 - Politics of the Middle East		X	
356 - Theories of International Politics			X
357 - International Security Policy			X

358 - United States Foreign Policy			X
359 - Current Issues in American Foreign Policy			X
360 - American Institutions: Congress			X
361 - American Institutions: The Presidency			X
370 - Religion and Politics (RELIG)			X
381 - International Political Economy			X
383 - Environmental Politics and Policies (ENV S)			X
385 - Women in Politics (WGS)	X		
413/513 - Intergovernmental Relations			X
417 - Campaign Rhetoric (SP CM)			X
420 - Constitutional Law			X
421 - Constitutional Freedoms			X
422/522 - International Law			X
430/530 - Foundations of Western Political Thought (CL ST)			X
431/531 - Modern Political Thought			X
452/552 - Comparative Foreign Policy		X	
453/553 - International Organizations			X
477/577 - Government, Business, and Society			X
480/580 - Ethics and Public Policy			X
487/587 - Electronic Democracy			X

Psychology (PYSCH):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
101 - Introduction to Psychology			X
230 - Developmental Psychology			X
280 - Social Psychology			X
314 - Motivation			X
315 - Drugs and Behavior			X
316 - Cognitive Psychology			X
346 - Psychology of Women (WGS)	X		
360 - Personality Psychology			X
381 - Social Psychology of Small Group Behavior (SOC)			X
460 - General Psychopathology			X

Religious Studies (RELIG):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
205 - World Religions (WLC)		X	
210 - Religion in America	X		
220 - Introduction to the Bible			X
242 - History of Christianity: Early to Medieval		X	
321 - The Hebrew Bible			X
322 - The New Testament			X
334 - Africana Religions (AF AM)	X		
336 - Religion and Gender (WGS)	X		
340/540 - Magic, Witchcraft, and Religion (ANTHR)		X	
342 - Religion and U.S. Latino/a Literature (US LS)	X		
350 - Philosophy of Religion (PHIL)			X
352 - Religions of India (WLC)		X	

358 - Islam (WLC)		X	
360 - Religion and Ethics			X
370 - Religion and Politics (POL S)			X
384 - Religion and Ecology (ENV S)		X	
485 - Theory and Method in Religious Studies			X

Sociology (SOC):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
134 - Introduction to Sociology			X
219 - Sociology of Intimate Relationships			X
230 - Rural Society in Transition			X
235 - Social Problems and American Values	X		
241 - Youth and Crime (C J)			X
305 - Social Psychology: A Sociological Perspective			X
310 - Community			X
325 - Transition in Agriculture			X
327 - Gender and Sexualities in Society (WGS)	X		
328 - Sociology of Masculinities and Manhood (WGS)	X		
330 - Ethnic and Race Relations (AF AM)	X		
331 - Social Class and Inequality	X		
332 - The Latino/Latina Experience in U.S. Society	X		
334 - Politics and Society (POL S)			X
340 - Deviant and Criminal Behavior (C J)			X
345 - Population and Society (ENV S)		X	
362 - Applied Ethics in Agriculture (ECON)			X
380 - Sociology of Work			X
381 - Social Psychology of Small Group Behavior (PSYCH)			X
382 - Environmental Sociology (ENV S)			X
401 - Contemporary Sociological Theories			X
411 - Social Change in Developing Countries		X	
415 - Dynamics of Social Change			X
485 - Sociology of the Family			X

Speech Communication (SP CM):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
216 - America Speaks: Great Speakers and Speeches in US History	X		
323 - Gender and Communication (WGS)	X		
417 - Campaign Rhetoric (POL S)			X

Theatre (THTRE):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
465 - Theatre History: Ancient to 19 th Century			X
466 - Theatre History: 19 th Century to Present			X

U.S. Latino/a Studies Program (US LS):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
211 - Introduction to U.S. Latino/a Studies	X		
342 - Religion and U.S. Latino/a Literature (RELIG)	X		

343 - Latin American Government and Politics (POL S)		X	
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Women's and Gender Studies (WGS):	U.S. Diversity	Intl. Persp.	IE SSH ONLY
201 - Introduction to Women's and Gender Studies	X		
203 - Introduction to Lesbian Studies	X		
301 - International Perspectives on Women and Gender		X	
307 - Women in Science and Engineering (BIOL, WISE)	X		
321 - Economics of Discrimination (ECON)	X		
323 - Gender and Communication (SP CM)	X		
327 - Gender and Sexualities in Society (SOC)	X		
328 - Sociology of Masculinities and Manhood (SOC)	X		
336 - Religion and Gender (RELIG)	X		
338 - Feminist Philosophy (PHIL)	X		
340 - Women's Literature (ENGL)	X		
345 - Women and Literature: Selected Topics (ENGL)	X		
346 - Psychology of Women (PSYCH)	X		
350 - Women of Color in the U.S. (AF AM)	X		
374 - Sex, Gender, and Culture in the Ancient Mediterranean World (CL ST, HIST)		X	
380 - History of Women in Science, Technology, and Medicine (HIST)	X		
385 - Women in Politics (POL S)	X		
386 - History of Women in America (HIST)	X		
401 - Feminist Theories			X
422 - Women, Men, and the English Language (ENGL, LING)	X		
444/544 - Cross-cultural Perspectives on Gender and Sexuality (ANTHR)		X	
494 - Women/Gender in Art (ART H)	X		
** Be sure to check the current catalog for prerequisites. **			

