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**PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR)**

**SUBMITTED BY:**

Department	CE	College/School	CEM
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See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

**PROGRAM IDENTIFICATION:**

<b>DEGREE PROGRAM</b>	Civil Engineering
<b>Degree Level: (i.e., Certificate, A.A., A.A.S., B.A., B.S., M.A., M.S., Ph.D.)</b>	B.S.

**A. CHANGE IN DEGREE REQUIREMENTS: (Brief statement of program/degree changes and objectives)**

1. Addition of CE437 – Design of Engineering Systems I (will be a prerequisite for existing CE438)
2. Removal of DRT 170 – Beginning AutoCAD
3. Removal of CE490 and CE491 CE seminars
4. Incorporation of Field Experience Elective; CE470 or CE471 as requirement for B.S. CE degree
5. Change department title to “Civil and Environmental Engineering”

**B. CURRENT REQUIREMENTS AS IT APPEARS IN THE CATALOG:**

**Civil Engineering**

**Minimum Requirements for Degree: 134 credits**

3. Complete the following program (major) requirements:
  - CE F112--Elementary Surveying--3 credits
  - CE F302--Introduction to Transportation Engineering--3 credits
  - CE F326W--Introduction to Geotechnical Engineering--4 credits
  - CE F331--Structural Analysis--3 credits
  - CE F334--Properties of Materials--3 credits
  - CE F341--Environmental Engineering--4 credits
  - CE F344--Water Resources Engineering--3 credits
  - CE F432--Steel Design--3 credits
  - CE F438W,O--Design of Engineered Systems--3 credits
  - CE F490--Civil Engineering Seminar--0.5 credits
  - CE F491--Civil Engineering Seminar--0.5 credits
  - DRT F210--Intermediate CAD--3 credits
  - ES F101--Introduction to Engineering--3 credits
  - ES F201--Computer Techniques--3 credits
  - ES F209--Statics--3 credits
  - ES F210--Dynamics--3 credits
  - ES F301--Engineering Analysis--3 credits
  - ES F331--Mechanics of Materials--3 credits
  - ES F341--Fluid Mechanics--4 credits
  - ESM F422--Engineering Decisions--3 credits
  - ESM F450W--Economic Analysis and Operations--3 credits
  - GE F261--General Geology for Engineers--3 credits
  - MATH F253X--Calculus III--4 credits
  - MATH F302--Differential Equations--3 credits
  - Technical electives\*\*--12 credits

\* Student must earn a C- grade or better in each course.

\*\*Technical electives must include 3 credits in the field of environmental engineering, construction, or

transportation, 6 credits of CE, ENVE, ESM courses or approved technical courses, and 3 credits of either ES F307 or ES F346. Students must earn a C- grade or better in each technical elective course. Up to two graduate-level courses may be used towards graduation. Graduate-level courses must be approved by student's advisor and the student must be within two semesters of graduation and have at least a 3.0 GPA to take graduate-level courses.

C. **PROPOSED REQUIREMENTS AS IT WILL APPEAR IN THE CATALOG WITH THESE CHANGES:**  
(Underline new wording strike through old wording and use complete catalog format )

**Civil & Environmental Engineering**

Minimum Requirements for Degree: 134 credits

3. Complete the following program (major) requirements:\*

- CE F112--Elementary Surveying--3 credits
- CE F302--Introduction to Transportation Engineering--3 credits
- CE F326W--Introduction to Geotechnical Engineering--4 credits
- CE F331--Structural Analysis--3 credits
- CE F334--Properties of Materials--3 credits
- CE F341--Environmental Engineering--4 credits
- CE F344--Water Resources Engineering--3 credits
- CE F432--Steel Design--3 credits
- CE F437--Design of Engineered Systems I--3 credits
- CE F438W,O--Design of Engineered Systems II 3 credits
- ~~CE F438W,O--Design of Engineered Systems--3 credits~~
- ~~CE F490--Civil Engineering Seminar--0.5 credits~~
- ~~CE F491--Civil Engineering Seminar--0.5 credits~~
- ~~DRT F210--Intermediate CAD--3 credits~~
- CE F470--Civil Engineering Internship or CE F471--Field Experience--1 credit
- ES F101--Introduction to Engineering--3 credits
- ES F201--Computer Techniques--3 credits
- ES F209--Statics--3 credits
- ES F210--Dynamics--3 credits
- ES F301--Engineering Analysis--3 credits
- ES F331--Mechanics of Materials--3 credits
- ES F341--Fluid Mechanics--4 credits
- ESM F422--Engineering Decisions--3 credits
- ESM F450W--Economic Analysis and Operations--3 credits
- GE F261--General Geology for Engineers--3 credits
- MATH F253X--Calculus III--4 credits
- MATH F302--Differential Equations--3 credits
- Technical electives\*\*--12 credits
- ~~Field Experience Elective\*\*--1 credit~~

\* Student must earn a C- grade or better in each course.

\*\*~~Technical electives must include 3 credits in the field of environmental engineering, construction, or transportation, 6 credits of CE, ENVE, ESM courses or approved technical courses, and 3 credits of either ES F307 or ES F346. Students must earn a C- grade or better in each technical elective course. Up to two graduate-level courses may be used towards graduation. Graduate-level courses must be approved by student's advisor and the student must be within two semesters of graduation and have at least a 3.0 GPA to take graduate-level courses~~

#### D. ESTIMATED IMPACT

*WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.*

- 1) CE437 will require the use of classroom and computer lab space and will need to be added to the workload of a faculty member. However, since this course is taking the place of two existing courses in the CE curriculum, it is not an additional teaching load above and beyond the existing needs of the department.
- 2) Removal of DRT210 will ultimately result in slightly lower enrollment in that course. This course is generally offered through CTC.
- 3) Removal of CE490 and CE491 Civil engineering seminars will have no significant impact; will no longer require department funds to provide lunch for ~20 students on the day-long seminar when it was held.
- 4) Incorporation of CE470 or CE471 "field experience elective" will require six laboratory contact hours from select faculty in the CE department and will be counted as non-credit instructional activities. CE471 will be taking the place of the combined 1.0cr of the CE 490 and CE491 CE seminar so there is no net difference in the overall CE teaching effort needed. Course will require storage and maintenance of associated instrumentation as well as transportation of students to and from field sites.

