



## Educational Unit - Strategic Plan

### Dept. of Civil & Architectural Engineering and Construction Management (CAECM)

**Vision and Mission:** The mission of the Department of Civil and Architectural Engineering and Construction Management at the University of Wyoming is to:

1. Educate and prepare Civil and Architectural Engineering and Construction Management students to lead as designers, builders, project managers and entrepreneurs as it relates to the built environment.
2. Develop technical solutions through research, innovation, and improved infrastructure to diversify and grow the economies that serve Wyoming and the world.

### College of Engineering and Applied Science

**Services offered:**

B.S. in Civil Engineering  
B.S. in Architectural Engineering  
B.S. in Construction Management

M.S. in Civil Engineering  
M.S. in Architectural Engineering  
M.S. in Environmental Engineering (shared)  
Ph.D. in Civil Engineering

Certificate in Cadastral Surveying  
Minor in Land Surveying  
Certificate in Construction Management  
Minor in Construction Management

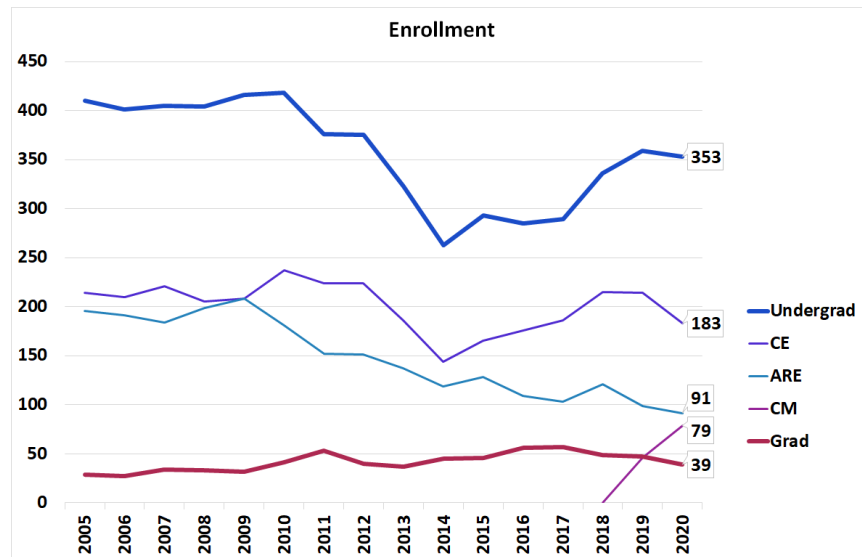
### Quantitative Data

FTE Snapshot: Spring 2021					
	Faculty	Staff	Temporary Lecturers	Postdoctoral Researchers	GAs
State funding	20.6	2	1 (8 x .125)		3.325
Research or other soft money		4		6	11.875
Surveying Program	1 + vacancy		0.75 (6 x .125)		

The faculty is highly-productive by all measures. Metrics for the past five years show:

- 4 courses per year, about 300 student credit hours taught (per FTE faculty per year).
- \$125K in research expenditures, 4-5 journal papers, 3 conference presentations, 1-2 other publications, 2-3 graduate students supervised (per FTE faculty per year).

Student enrollment is variable but generally trending up since a low point in 2014. The new Construction Management program is already exceeding projections.



Time to degree: Architectural Engineering: 5.4 years Civil Engineering: 4.9 years  
It is not clear how to improve these figures without lowering standards

### Qualitative Assessment

**Land-Grant Mission:** The Department is oriented to fulfilling UW’s land-grant mission. Our graduates are responsible for the built environment and ensuring the safety of Wyoming’s infrastructure. Every county in Wyoming employs Civil Engineers and numerous cities do too. State and Federal agencies such as WYDOT and BLM also employ Civil Engineers across the state. Architectural Engineers and Construction Managers are essential for building schools, hospitals, and private projects that support the Wyoming economy. In short, the quality of life for Wyoming citizens is dependent on having well-trained Civil Engineers, Architectural Engineers, and Construction Managers. Upon graduation, over 90% of our graduates are either employed in a permanent career or heading to graduate school.