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Courses Not Offered in 2022-2023 Catalog

The courses listed below are approved for Industrial Engineering majors, but are not being offered in the 2022-2023 academic year. If you took one of these courses in the past, it will still count towards your IE degree.

Engineering Electives not in 2022-2023 Catalog			
A E 423x	Energy and the Environment	MATH 160 or higher, PHYS 221, A B E 216 or ME 270	F.
C E 430x	Anerobic Biproducts	C E 326	VARIES
C E 511	Bioprocessing and Bioproducts (A B E)	A B E 216, C E 326 or equivalent, MATH 160 or MATH 165, CHEM 167 or higher, BIOL 173 or BIOL 211 or higher, Senior or Graduate classification	F.
CON E 454x	Building Energy Modeling	CON E 354	F.
CPR E 467	Multidisciplinary Engineering Design II (AER E, E E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F., Alt. S., offered irregularly.
E E 467	Multidisciplinary Engineering Design II (AER E, CPR E, ENGR, I E, M E, MAT E)	Student must be within two semesters of graduation and permission of instructor.	Alt. F., Alt. S., offered irregularly.
ECON 333	Advanced Farm Business management	ECON 230	VARIES
E M 345	Engineering Dynamics	E M 274, credit or enrollment in MATH 266 or 267	F.S.SS.
I E 222	Design & Analysis Methods for Systems Improvements *Only an Engr Topic Elective for students who began I E program before Fall 2014.	I E 248; credit and enrollment in I E 271	S.
I E 347X	Medical Manufacturing	MAT E 273	VARIES
I E 409	Interdisciplinary Systems Effectiveness	Junior or Senior classification	F.SS.
I E 578X	Human-Centered Design and Manufacturing		VARIES
MAT E 363	Materials for Wind Energy	ENGR 340	S
MAT E 442	Structure/Property Relations in Nonferrous Metals	MAT E 215 or 273 or 392	F.
M E 446	Power Plant Design	M E 332, credit or enrollment in M E 335	F.
M E 540	Solar Energy Systems	ME 436	F.
MGMT 313	Feasibility Analysis and Business Planning	MGMT 310	F.S.
NUC E 401	Nuclear Radiation Theory and Engineering	PHYS 222, MATH 266 or MATH 267	F.
NUC E 402	Nuclear Reactor Engineering	NUC E 401, permission of Nuclear Engineering program director	S.
NUC E 441	Probabilistic Risk Assessment	STAT 305 or equivalent	S.
NUC E 461	Radiation Detection, Measurement and Simulation	NUC E 401	S.
STAT 407	Methods of Multivariate Analysis	STAT 301 or STAT 326 or STAT 401, knowledge of matrix algebra	F.

SSH Classes not in 2022-2023 Catalog	U.S. Diversity	Intl. Persp.	IE SSH ONLY
AF AM 348 - Cont. African American Literature	X		
AM IN 323 - Topics in Latin American Anthropology (ANTHR)			X
AM IN 328 - American Indian Religions (RELIG)	X		
AM IN 342 - American Indian Women Writers (W S) (ENGL)	X		
AM IN 432 - Current Issues in Native North America (now listed as AM IN 332)	X		
ANTHR 333 - Asian American Material Cultures (HIST)	X		
ANTHR 337 - Andean Archaeology		X	
ANTHR 412 - Psychological Anthropology	X		
ANTHR 432 - Current Issues in Nat. N. America (now listed as ANTHR 332)	X		
ANTHR 439 - Medical Anthropology		X	

