

## CE Engineering Topics Electives List: 2015-2016 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 (A B E/C E/E E 388)	3	Sustainable Engineering & International Development	F	Prereq: Junior classification in engineering	<input checked="" type="checkbox"/>			
A B E 408 (EN SCI 408)	3	GIS & Natural Resources Management	F	Dual-listed with A B E 508	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
A B E 478/578	3	Wood Frame Structural Design	Alt. S ('13)	Prereq: A B E 216, E M 324; Dual-listed with A B E 578				<input checked="" type="checkbox"/>
AER E 417 (EM 417)	3	Experimental Mechanics	Alt. F ('12)	Prereq: E M 324				<input checked="" type="checkbox"/>
AGRON 402 (EN SCI/ GEOL/MTEOR/NREM)	4	Watershed Hydrology	F	Prereq: Four courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			
AGRON 404/504 (EN SCI/ENV S/MTEOR)	3	Global Change	S	Dual-listed AGRON 504; Prereq: Four courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			
BIOL 173 (ENVS 173)	3	Environmental Biology	F, S		<input checked="" type="checkbox"/>			

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C E 388 (A B E/E E 388)	3	Sustainable Engineering & International Development	F	Junior classification in engineering	<input checked="" type="checkbox"/>			
C E 417	3	Land Surveying	S	Prereq: C E 111			<input checked="" type="checkbox"/>	
C E 420/520 (General Option Only)	3	Environmental Engineering Chemistry	F	Dual-listed with C E 520; Prereq: C E 326, CHEM 177 and 178, MATH 166	<input checked="" type="checkbox"/>			
C E 421 (General Option Only)	3	Environmental Biotechnology	F	Prereq: C E 326	<input checked="" type="checkbox"/>			
C E 424/524 (A B E /EN SCI 424)	1	Air Pollution		Dual-listed with C E 524; Prereq: Either PHYS 221 or CHEM 178 and either MATH 166 or 3 credits in statistics. Senior classification or above	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
C E 428 (General Option Only)	3	Water & Wastewater Treatment Plant Design	S	Prereq: C E 326	<input checked="" type="checkbox"/>			
C E 436/536	3	Masonry & Timber Design		Dual-listed with C E 536; Prereq: C E 334				<input checked="" type="checkbox"/>
C E 440	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	<input checked="" type="checkbox"/>			
C E 446/546	3	Bridge Design	Alt. S ('13)	Dual-listed with C E 546; Prereq: C E 333 and 334				<input checked="" type="checkbox"/>
C E 448/548	3	Building Design	Alt. S ('14)	Dual-listed with C E 548; Prereq: C E 333 and 334				<input checked="" type="checkbox"/>

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C E 449	3	Structural Health Monitoring	Alt. S	Senior classification in Engineering or permission of instructor				<input checked="" type="checkbox"/>
C E 451/551	3	Urban Transportation Planning Models	F	Dual-listed with C E 551; Prereq: C E 350 or 355, STAT 101 or STAT 105			<input checked="" type="checkbox"/>	
C E 453	3	Highway Design	F, S	C E 306				
C E 460	3	Foundations	F, S	Prereq: C E 360 This course is on the design electives list.		<input checked="" type="checkbox"/>		
C E 467/567	3	Geomaterials Stabilization		Dual-listed with C E 567; Prereq: C E 360		<input checked="" type="checkbox"/>		
C E 473/573	3	Groundwater Hydrology	F	Dual-listed with C E 573; Prereq: C E 372 This course is on the design electives list.	<input checked="" type="checkbox"/>			
C E 483/583	3	Pavement Analysis & Design		Dual-listed with C E 583; Prereq: C E 360 and C E 382		<input checked="" type="checkbox"/>		
C E 484/584	3	Advanced Design of Concretes		Dual-listed with C E 584; Prereq: C E 382		<input checked="" type="checkbox"/>		
C E 488	3	Sustainable Horizontal Civil Infrastructure Systems	F	Prereq: Junior standing This course is on the design electives list.	<input checked="" type="checkbox"/>			
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; Prereq: permission of Instructor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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C E 500 - level courses and above	var.	(except C E 590, 591, 595 & 599)		Variable prereqs: See instructor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CH E 210	3	Material & Energy Balances	F, S	Prereq: CHEM 178, MATH 166	<input checked="" type="checkbox"/>			
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, E E/ENGR/I E/MAT E/ M E)	3	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation and receive the permission of the instructor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C R P 293 (ENVS 293)	3	Environmental Planning	F		<input checked="" type="checkbox"/>			
C R P 484/584 (ENV S 484)	3	Sustainable Communities	S	Prereq: Junior standing; Dual-listed with C R P 584	<input checked="" type="checkbox"/>			
E E 201	4	Electric Circuits	F, S	Prereq: Credit for or enrolled in MATH 267, PHYS 222	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E E 388 (A B E/C E 388)	3	Sustainable Engineering & International Development	F	Prereq: Junior classification in engineering	<input checked="" type="checkbox"/>			
E E 466 (A B E/AER E/CPR E/ENGR/I E/M E/MAT E)	3	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation and receive the permission of the instructor; Repeatable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E M 350	3	Introduction to Nondestructive Evaluation Engineering	S	Prereq: E M 324, MATH 266 or 267, PHYS 222		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

