

CE Engineering Topics Electives List: 2023-2024 Catalog

According to ABET, the department's accrediting body, engineering topics consist of *engineering sciences and engineering design appropriate to the student's field of study*. The engineering sciences have their roots in mathematics and basic sciences but carry knowledge further toward creative application. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the other. Engineering design is the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet these stated needs. **Students may petition** the CE Curriculum Committee to accept a course not listed below as an engineering topics elective. The petition should explain how the proposed course involves engineering sciences or engineering design appropriate to the student's field of study. NOTE: Courses that are listed on more than one electives lists can count for only one requirement. The student is responsible for checking and abiding by the ISU catalog relative to official course details, prerequisites and narratives.

Course	CR.	Title	Offered	Notes	Environmental	Geotechnical	Transportation	Structural
A B E 388 (C E, E E)	3	Sustainable Engineering & International Development	F	Prereq: Junior classification in engineering	<input checked="" type="checkbox"/>			
A B E 478/578	3	Wood Frame and Agri-Industrial Structures	Alt. S (odd years)	Prereq: E M 324 (This course is on the design electives list.)				<input checked="" type="checkbox"/>
AER E 417/517 (EM)	3	Experimental Mechanics	Alt. F (even years)	Prereq: E M 324, MAT E 273				<input checked="" type="checkbox"/>
AER E 494X	2-3	Make to Innovate	F.S.	Prereq: Restricted to Junior or Senior classifications, Instructor permission required.				
AGRON 404/504 (EN SCI, ENV S, MTEOR)	3	Global Change	F.S	Prereq: Four courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			
C E 333	3	Structural Steel Design I	F, S	Prereq: C E 332, E M 327				<input checked="" type="checkbox"/>
C E 334	3	Reinforced Concrete Design I	F, S	Prereq: C E 332, E M 327				<input checked="" type="checkbox"/>

Course	CR.	Title	Offered	Notes	Environmetnal	Geotechnical	Transportation	Structural
C E 388 (A B E, E E)	3	Sustainable Engineering & International Development	F	Junior classification in engineering	<input checked="" type="checkbox"/>			
C E 395 (395X)	3	Global Perspectives in Transportation	S	Repeatable (Can be used to fulfill IP and Engineering Topics only - not SSH)			<input checked="" type="checkbox"/>	
C E 413/513 (ENSCI, GEOL)	3	Applied and Environmental Geophysics	Alt S (odd years)	Prereq: GEOL 100 or GEOL 201, algebra and trigonometry	<input checked="" type="checkbox"/>			
C E 417	3	Land Surveying	S	Prereq: C E 111			<input checked="" type="checkbox"/>	
C E 428 (General Option Only)	3	Water & Wastewater Treatment Plant Design	S	Prereq: C E 326 (This course is on the design electives list.)	<input checked="" type="checkbox"/>			
C E 446/546	3	Bridge Design	Alt. S (odd years)	Prereq: C E 333 and 334 (This course is on the design electives list.)				<input checked="" type="checkbox"/>
C E 448/548	3	Building Design	irregularly	Prereq: C E 333 and 334 (This course is on the design electives list.)				<input checked="" type="checkbox"/>
C E 449/549 (MAT E 449)	3	Structural Health Monitoring	irregularly	Senior classification in Engineering or permission of instructor				<input checked="" type="checkbox"/>
C E 451/551	3	Urban Transportation Planning Models	F	Prereq: C E 355, and a course in statistics from the approved departmental list			<input checked="" type="checkbox"/>	
C E 453	3	Highway Design	F	C E 306, CE 355 (This course is on the design electives list.)				