ARCH 222 - History of Architecture II		X	
ART H 181 - Origins and Evolution of Modern Design			X
ART H 481 - Art and Architecture of India		X	
CL ST 404 - Roman Social History			X
C R P 253 - Survey of Community and Regional Planning			X
C R P 270 - Forces Shaping Our Metropolitan Env. (DSN S 270)	X		
CZECH 101 - Elementary Czech			X
CZECH 102 - Elementary Czech II		X	
CZECH 201 - Intermediate Czech I		X	
CZECH 202 - Intermediate Czech II		X	
DSN S 181 - Origins and Evolution of Modern Design			X
DSN S 221 - History of Architecture I (ARCH)		X	
DSN S 222 - History of Architecture II (ARCH)		X	
DSN S 270 - Forces Shaping Our Metropolitan Environment	X		
DSN S 280 - History of Art I (ART H)		X	
DSN S 281 - History of Art II (ART H)		X	
DSN S 371 - History of Modern Landscapes, 1750 to Present			X
DSN S 373 - Gardens and Landscapes from Antiquity to 1750		X	
DSN S 382 - Art and Architecture in Asia		X	
DSN S 383 - Greek and Roman Art			X
DSN S 385 - Renaissance Art			X
DSN S 388 - Modern Art and Theory			X
DSN S 395 - Art and Theory Since 1945	X		
DSN S 396 - History of Photography			X
DSN S 481 - Art and Architecture in India		X	
DSN S 487 - Nineteenth Century Art			X
DSN S 494 - Women/Gender in Art	X		
ECON 308 - Agent-Based Computational Economics			X
ECON 312 - History of Economic Thought			X
ECON 370 - Comparative Capitalism and Economic Transitions		X	
ECON 378 - Retirement Planning and Employee Benefits	X		
ECON 458 - Economic Systems for Electric Power Planning (E E)			X
ENGL 205 - Popular Culture Analysis			X
ENGL 231 - Readings in American Literature & Culture			X
ENGL 301 - Cultural Studies			X
ENGL 342 - American Indian Women Writers (AM IN, W S)	X		
ENGL 348 - Cont. African American Literature	X		
ENGL 366 - Studies in Drama			X
ENGL 374 - Studies in British Literature: The Renaissance		X	
ENGL 378 - Studies in British Literature: 1900 to Present			X
ENGL 384 - 20th Century & Contemporary Literature			X
ENGL 482 - Environmental Politics & Policies			X
ENV S 442 - The Policy and Politics of Coastal Areas (POL S)			X
ENV S 472 - U.S. Environmental History (HIST)			X
FRNCH 310 - French Pronunciation and Phonetics			X
FRNCH 314 - Textual Analysis			X
FRNCH 333 - Modern French Literature		X	
FRNCH 334 - The French Literary Tradition		X	
FRNCH 375 - Contemporary France and the Francophone World		X	
FRNCH 395 - Study Abroad		X	
FRNCH 440 - Topics in French Studies		X	
FRNCH 471 - Foundations of French Civilization		X	
FRNCH 472 - Modern France and French Civilization		X	

FS HN 432 - World Food Issues: Past and Present (AGRON, ENV S, T SC)		X	
GER 471 - Foundations of German Civilization			X
GER 472 - Topics in German Cultural Studies (now listed as GER 476)			X
GREEK 101 - Elementary Ancient and New Testament Greek I			X
GREEK 102 - Elementary Ancient and New Testament Greek II		X	
GREEK 201 - Intermediate Classical Greek		X	
GREEK 332 - Introduction to Classical Greek Literature		X	
GREEK 441 - Advanced Readings in Greek Literature		X	
GREEK 442 - Advanced Topics in Greek Literature		X	
HIST 225 - Introduction to Asian American Studies	X		
HIST 240 - Latina/o History (US LS)	X		
HIST 245 - Introduction to Latin American History		X	
HIST 285 - Modern Wonders of the World			X
HIST 305 - Cultural Heritage of the Modern World			X
HIST 323 - Science and Religion (RELIG)		X	
HIST 339 - U.S.-Asian Relations		X	
HIST 351 - Social and Cultural History of American People I			X
HIST 352 - Social and Cultural History of American People II			X
HIST 355 - Early American Republic			X
HIST 356 - U.S. Civil War and Reconstruction Era			X
HIST 371 - The Holocaust in Text, Image, and Memory		X	
HIST 388 - History of Modern Astronomy			X
HIST 404 - Roman Social History			X
HIST 410 - 19th Century Europe			X
HIST 425 - History of Modern Germany II		X	
HIST 454 - Slavery and the Crisis of Union			X
HIST 456 - American Family History			X
HIST 462 - History of American Thought I			X
HIST 463 - History of American Thought II			X
HIST 464 - Nineteenth Century America			X
HIST 466 - North American Expansion			X
HIST 469 - Contemporary America			X
HIST 470 - The United States and the Cold War I			X
HIST 471 - The United States and the Cold War II			X
HIST 472 - U. S. Environmental History (ENV S)			X
HIST 483 - History of Social and Behavioral Sciences			X
HIST 484 - Science, Technology, Medicine, and Public Policy			X
HIST 489 - History of American Science			X
HD FS 349 - Parenting and Family Diversity Issues (now listed under HD FS 249)	X		
LAS 211 - Introduction to U.S. Latino/a Studies	X		
LAS 225 - Introduction to Asian American Studies	X		
LAS 325 - Introduction to Asian American Studies	X		
LAS 385 - The Holocaust		X	
LATIN 201 - Intermediate Latin		X	
LATIN 332 - Introduction to Latin Literature		X	
LATIN 441 - Advanced Readings in Latin Literature		X	
LATIN 442 - Advanced Topics in Latin Literature		X	
M S 283 - The U. S. Army in American Society to 1917			X
MUSIC 471 - Tones of Florence - A Study in Humanism		X	
PHIL 381 - Philosophy of the Social and Behavioral Sciences			X
PHIL 460 - Epistemology and Metaphysics			X
PHIL 480 - Controversies in Science			X
PHIL 483 - Philosophy of Biology			X