**Service to the State:** We have numerous faculty-led research and outreach activities which directly address the needs of the State of Wyoming and its citizens. Among these are:

- **Building Energy Research Group (BERG)**  
*applied projects for Wyoming clients; business incubation*
- **Carbon Capture and Storage research**  
*research with Wyoming industry partners and policy makers*
- **Center of Excellence in Produced Water Management (CEPWM)**  
*research with Wyoming industry partners*
- **Center for Biogenic Natural Gas Research**  
*research with Wyoming industry partners; business incubation*
- **Construction Workforce Training**  
*workforce training for Wyoming citizens*
- **Driving Simulation Laboratory (WYOSIM)**  
*workforce training for Wyoming Highway Patrol*
- **Traffic Operations lab (TOMAS)**  
*research with Wyoming partners*
- **WYDOT Design Squad**  
*student coop workforce training*
- **Wyoming T2/LTAP center**  
*workforce training for WYDOT and county workers*

**Size and Breadth:** With approximately 23 faculty members, we recognize that we are relatively large. However, our undergraduate student-to-faculty ratio is 17:1, therefore we are more efficient UW as a



whole (15:1). Also we are very productive in terms of student credit hours delivered, and in research measures.

We are effectively required to be large, because of the sub-disciplinary nature of our programs, and because all sub-disciplinary areas must have faculty expertise for ABET accreditation.

Civil Engineering must have faculty expertise in:

- Structures
- Environmental
- Water Resources
- Geotechnical
- Transportation
- Surveying

Architectural Engineering must have faculty expertise in:

- Structures
- Building Mechanical Systems
- Building Electrical Systems
- Architecture
- Construction

**Four Pillars:** The Department contributes to the President's "Four Pillars" in significant ways:

- **Digital.** We prepare undergraduate students to work using the digital tools of industry. The use of Building Information Modeling (BIM) in Architectural Engineering is notable. We have research strength in transportation simulation, big data analysis, energy and carbon modeling. Prior to Covid-19, we had a strong online teaching presence through the Land Surveying program. Since Covid-19, we have become enthusiastic about online teaching and see opportunities for growth in that area.
- **Entrepreneurial.** We have undertaken initiatives to become more entrepreneurial. Two faculty members have start-up companies and patents. Several faculty conduct research projects in partnership with entrepreneurs in the private sector. For undergraduates, we have redesigned a junior-level required course (VISTA 3) to focus on entrepreneurship, using the expertise of the College's Entrepreneur in Residence.
- **Interdisciplinary.** We have numerous productive collaborations with units across campus, such as: the School of Energy Resources (SER), Haub School of Environment & Natural Resources, College of Business, Geology, and Statistics.
- **Inclusive.** Although Engineering is historically male-dominated and we need more women faculty, we have some diverse qualities: of 21 faculty, 10 have a country-of-origin other than the US, and seven different countries are represented. Among graduate students, most are international students, and 12 different countries are represented. Our undergraduate student population in Architectural Engineering is about 34% women; this is significantly better than the College as a whole (18%). We practice inclusivity in our programs through academic programming (team projects) and student activities which give students great opportunities to *be* inclusive and to grow in diverse groups.

**Professional Skills:** In ARE and CE, we spend a great deal of effort in developing our students' communication skills and we believe this has been very successful. A suite of courses—VISTA 1, VISTA 2, VISTA3, and Capstone—emphasize oral and graphic communication. The COM3 requirement is embedded in our curriculum (in ARE/CE 3210) and we hire an English professor to assist this course.

#### Department Unit Strengths

- The department excel in terms of the land-grant mission and service to the State (see above).



- The department is highly-connected with industry and we have excellent relationships with alumni. For example, our freshman introductory course (called VISTA 1) had 26 speakers from industry last semester. Architectural Engineering “Design Day” often has 30-40 guest reviewers from industry.
- The department is a high-functioning and stable department which has matured in the past six years from a majority of Assistant Professors to a majority of tenured faculty. Collegiality is high.
- The new Construction Management program has been very successful, both in terms of enrollment and the accomplishments of the new faculty.
- The department has unique facilities and equipment. The new EERB is a tremendous asset.

### Goals moving forward

1. Build-out the Construction Management program. Two more faculty positions are absolutely necessary—one immediately and one next year. These were committed by the Provost and Trustees during the program’s approval. Four new courses are to be created in 2021-22.
2. Obtain initial accreditation from ACCE for Construction Management. (Review occurs in 2021-22.)
3. Obtain 6-year re-accreditation from ABET for Civil Engineering and Architectural Engineering. (Review occurs in 2021.)
4. Examine Land Surveying program and develop specific actions to strengthen or reorganize it.
5. Make specific progress in marketing and outreach efforts.

**This Strategic Vision Report, will be revised again in 2025.**