

CE Engineering Topics Electives List: 2021-2022 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.

Course	CR.	Title	Offered	Notes	Environmetnal	Geotechnical	Transportation	Structural
A B E 388 (C E, E E)	3	Sustainable Engineering & International Development	F	Prereq: Junior classification in engineering	☒			
A B E 478/578	3	Wood Frame Structural Design	Alt. S (odd years)	Prereq: ME 231, E M 324 (This course is on the design electives list.)				☒
AER E 417/517 (EM)	3	Experimental Mechanics	Alt. F (even years)	Prereq: E M 324, MAT E 273				☒
AER E 494X	2	Make to Innovate						
AGRON 404/504 (EN SCI, ENV S, MTEOR)	3	Global Change	S	Prereq: Four courses in physical or biological sciences or engineering; junior standing	☒			
C E 333	3	Structural Steel Design I	F, S	Prereq: C E 332, E M 327				☒
C E 334	3	Reinforced Concrete Design I	F, S	Prereq: C E 332, E M 327				☒

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C E 388 (A B E, E E)	3	Sustainable Engineering & International Development	F	Junior classification in engineering	☒			
C E 395 (395X)	3	Global Perspectives in Transportation	SS	C E 355 or equivalent; repeatable (Can be used to fulfill IP and Engineering Topics only - not SSH)			☒	
C E 413/513 (ENSCI, GEOL)	3	Applied and Enviornmental Geophysics	Alt S (odd years)	Prereq: GEOL 100 or GEOL 201, algebra and trigonometry	☒			
C E 417	3	Land Surveying	S	Prereq: C E 111			☒	
C E 420/520 (General Option Only) (ENSCI)	3	Environmental Engineering Chemistry	F	Prereq: C E 326, CHEM 178	☒			
C E 421/521 (General Option Only) (ENSCI)	3	Environmental Biotechnology	F	Prereq: C E 326	☒			
C E 424/524 (A B E, EN SCI)	1	Air Pollution	irregu- larly	Prereq: Either PHYS 221 or CHEM 178 and either MATH 166 or 3 credits in statistics. Senior classification or above	☒		☒	
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.)	☒			
C E 440/540 (FS HN 440; BRT 540, FS HN 540)	3	Bioprocessing & Bioproducts	F	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	☒			
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.)				☒

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C E 448/548	3	Building Design	Alt. S (even years)	Prereq: C E 333 and 334 (This course is on the design electives list.)				☒
C E 449/549 (MAT E 449)	3	Structural Health Monitoring	irregu- larly	Senior classification in Engineering or permission of instructor				☒
C E 451/551	3	Urban Transportation Planning Models	F	Prereq: C E 355, STAT 101 or STAT 105			☒	
C E 453	3	Highway Design	F, S	C E 306, CE 355 (This course is on the design electives list.)				
C E 460	3	Foundation Engineering	F, S	Prereq: C E 360 (This course is on the design electives list.)		☒		
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.)		☒		
C E 473/573	3	Groundwater Hydrology	F	Prereq: C E 372 (This course is on the design electives list.)	☒			
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.)		☒		
C E 484/584	3	Advanced Design of Concretes	irregu- larly	Prereq: C E 382 (This course is on the design electives list.)		☒		
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.)	☒			

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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	☒	☒	☒	☒
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.)	☒	☒	☒	☒
CE 600 - level courses	var.			Variable prereqs: See catalog.	☒	☒	☒	☒
CH E 210	3	Material & Energy Balances	F, S	Prereq: CHEM 178, MATH 166, CH E 160	☒			
CIV E 11034 taken at University of Edinburgh	5	Structural Dynamics and Earthquake Engineering						
COM S 207	3	Fundamentals of Computer Programming	F, S, SS	Prereq: MATH 150 or placement into MATH 140 or higher				
COM S 227	4	Object-Oriented Programming	F, S, SS	Prereq: Credit or Enrollment in MATH 143 or higher; recommended: a previous high school or college course in programming or equivalent experience.				
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				