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C E 460	3	Foundation Engineering	F, S	Prereq: C E 360 (This course is on the design electives list.)		<input checked="" type="checkbox"/>		
C E 462	3	Site Evaluations for Civil Engineering Projects		Prereq: C E 360 or instructor approval.				
C E 467/567	3	Geomaterials Stabilization	S	Prereq: C E 360, CE 382 or CE 383 (This course is on the design electives list.)		<input checked="" type="checkbox"/>		
C E 473/573	3	Groundwater Hydrology	F	Prereq: C E 372 (This course is on the design electives list.)	<input checked="" type="checkbox"/>			
C E 483/583	3	Pavement Analysis & Design	S	Prereq: C E 360 and C E 382 (This course is on the design electives list.)		<input checked="" type="checkbox"/>		
C E 484/584	3	Advanced Design of Concretes	irregu- larly	Prereq: C E 382 (This course is on the design electives list.)		<input checked="" type="checkbox"/>		
C E 488/588	3	Sustainable Horizontal Civil Infrastructure Systems	F	Prereq: Junior or higher classification in engineering or science (This course is on the design electives list.)	<input checked="" type="checkbox"/>			
C E 489/589	3	Pavement Preservation and Rehabilitation	F, S	C E 382				
C E 490/CON E 490	1-3	Independent Study -- with a contract between the student and instructor at registration	F, S, SS	Repeatable with the maximum of 6 credits; applied as Engineering Topics Electives. Prereq: permission of Instructor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C E 500 - level courses	var.	(except C E 590, 591, 595 & 599)		Variable prereqs: See catalog. (Some of these courses are on the design electives list.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CH E 210	3	Material & Energy Balances	F, S	Prereq: CHEM 178, MATH 166, CH E 160	<input checked="" type="checkbox"/>			
COM S 207 (MIS) OR COM S 227 but not both	3	Fundamentals of Computer Programming	F, S, SS	Prereq: MATH 150 or placement into MATH 140 or higher				
COM S 227 OR COM S 207 but not both	4	Object-Oriented Programming	F, S, SS	Prereq: 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				
CON E 322	3	Construction Equipment and Heavy Construction Methods	F, S	Prereq: CON E 222 and CON E 241, or C E 306 in lieu of CON E 222 and 241				
CON E 340	3	Concrete and Steel Construction	F, S	Prereq: E M 324 and CON E 222, or CE 306 in lieu of CON E 222				
CON E 380	3	Engineering Law	F, S	Junior Classification	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CPR E 466 (A B E, AER E, B M E, E E, ENGR, I E, MAT E, M E)	1-4	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; repeatable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C R P 251	3	Fundamentals of Geographic Information Systems	F					
C R P 293 (ENV S)	3	Environmental Planning	F, S		<input checked="" type="checkbox"/>			
C R P 351	3	Intermediate Geographic Information Systems	F.S.	Prereq: CRP 251X				

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C R P 445/545	3	Transportation Policy and Planning	F	Prereq: Junior classification; CRP 545 prerequisite: Graduate classification				
C R P 484/584 (ENV S)	3	Sustainable Communities	S	Prereq: Junior classification	<input checked="" type="checkbox"/>			
E E 201	4	Electric Circuits	F, S	Prereq: Credit or enrollment in MATH 267 and PHYS 231 and Phys 231L	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E E 388 (A B E, C E)	3	Sustainable Engineering & International Development	F	Prereq: Junior classification in engineering	<input checked="" type="checkbox"/>			
E E 466 (A B E, AER E, B M E, CPR E, ENGR, I E, M E, MAT E)	1-4	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; Repeatable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E M 362 & E M 362L (MAT E)	3 &1	Principles of Non-Destructive Testing & Lab (optional)	S	Prereq: PHYS 132 and PHYS 132L or PHYS 232 and PHSY 232L		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
E M 417/517 (AER E)	3	Experimental Mechanics	Alt. F (even years)	Prereq: E M 324, MAT E 273		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
E M 424	3	Intermediate Mechanics of Materials	F, S	Prereq: E M 324		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
E M 425	3	Introduction to the Finite Element Method	S	Prereq: E M 324, Math 266 or MATH 267	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
E M 510	3	Continuum Mechanics	F	Prereq: MATH 385				