#### E. IMPACTS ON PROGRAMS/DEPTS:

*What programs/departments will be affected by this proposed action?*

*Include information on the Programs/Departments contacted (e.g., email, memo)*

- 1) Proposed CE437 is anticipated to improve the overall senior design/capstone offering and provide the students with a more comprehensive and robust engineering experience. This will result in more marketable undergraduate students who are better prepared to enter the workforce. Since senior design projects are typically service learning projects, they directly impact and improve the community. By requiring a second semester of senior design, the deliverables from these projects will be of better quality and worthy of being associated with UAF. No negative impacts are anticipated. No impacts on other programs or departments are anticipated.
- 2) Since it will no longer be a requirement of the B.S. CE degree, there will likely be slightly lower enrollment in DRT 210. However, there are often students waitlisted for this course and enrollment will not be diminished significantly enough that the course would be in jeopardy of being cancelled. No impacts on other programs or departments are anticipated.
- 3) Removal of CE490 and CE491 Civil engineering seminars will have no net impact on the CE department; will free up 1.0cr for the inclusion of the field experience elective.
- 4) Addition of CE470 or CE471 as "field experience elective" will have no net impact on the CE department; 1.0cr being absorbed from the removal of the CE490 and CE491 pair. CE470 already exists in the civil engineering course offerings. No impacts on other programs or departments are anticipated.
- 5) This program change will require a transition period for students under the current catalog. This will be handled as follows: A student under the current catalog has already taken CE 490 and CE 491 and CAD and would only need to take CE438. For this case we would waive the prerequisite so they can take CE438 without having taken CE437. **OR** A student under the current catalog has already taken CAD but not taken CE491 or CE491 and those are no longer offered. We can't have them take CE437 and CE438 because they would be taking more credits than as required by catalog the came in under. For this case we would let them take either CE470 or CE471 or a special topics course approved by the department chair and waive the prerequisite so they can take CE438 without having taken CE437.

#### F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

*Description of the student learning outcomes assessment process.)*

Our student learning outcomes are regularly assessed through the ABET process which evaluates CE students on their knowledge, application and synthesis of engineering principles with the following three objectives that follow ABET outcomes "a" through "l":

- Objective 1: Proficiency in data analysis and engineering design
- (a) math, science, and engineering skills
  - (b) design and conduct experiments and analyze data
  - (c) design a system or process

- (e) solve engineering problems
- (k) ability to use techniques, skills, and modern engineering tools
- (l) northern engineering knowledge and skill

Objective 2: Communicate effectively

- (d) function on multidisciplinary teams
- (g) ability to communicate in oral and written form
- (h) understand impact of engineering in a global and societal context
- (j) knowledge of contemporary issues

Objective 3: active in the professional community, demonstrate high ethical standards, obtain licensure, and pursue lifelong learning

- (f) understand ethical and professional responsibility
- (i) recognize lifelong learning

### ***JUSTIFICATION FOR ACTION REQUESTED***

The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.

1) The addition of CE437 is to improve student preparedness for the engineering profession. One semester is too short to cover the material needed for meaningful senior design projects and effectively engage students in service learning projects that meet our ABET accreditation outcomes. This material will then be covered the semester prior to beginning the service learning projects. The addition of this course is in the best interest of the civil engineering students.

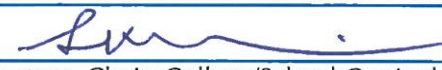
2) DRT210 (Intermediate CAD) is being removed from the CE major program requirements because the concepts and skillsets needed by our students in their technical electives and senior design projects are not being sufficiently met by this course. Material will be incorporated into the proposed CE437 course.


3) The original intent of the CE490 and CE491 Civil engineering seminars was to provide students with the opportunity to engage with practicing engineers. It became evident that these 0.5cr seminars offered in the Fall and Spring were not meeting that anticipated outcome. Logistically, it was hard to execute and the nature of the 0.5cr course made little practical sense and difficult to provide the students with a learning experience that was meaningful or provide them with feedback in a way that could help them improve. Since CE438 will now be focused solely on the service learning projects for which there are local and community constituents who are involved, students will be better able to engage with engineers outside of UAF. The CE Advisory Board, who originally proposed the CE490 and CE491 seminars, is in favor of this change.

4) The nature of Civil Engineering requires those in the profession to be knowledgeable and experienced with working in a field environment. The inclusion of CE470 or CE471 as a required field experience elective will improve the connection between classroom concepts and practical real-world field applications. This proposed course directly targets ABET outcome criteria K: ability to use techniques, skills, and modern engineering tools necessary for practice.

**APPROVALS: SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

	Date	9/25/2015
Signature, Chair, Program/Department of: _____		

	Date	9-28-15
Signature, Chair, College/School Curriculum Council for: <u>CEM</u>		

	Date	10/5/15
Signature, Dean, College/School of: <u>CEM</u>		

**CHAIR SIGNATURE OBTAINED FOLLOWING APPROVAL BY FACULTY SENATE COMMITTEE**

_____	Date	_____
Signature, Chair, UAF Faculty Senate		
___Curriculum Review Committee		
___Graduate Academic and Advisory Committee		