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CON E 380	3	Engineering Law	F, S	Junior Classification	☒	☒	☒	☒
CPR E 466 (A B E, AER E, B M E, E E, ENGR, I E, MAT E, M E)	var.	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; repeatable	☒	☒	☒	☒
C R P 251	3	Fundamentals of Geographic Information Systems	F					
C R P 293 (ENV S)	3	Environmental Planning	F, S		☒			
C R P 351	3	Intermediate Geographic Information Systems	F.S.					
C R P 445	3	Transportation Policy and Planning	F	Prereq: Junior classification				
C R P 484/584 (ENV S)	3	Sustainable Communities	S	Prereq: Junior classification	☒			
E E 201	4	Electric Circuits	F, S	Prereq: Credit or enrollment in MATH 267 and PHYS 222	☒	☒	☒	☒
E E 388 (A B E, C E)	3	Sustainable Engineering & International Development	F	Prereq: Junior classification in engineering	☒			
E E 466 (A B E, AER E, B M E, CPR E, ENGR, I E, M E, MAT E)	var.	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; Repeatable	☒	☒	☒	☒

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E M 362 & E M 362L (MAT E)	3 &1	Principles of Non-Destructive Testing & Lab (optional)	S	Prereq: PHYS 112 or 222		☒		☒
E M 417/517 (AER E)	3	Experimental Mechanics	Alt. F (even years)	Prereq: E M 324, MAT E 273		☒		☒
E M 424	3	Intermediate Mechanics of Materials	F, S	Prereq: E M 324		☒		☒
E M 425	3	Introduction to the Finite Element Method	S	Prereq: E M 324, Math 266 or MATH 267	☒			☒
E M 4T06 taken at Hochschule Mannheim	3	Finite Element Analysis						
E M 510	3	Continuum Mechanics	F	Prereq: MATH 385				
E M 525 (AER E)	3	Finite Element Analysis	S	Prereq: E M 425, MATH 385				
E M 548	3	Advanced Engineering Dynamics	S (even years)	Prereq: E M 345, MATH 266 or MATH 267		☒		☒
E M 569 (AER E, MSE)	3	Mechanics of Composite & Combined Materials	Alt. S (even years)	Prereq: E M 324				☒
E M 570 (AER E)	3	Wind Engineering	Alt. S (odd years)	Prereq: E M 378, E M 345	☒			☒

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ENGR 375X	3	Introduction to Global Engineering	S	Prereq: Junior classificaion in engineering, or instructor permission				
ENME 307 taken at University of Canterbury	3	Performance of Engineering Materials						
ENSCI 324 (ENV S, GEOL, MTEOR)	3	Energy & the Environment	S	Prereq: Chem 163 or Chem 177, Math 140	☒			
ENSCI 402/502 (GEOL, MTEOR, NREM)	3	Watershed Hydrology	F	Prereq: four courses in physical or biological sciences or engineering; Junior standing	☒			
ENSCI 402I (AGRON, IA LL)	4	Watershed Hydrology & Surficial Processes	SS	Prereq: four courses in physical or biological sciences or engineering	☒			
ENSCI 404/504 (AGRON, ENV S, MTEOR)	3	Global Change	S	Prereq: four courses in physical or biological sciences or engineering; junior standing	☒			
ENSCI 411/511 (GEOL)	4	Hydrogeology	F	Prereq: four courses in biological or physical sciences	☒			
ENSCI 413/513 (C E, GEOL)	3	Applied and Enviornmental Geophysics	Alt S (odd years)	Prereq: GEOL 100 or GEOL 201, algebra and trigonometry	☒			
ENSCI 414/514 (GEOL)	3	Applied Groundwater Flow Modeling	Alt. S (even years)	Prereq: GEOL 411 or CE 473, MATH 165 or Math 181	☒			
ENSCI 419/519 (GEOL)	3	Aqueous Environmental Geochemistry	S	Prereq: CHEM 178, CHEM 178L; junior classification	☒			