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E M 525 (AER E)	3	Finite Element Analysis	S	Prereq: E M 425, MATH 385				
E M 548	3	Advanced Engineering Dynamics	Alt. S (even years)	Prereq: E M 345, MATH 266 or MATH 267		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
E M 569 (AER E, MSE)	3	Mechanics of Composite & Combined Materials	Alt. S (even years)	Prereq: E M 324				<input checked="" type="checkbox"/>
E M 570 (AER E)	3	Wind Engineering	Alt. S (odd years)	Prereq: A B E 378, M E 345	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
ENGR 375X	3	Introduction to Global Engineering	S	Prereq: Junior classification in engineering, or instructor permission				
ENSCI 324 (ENV S, GEOL, MTEOR)	3	Energy & the Environment	S	Prereq: Chem 163 or Chem 177, Math 140	<input checked="" type="checkbox"/>			
ENSCI 402/502 (GEOL, MTEOR, NREM)	2-3	Watershed Hydrology	F	Prereq: four courses in physical or biological sciences or engineering; Junior standing	<input checked="" type="checkbox"/>			
ENSCI 404/504 (AGRON, ENV S, MTEOR)	3	Global Change	F.S	Prereq: four courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			
ENSCI 411/511 (GEOL)	4	Hydrogeology	F	Prereq: four courses in biological or physical sciences	<input checked="" type="checkbox"/>			
ENSCI 413/513 (C E, GEOL)	3	Applied and Enviornmental Geophysics	Alt S (odd years)	Prereq: GEOL 100 or GEOL 201, algebra and trigonometry	<input checked="" type="checkbox"/>			

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ENSCI 414/514 (GEOL)	3	Applied Groundwater Flow Modeling	Alt. S (even years)	Prereq: GEOL 411 or CE 473, MATH 165 or Math 181	<input checked="" type="checkbox"/>			
ENSCI 419/519 (GEOL)	3	Aqueous & Environmental Geochemistry	S	Prereq: CHEM 178, CHEM 178L; junior classification	<input checked="" type="checkbox"/>			
ENV E 426	3	Environmental Engineering Science	F	Prereq: ENV E 201, CE 326, Chem 231, Micro 201	<input checked="" type="checkbox"/>			
ENV E 427	3	Environmental Engineering Systems	S	Prereq: Math 265, Math 266, CE 326, CE 372	<input checked="" type="checkbox"/>			
ENV E 429	3	Air Pollution and Control	S	Prereq: Math 265, CE 326	<input checked="" type="checkbox"/>			
ENV E 430	3	Solid and Hazardous Waste Management		Prereq: CE 326 and credit or enrollment in CE 426	<input checked="" type="checkbox"/>			
ENV S 324 (ENSCI, GEOL, MTEOR 324)	3	Energy & the Environment	S	Chem 163 or Chem 177, Math 140	<input checked="" type="checkbox"/>			
ENV S 404 (AGRON, ENSCI, MTEOR)	3	Global Change	F.S	Prereq: four courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			
ENV S 484 (CRP)	3	Sustainable Communities	S	Prereq: Junior Classification	<input checked="" type="checkbox"/>			
GEOL 324 (ENSCI, ENV S, MTEOR)	3	Energy & the Environment	S	Chem 163 or Chem 177, Math 140	<input checked="" type="checkbox"/>			

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GEOL 402/502 (ENSCI, MTEOR, NREM)	4	Watershed Hydrology	F	Prereq: four courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			
GEOL 411/511 (ENSCI)	4	Hydrogeology	F	Prereq: four courses in biological or physical sciences	<input checked="" type="checkbox"/>			
GEOL 413/513 (C E, ENSCI)	3	Applied and Environmental Geophysics	Alt. S (odd years)	Prereq: GEOL 100 or GEOL 201, algebra and trigonometry	<input checked="" type="checkbox"/>			
GEOL 414/514 (ENSCI)	3	Applied Groundwater Flow Modeling	Alt. S (even years)	Prereq: GEOL 411 or CE 473; MATH 165 or MATH 181	<input checked="" type="checkbox"/>			
GEOL 416/516 (MTEOR, ENSCI)	3	Hydrologic Modeling & Analysis	Alt. S (odd years)	Prereq: four courses in Earth science, meteorology, or engineering; junior standing	<input checked="" type="checkbox"/>			
GEOL 439/539	3	Seismic Methods in Geology, Engineering and Petroleum Exploration	Alt. S (even years)	Prereq: GEOL 100 or GEOL 201, algebra and trigonometry				
GEOL 452	3	GIS for Geoscientists	F, S					
I E 361 (STAT)	3	Statistical Quality Assurance	F, S	Prereq: STAT 231, STAT 301. STAT 326, STAT 401, or STAT 587	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
I E 430 (ENGR)	3	Entrepreneurial Product Engineering	F.Alt.S	Offered irregularly. Prereq: Junior Classification				
I E 434X (ENGR)	3	Entrepreneurial Product Engineering Design Project	S	Prereqs: I E 430 or ENGR 430				

