Engineering for Society (EfS) B.S. Degree

- **New!** ABET-accredited B.S. general engineering degree optimized for K-12 teacher licensure
- Expand CU Teach to include **CU Teach Engineering**
- Streamlined 4.5 year degree program
- Graduates prepared for K-12 secondary science or math teacher licensure
- Evidence-and research-based program design that integrates
  - Design-focused engineering curriculum (based on NAE K-12 recommendations)
  - Extensive science or math content
  - Education pedagogy courses + student teaching
- Goal: nationally replicable model for other engineering colleges
- Planning study funded by S.D. Bechtel Jr Foundation
Engineering for Society Task Force

Travis Anderson, Director Teacher Education, School of Education
Penny Axelrad, Chair ASEN
Anne Dougherty, Assoc. Chair APPM
Scot Douglass, Director Engineering Honors Pgm and Herbst Humanities
Noah Finkelstein, Physics Education (and major campus and national STEM leader)
Marissa Forbes, ITL Program and PhD student CEAE
Jim Martin, Chair CSCI
Derek Reamon, MCEN and co-Director ITL Program
Diane Sieber, Assoc. Dean for Education and Herbst Humanities
Jackie Sullivan, Assoc. Dean for Inclusive Excellence and co-Director ITL Program
Jennie Whitcomb, Assoc. Dean Teacher Education – School of Education
Mindy Zarske, Director K-12 Engineering Education, BOLD Center
EfS Benchmarking Analysis

Task Force benchmarked other programs, including:

- Course requirements for the 19 undergraduate UTeach Natural Sciences programs
- Study of Engineering, Science, and Math course requirements for 19 ABET-Accredited undergraduate General Engineering degree programs
  - Including highly ranked general engineering programs at MIT, Purdue and Harvey Mudd
Engineering for Society (EfS) Concept

School district partnerships:
St. Vrain Valley School District
Boulder Valley School District
Denver Public Schools

CU Teach Engineering Licensure Program
Step 1 and Step 2 classes
Learning Assistant Program

Secondary STEM Teachers
Multi-credentialled and licensed
biology
chemistry
physics
mathematics
engineering

Recruitment of university engineering majors

Engineering for Society
BS degree program coursework
Scaffolded by:
TeachEngineering Digital Library
K-12 engineering curricula

TEAMs K-12 Engineering Pgm
Science Discovery Program
Afterschool clubs and summer workshop teaching experiences
Strand 1: ABET-Accredited General Engineering Degree and Teacher Licensure Preparation

- Engineering Core (53-60 credits)
- Mathematics Core (31 credits)
- Science Core (28-40 credits)
- CU Teach Education Core (22 credits)

Engineering for Society
B.S. degree
College of Engineering and Applied Science
(133-156 Credits)
<table>
<thead>
<tr>
<th>Course Title/Subject</th>
<th>Course Number</th>
<th>Level</th>
<th>Units</th>
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<tbody>
<tr>
<td>Introduction to Engineering Computing</td>
<td>GEEN 1300</td>
<td>Freshman</td>
<td>3</td>
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<tr>
<td>First-Year Engineering Projects</td>
<td>GEEN 1400</td>
<td>Freshman</td>
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<td>Introduction to Engineering</td>
<td>GEEN 1500</td>
<td>Freshman</td>
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<td>Statics and Structures</td>
<td>MCEN 2023</td>
<td>Sophomore</td>
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<td>Materials</td>
<td>MCEN 2024</td>
<td>Sophomore</td>
<td>3</td>
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<td>Engineering for the Community</td>
<td>GEEN 2400</td>
<td>Sophomore</td>
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<tr>
<td>Circuits/Electronics (with lab)</td>
<td>ECEN 3010</td>
<td>Junior</td>
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<tr>
<td>Thermodynamics</td>
<td>MCEN 3012</td>
<td>Junior</td>
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<tr>
<td>Data Analysis</td>
<td>MCEN 3037</td>
<td>Junior</td>
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<tr>
<td>Measurements Lab</td>
<td>MCEN 4037</td>
<td>Junior/Senior</td>
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<tr>
<td>Invention and Innovation</td>
<td>GEEN 3400</td>
<td>Junior</td>
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<td>Teaching Design</td>
<td>GEEN 4400</td>
<td>Junior/Senior</td>
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<td>Solid Mechanics</td>
<td>MCEN 2063</td>
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<td>Fluid Mechanics</td>
<td>MCEN 3021</td>
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<td>Dynamics</td>
<td>MCEN 2043</td>
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<td>Component Design</td>
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<td>System Dynamics</td>
<td>MCEN 4043</td>
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<td>Capstone Design 1</td>
<td>MCEN 4035</td>
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<td>Capstone Design 2</td>
<td>MCEN 4085</td>
<td>Senior</td>
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**TOTAL ENGINEERING CREDIT HOURS** 54
Going Forward…

• Work with departments to explore the feasibility of aligning EfS with departmental curriculum (integrated EfS vs standalone curriculum)
• Approval by Admin Council for new degree program
• Establish creative funding model (likely different than departmental funding model) to support this interdisciplinary degree
• Establish administrative model, with appropriate advising
• Program Plan for campus
• Board of Regents approval
• Implementation proposal to S. D. Bechtel Jr. Foundation
• Implement…
  • Market to fall 2014 entering First Year students
  • Recruit for pilot within Fall 2013 entering class (?)
Thanks!
Please send us your ideas...

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