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ENV S 324 (ENSCI, GEOL, MTEOR 324)	3	Energy & the Environment	S	Chem 163 or Chem 177, Math 140	☒			
ENV S 404 (AGRON, ENSCI, MTEOR)	3	Global Change	S	Prereq: four courses in physical or biological sciences or engineering; junior standing	☒			
ENV S 484 (CRP)	3	Sustainable Communities	S	Prereq: Junior Classification	☒			
GEOL 324 (ENSCI, ENV S, MTEOR)	3	Energy & the Environment	S	Chem 163 or Chem 177, Math 140	☒			
GEOL 402/502 (ENSCI, MTEOR, NREM)	4	Watershed Hydrology	F	Prereq: four courses in physical or biological sciences or engineering; junior standing	☒			
GEOL 411/511 (ENSCI)	4	Hydrogeology	F	Prereq: four courses in biological or physical sciences	☒			
GEOL 413/513 (C E, ENSCI)	3	Environmental Geophysics	Alt. S (odd years)	Prereq: GEOL 100 or GEOL 201, algebra and trigonometry	☒			
GEOL 414/514 (ENSCI)	3	Applied Groundwater Flow Modeling	Alt. S (even years)	Prereq: GEOL 411 or CE 473; MATH 165 or MATH 181	☒			
GEOL 416/516 (MTEOR, ENSCI)	3	Hydrologic Modeling & Analysis	Alt. S (odd years)	Prereq: four courses in Earth science, meteorology, or engineering; junior standing	☒			
GEOL 439/539 (C E)	3	Seismic Methods in Geology, Envineering and Petroleum Exploration	Alt. S (even years)	Prereq: GEOL 100 or GEOL 201, algebra and trigonometry				

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I E 361 (STAT)	3	Statistical Quality Assurance	F, S	Prereq: STAT 231, STAT 301. STAT 326 or STAT 415	☒	☒	☒	☒
I E 430X (ENGR)	3	Entrepreneurial Product Engineering	F.S	Prereq: Junior Classification				
I E 434X (ENGR)	3	Entrepreneurial Product Engineering Design Project	S	Prereqs: I E 430 or ENGR 430				
I E 466/546 (A B E, AER E, B M E, CPR E, E E, ENGR, MAT E, M E)	3	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; Repeatable	☒	☒	☒	☒
MAT E 273	3	Principles of Materials Science & Engineering	F, S	Prereq: CHEM 167 or 177, MATH 165				☒
MAT E 362 & 362L (EM)	3 & 1	Principles of Nondestructive Testing & Lab (optional)	S	Prereq: PHYS 112 or Phys 222		☒		☒
MAT E 392 (taken at Brunel)		Principles of Materials Science & Engineering		Students must earn a grade of S				
MAT E 394 (taken in Italy)		Statistics and Sustainability in Italy		For general option				
MAT E 466 (A B E,AER E, B M E, CRP E, EE, ENGR, I E, M E)	3	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; Repeatable	☒	☒	☒	☒
M E 231	3	Engineering Thermodynamics I	F, S, SS	Prereq: MATH 166, CHEM 167, PHYS 221	☒			

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M E 433	3	Alternative Energy	F	Prereq: PHYS 221 and PHYS 222 and CHEM 167				
M E 466 (A B E, AER E, B M E, CPR E, E E, ENGR, I E, MAT E)	var.	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation; permission of the instructor; Repeatable	☒	☒	☒	☒
MTEOR 324 (ENSCI, ENV S, GEOL)	3	Energy & the Environment	S	Chem 163 or Chem 177, Math 140	☒			
MTEOR 404/504 (AGRON/ENSCI/ENV S)	3	Global Change	S	Prereq: four courses in physical or biological sciences or enigneering, junior standing	☒			
N S 320	3	Naval Ship Systems I (Engineering)	F	Prereq: PHYS 221, sophomore classification				
N S 330	3	Naval Ship Systems II (Weapons)	S	Prereq: PHYS 221, sophomore classification				
SCM 301	3	Supply Chain Management	irregu- larly	Prereq: Econ 101 and Stat 226			☒	
SCM 460	3	Decision Tools for Logistics & Operations Management	irregu- larly	Prereq: SCM 301			☒	
SCM 461	3	Principles of Transportation	irregu- larly	Prereq: SCM 301			☒	
SCM 462	3	Transportation Carrier Management	irregu- larly	Prereq: Credit or enrollment in SCM 461			☒	

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SCM 466	3	International Transportation & Logistics	F.S.	Prereq: SCM 301			☒	
STAT 361 (IE)	3	Statistical Quality Assurance	F, S	Prereq: STAT 231, STAT 301. STAT 326 or STAT 415	☒	☒	☒	☒
Study Abroad Course								
CIV E 11034	5	Structural Dynamics & Earthquake Engr.		University of Edinburgh				
ENME 307	3	Performance of Engineering Materials		University of Canterbury				