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I E 466 (A B E, AER E, B M E, CPR E, E E, ENGR, MAT E, M E)	1-4	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; Repeatable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MAT E 273	3	Principles of Materials Science & Engineering	F, S	Prereq: CHEM 167 or 177, MATH 165				<input checked="" type="checkbox"/>
MAT E 362 & 362L (EM)	3 & 1	Principles of Nondestructive Testing & Lab (optional)	S	Prereq: PHYS 112 or Phys 232		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
MAT E 392 (taken at Brunel)		Principles of Materials Science & Engineering		Students must earn a grade of S				
MAT E 466 (A B E, AER E, B M E, CRP E, EE, ENGR, I E, M E)	1-4	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; Repeatable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
M E 231	3	Engineering Thermodynamics I	F, S, SS	Prereq: MATH 166, CHEM 167, PHYS 231 & Phys 231L	<input checked="" type="checkbox"/>			
M E 433	3	Alternative Energy	F	Prereq: PHYS 232 and PHYS 232L and CHEM 167				
M E 466 (A B E, AER E, B M E, CPR E, E E, ENGR, I E, MAT E)	1-4	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; Repeatable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MTEOR 324 (ENSCI, ENV S, GEOL)	3	Energy & the Environment	S	Chem 163 or Chem 177, Math 140	<input checked="" type="checkbox"/>			
MTEOR 404/504 (AGRON/ENSCI/ENV S)	3	Global Change	F.S	Prereq: four courses in physical or biological sciences or engineering, junior standing	<input checked="" type="checkbox"/>			

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N S 320	3	Naval Ship Systems I (Engineering)	F	Prereq: PHYS 231 and PHYS 231L, sophomore classification				
N S 330	3	Naval Ship Systems II (Weapons)	S	Prereq: PHYS 231, sophomore classification				
SCM 301	3	Supply Chain Management	irregu- larly	Prereq: Econ 101 and Stat 226			<input checked="" type="checkbox"/>	
SCM 460	3	Decision Tools for Logistics & Operations Management	irregu- larly	Prereq: SCM 301			<input checked="" type="checkbox"/>	
SCM 461	3	Principles of Transportation	irregu- larly	Prereq: SCM 301			<input checked="" type="checkbox"/>	
SCM 462	3	Transportation Carrier Management	irregu- larly	Prereq: Credit or enrollment in SCM 461			<input checked="" type="checkbox"/>	
SCM 466	3	International Transportation & Logistics	F.S.	Prereq: SCM 301			<input checked="" type="checkbox"/>	
SCM 501	3	Supply Chain Management	irregu- larly	Prereq: Enrollment in MBA program or departmental permission			<input checked="" type="checkbox"/>	
STAT 361 (IE)	3	Statistical Quality Assurance	F, S	Prereq: STAT 231, STAT 301. STAT 326, or STAT 587	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Study Abroad Courses								

Course	CR.	Title	Offered	Notes	Environmetnal	Geotechnical	Transportation	Structural
CIV E 09023	5	Fire Safety Engineering 3		University of Edinburgh				
CIV E 11034	5	Structural Dynamics & Earthquake Engr.		University of Edinburgh				
ENME 307	3	Performance of Engineering Materials		University of Canterbury				
E M 4T06	3	Finite Element Analysis		Hochschule Mannheim				
ENGG 3860	10	Carbon Accounting and Energy Auditing		University of Newcastle				
ENVS 3007	10	Environmental Remediation		University of Newcastle				
EG 169		Enviornmental Awareness for Engineers		Swansea University				
256-15502		Environmental Technology		Universidad Carlos III de Madrid				
ACEE449		Building Energy Modeling and Analysis		Korea University, South Korea				
ACEE334		Applied Energy Engineering		Korea University, South Korea				
ACEE439		Introduction to Computa-tional Structural Analysis		Korea University, South Korea				
ACEE348		Coastal Disaster Modelling		Korea University, South Korea				