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E M 362 & E M 362L (MATE)	3 &1	Principles of Non-Destructive Testing & Lab (optional)	S	Prereq: PHYS 112 or 222		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
E M 417 (AER E 417)	3	Experimental Mechanics	Alt. F ('12)	Prereq: E M 324		<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 267; On NA elective list.	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
E M 548	3	Advanced Engineering Dynamics		Prereq: E M 245, MATH 266 on MATH 267		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
E M 569	3	Mechanics of Composite & Combined Materials	Alt. S (even years)	Prereq: E M 245				<input checked="" type="checkbox"/>
E M 570	3	Wind Engineering	Alt. S (odd years)	Prereq: E M 378, E M 345	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
EN SCI 324 (ENV S/GEOL/MTEOR 324)	3	Energy & the Environment	S		<input checked="" type="checkbox"/>			
EN SCI 402/502 (GEOL/MTEOR/NREM)	4	Watershed Hydrology	F	Prereq: 4 courses in physical or biological sciences or engineering; Junior standing; Dual-listed with ENSCI 502	<input checked="" type="checkbox"/>			
EN SCI 402L (AGRON/IA LL)	4	Watershed Hydrology & Surficial Processes	SS	prereq: 4 courses in physical or biological sciences or engineering	<input checked="" type="checkbox"/>			

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EN SCI 404/504 (AGRON/ENV S/Mteor)	3	Global Change	S	Dual-listed with ENSCI 504; prereq: 4 courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			
EN SCI 408/508 (A B E 408)	3	GIS & Natural Resources Management	F	Dual-listed with ENSCI 508; Prereq: working knowledge of computers and windows environment	<input checked="" type="checkbox"/>			
EN SCI 411/511 (GEOL 411)	4	Hydrogeology	F	Dual-listed with ENSCI 511; Prereq: 4 courses in Biological or Physical Sciences	<input checked="" type="checkbox"/>			
EN SCI 414/514 (GEOL 414)	3	Applied Groundwater Flow Modeling	Alt. S ('12)	Dual-listed with ENSCI 514; Prereq: ENSCI/GEOL 411 or CE 473, MATH 165 or 181	<input checked="" type="checkbox"/>			
EN SCI 419/519 (GEOL 419)	3	Environmental Geochemistry	F	Dual-listed with ENSCI 519; Prereq: GEOL 402 or 411 or equivalent	<input checked="" type="checkbox"/>			
ENV S 324 (EN SCI/ GEOL/MTEOR 324)	3	Energy & the Environment	S		<input checked="" type="checkbox"/>			
ENV S 404 (AGRON/EN SCI/MTEOR)	3	Global Change	S	Prereq: 4 courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			
ENV S 484 (CRP 484)	3	Sustainable Communities	S	Prereq: Junior Classification	<input checked="" type="checkbox"/>			
GEOL 324 (EN SCI/ ENV S/MTEOR 324)	3	Energy & the Environment	S		<input checked="" type="checkbox"/>			
GEOL 402/502 (AGRON/EN SCI/ MTEOR/NREM 402)	4	Watershed Hydrology	F	Dual-listed with GEOL 502; Prereq: 4 courses in physical or biological sciences or engineering; junior standing	<input checked="" type="checkbox"/>			

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GEOL 411/511 (EN SCI 411)	4	Hydrogeology	F	Dual-listed GEOL 511; Prereq:4 courses in biological or physical sciences	<input checked="" type="checkbox"/>			
GEOL 414/514 (EN SCI 414)	3	Applied Groundwater Flow Modeling	Alt. S ('12)	Dual-listed with GEOL 514; Prereq: ENSCI/GEOL 411 or CE 473; MATH 165 or MATH 181	<input checked="" type="checkbox"/>			
GEOL 416/516 (MTEOR/EN SCI 416)	3	Hydrologic Modeling & Analysis	Alt. S (odd years)	Dual-listed with GEOL 516; Prereq: Four courses in Earth science, meteorology, or engineering; junior standing	<input checked="" type="checkbox"/>			
I E 361 (STAT 361)	3	Statistical Quality Assurance	F, S	Prereq: STAT 231, STAT 301. STAT 326 or STAT 401	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
I E 466 (A B E/AER 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 and receive the 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, SS	Prereq: CHEM 167 or 177, MATH 165; Sophomore Classification				<input checked="" type="checkbox"/>
MAT E 362 & 362L (EM)	3 & 1	Principles of Nondestructive Testing & Lab (optional)	S	Prereq: PHYS 112 or 222		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
MAT E 466 (A B E/AER E/CRP E/EE/ENGR/I E/M E)	3	Multidisciplinary Engineering Design	F, S	Prereq: student must be within two semesters of graduation and receive the 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 265, CHEM 167, PHYS 222	<input checked="" type="checkbox"/>			
M E 466 (A B 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 and receive the permission of the instructor; Repeatable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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MTEOR 324 (EN SCI/ ENV S/GEOL 324)	3	Energy & the Environment	S		<input checked="" type="checkbox"/>			
MTEOR 404/504 (AGRON/EN SCI/ ENV S)	3	Global Change	S	Dual-listed with 504; Prereq: four courses in physical or biological sciences or enigneering, junior standing	<input checked="" type="checkbox"/>			
SCM 301	3	Supply Chain Management		Prereq: Econ 101 and Stat 206			<input checked="" type="checkbox"/>	
SCM 460	3	Decision Tools for Logistics & Operations Management		Prereq: SCM 301			<input checked="" type="checkbox"/>	
SCM 461	3	Principles of Transportation		Prereq: SCM 301			<input checked="" type="checkbox"/>	
SCM 462	3	Transportation Carrier Management		Prereq: SCM 461			<input checked="" type="checkbox"/>	
SCM 466	3	International Transportation & Logistics		Prereq: SCM 301			<input checked="" type="checkbox"/>	
STAT 361 (IE 361)	3	Statistical Quality Assurance	F, S	Prereq: STAT 231, STAT 301. STAT 326 or STAT 401	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>