POL S 311 - Municipal Government and Politics			X
POL S 332X - Latino Politics	X		
POL S 341 - Politics of Japan		X	
POL S 345 - Immigration Policy		X	
POL S 371 - Public Organizations and Leadership			X
POL S 406 - Public Opinion and Voting Behavior (now listed as POL S 306)			X
POL S 410 - Iowa Government and Politics			X
POL S 433 - American Political Thought			X
POL S 442/542 - The Policy and Politics of Coastal Areas (ENV S)			X
POL S 451 - International Politics of Asia			X
POL S 464 - Political Parties and Interest Groups			X
POL S 470 - Political Game Theory			X
POL S 483 - Law and Management			X
POL S 485 - Comparative Public Administration			X
POL S 486 - Science, Technology, and Public Policy (now listed as POL S 335)			X
POLSH 101 - Elementary Polish I			X
POLSH 102 - Elementary Polish II		X	
POLSH 201 - Intermediate Polish I		X	
POLSH 202 - Intermediate Polish II		X	
PORT 202 - Intermediate Portuguese II			X
PORT 301 - Advanced Grammar, Composition, and Conversation			X
PORT 321 - Luso-Brazilian Civilization and Culture			X
PORT 330 - Readings in Luso-Brazilian			X
PORT 370 - Luso-Brazilian Topics in English Translation			X
PSYCH 318 - Thinking and Decision Making			X
PSYCH 401 - History of Psychology			X
RELIG 260 - Religious Ethics (now listed under RELIG 360)			X
RELIG 280 - Introduction to Catholicism			X
RELIG 323 - Science and Religion (HIST)		X	
RELIG 328 - American Indian Religions (AM IN)	X		
RELIG 333 - Introduction to Judaism		X	
RELIG 338 - Latino/a Religious Experience			X
RELIG 356 - African Religions		X	
RELIG 376 - Classical Archaeology (ANTHR, CL ST)		X	
RELIG 377 - Social Dimensions of Religion (SOC)			X
RELIG 453 - Buddhism		X	
RUS 320 - Russia Today (now listed as RUS 375)			X
RUS 376 - Topics in Russian, East European, and Eurasian Studies			X
RUS 401 - Advanced Composition and Conversation			X
RUS 440 - Seminar in Russian Studies			X
SERBC 101 - Elementary Serbo-Croatian I			X
SERBC 102 - Elementary Serbo-Croatian II		X	
SOC 130 - Rural Institutions and Organizations			X
SOC 264 - Small Group Dynamics			X
SOC 377 - Social Dimensions of Religion (RELIG)			X
SOC 420 - Complex Organizations			X
SOC 431 - Chicanos/Chicanas in Contemporary Society	X		
SOC 435 - Urban Sociology			X
SOC 461 - Life Course Sociology			X
SOC 484 - Topical Studies in Criminal and Juvenile Justice (CJ ST)			X
SPAN 301 - Spanish Grammar and Composition		X	
SPAN 331 - Survey of Spanish Literature from 1700 to the Present		X	
T C 165 - Dress and Diversity in Society (now listed as AMD 165)	X		

T C 354 - History of European & North American Dress (now listed as AMD 354)		X	
T C 362 - Cultural Perspectives of Dress (now listed as AMD 362)		X	
T SC 341 - Technology: International, Social, & Human Issues			X
T SC 342 - World Food Issues: Past and Present (AGRON, ENV S, FS HN)		X	
T SC 343 - Philosophy of Technology (PHIL)			X
T SC 474 - Communication Technology & Social Change (JL MC)		X	
US LS 332 - The Latino/Latina Experience in U.S. Society (SOC)	X		
U ST 342 - World Food Issues: Past and Present		X	
W S 342 - American Indian Women Writers (AM IN) (ENGL)	X		
W S 394 - Women in Art	X		

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