CE Engineering Topics Electives List: 2017-2018 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. *(At least six of eleven credits must be C E or CON E courses.)*

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 408/508 (ENSCI)	3	GIS & Natural Resources Management	F		☑		☑	
A B E 478/578	3	Wood Frame Structural Design	Alt. S (odd years)	Prereq: A B E 216, 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				☑
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 388 (A B E, E E)	3	Sustainable Engineering & International Development	F	Junior classification in engineering	☑			
C E 417	3	Land Surveying	S	Prereq: C E 111			☑	

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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		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.)				☑
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		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.)				

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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		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.)	☑			
C E 489/589	3	Pavement Preservatiion and Rehabilitation	F	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 and above	var.	(except C E 590, 591, 595 & 599)		Variable prereqs: See catalog. (Some of these courses are on the design electives list.)	☑	☑	☑	☑
CH E 210	3	Material & Energy Balances	F, S	Prereq: CHEM 178, MATH 166, CH E 160	☑			

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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	☑	☑	☑	☑
C R P 293 (ENV S)	3	Environmental Planning	F, S		☑			
C R P 484/584 (ENV S)	3	Sustainable Communities	S	Prereq: Junior classification	☑			
E E 201	4	Electric Circuits	F, S	Prereq: Credit for 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	☑	☑	☑	☑
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		☑		☑

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E M 425	3	Introduction to the Finite Element Method	S	Prereq: E M 324, Math 266 or MATH 267	☑			☑
E M 548	3	Advanced Engineering Dynamics	S (even yars)	Prereq: E M 345, MATH 266 on MATH 267		☑		☑
E M 569 (ARE 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	☑			☑
ENSCI 324 (ENV S, GEOL, MTEOR)	3	Energy & the Environment	S		☑			
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 408/508 (A B E)	3	GIS & Natural Resources Management	F	Prereq: working knowledge of computers and windows environment	☑			
ENSCI 411/511 (GEOL)	4	Hydrogeology	F	Prereq: four courses in biological or physical sciences	☑			

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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 181	☑			
ENSCI 419/519 (GEOL)	3	Aqueous Environmental Geochemistry	F	Prereq: CHEM 178, CHEM 178L; junior classification	☑			
ENV S 324 (ENSCI, GEOL, MTEOR 324)	3	Energy & the Environment	S		☑			
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		☑			
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 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	☑			

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I E 361 (STAT)	3	Statistical Quality Assurance	F, S	Prereq: STAT 231, STAT 301. STAT 326 or STAT 401	☑	☑	☑	☑
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, SS	Prereq: Sophomore classification, CHEM 167 or 177, MATH 165				☑
MAT E 362 & 362L (EM)	3 & 1	Principles of Nondestructive Testing & Lab (optional)	S	Prereq: PHYS 112 or 222		☑		☑
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	☑			
M E 466 (A B E, AER E, B M E, CPR E, E E, ENGR, I E, MAT E)	3	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		☑			
MTEOR 404/504 (AGRON/ENSCI/ENV S)	3	Global Change	S	Prereq: four courses in physical or biological sciences or enigneering, junior standing	☑			
SCM 301	3	Supply Chain Management		Prereq: Econ 101 and Stat 226			☑	

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SCM 460	3	Decision Tools for Logistics & Operations Management		Prereq: SCM 301			☑	
SCM 461	3	Principles of Transportation		Prereq: SCM 301			☑	
SCM 462	3	Transportation Carrier Management		Prereq: SCM 461			☑	
SCM 466	3	International Transportation & Logistics		Prereq: SCM 301			☑	
STAT 361 (IE)	3	Statistical Quality Assurance	F, S	Prereq: STAT 231, STAT 301. STAT 326 or STAT 401	☑	☑	☑	☑