Powering the New Engineer to Transform the Future

BOG August 2019

Response to BOG Inquiry Re Credits to Degree

- SUS Deans of Engineering caucused and agreed to work together to assess state of engineering undergraduate programs in Florida

- UF department chairs convened conversations between SUS chairs in their respective disciplines

- Objective was to answer the following questions:
  - What is the focus of engineering education in Florida?
  - Are our degree requirements and times to degree consistent with our top peers?
  - Are we meeting the specifications of our accrediting body (ABET)?
    - Are we meeting the needs of our employers?
  - What is the average graduation rate for engineering students ins the SUS?

- All programs agreed that providing an excellent education with a high ROI as efficiently as possible was the primary goal of their undergraduate programs

Avg. Credits to BS Engineering Degrees At Top Institutions

University of California-Berkeley, University of Illinois at Urbana-Champaign, University of Washington, the Ohio State University, University of Michigan, Georgia Tech, Texas A&M, Purdue. ASEE 2017

- Aerospace Eng: 128
- Biomedical Eng.: 128
- Chemical Eng: 129
- Civil Eng: 128
- Computer Eng: 126
- Electrical Eng: 128

- Environmental Eng: 127
- Industrial Eng: 126
- Materials Eng: 128
- Mechanical Eng: 128
- Nuclear Eng: 126
- Within the SUS, credits to degree currently range from 120 to 131
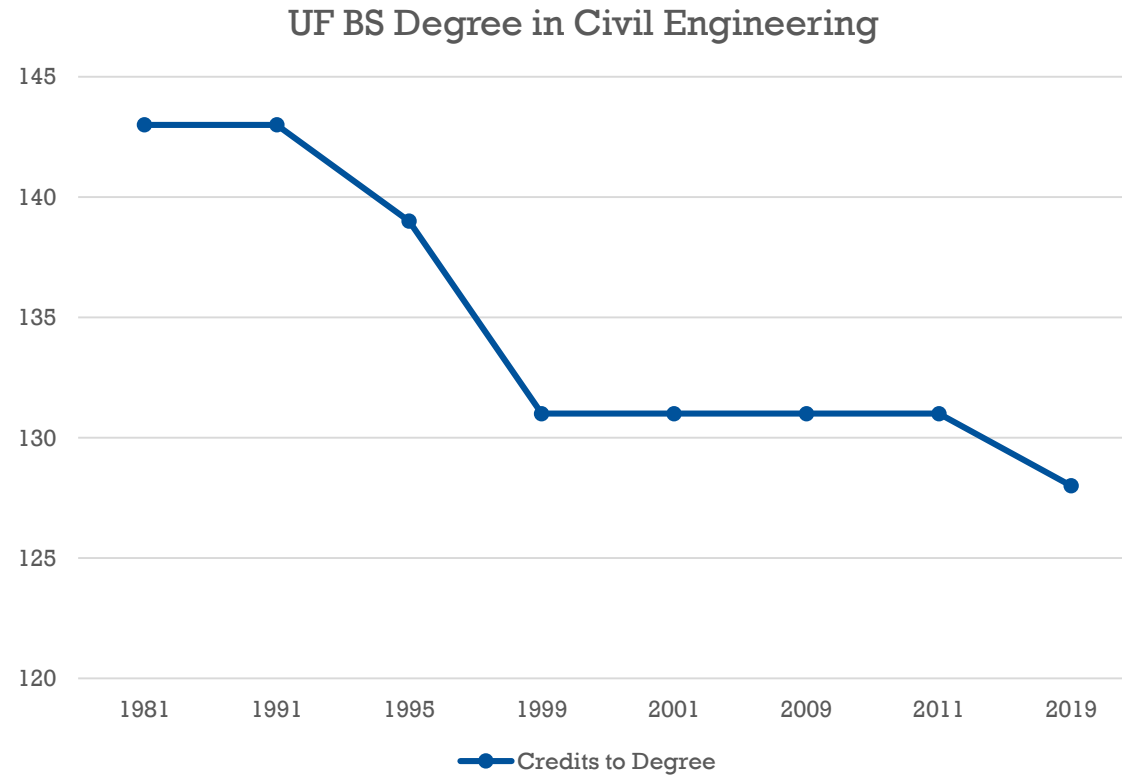
ABET Accreditation

- Required by most states in order for graduates to become licensed professional engineers

- Required by many graduate schools in order to be granted an advanced degree

- 6 year cycle
  - Must assess student learning
    - Assessed every semester
  - Must consult with constituents (includes employers and alumni)
    - At lease once per year
  - Must pursue, and document, continuous improvement

- Changes to the curricula made outside of this process can lead to loss of accreditation

SUS Discipline Reviews

- All programs in the SUS have solicited input from their employers and alumni regarding their curricula and reacted accordingly

- Different programs serve different markets and thus have different requirements

- UF example - Spring 2019
  - Every department consulted with their Employer and Alumni Advisory Board regarding student learning and success and discussed whether or not changes were needed in the curricula and credits to degree
  - Two departments concluded that some reduction in credit hours was warranted (Chemical Engineering and Civil Engineering)
  - All boards expressed extreme disapproval of further reductions in credit hours to degree
    - Significant concern over erosion in credits to degree over time

Example of Decrease in Credits to Degree Over Time

UF BS Degree in Civil Engineering

Line chart titled "UF BS Degree in Civil Engineering" showing Credits to Degree on the y-axis (120 to 145) versus years on the x-axis (1981, 1991, 1995, 1999, 2001, 2009, 2011, 2019). Values: 1981 ≈ 143, 1991 ≈ 143, 1995 ≈ 139, 1999 ≈ 131, 2001 ≈ 131, 2009 ≈ 131, 2011 ≈ 131, 2019 ≈ 128.

Legend: Credits to Degree

Additional Program Elements

- Co-curricular activities are critical to retention and post-graduation placement
  - Internships
  - Student design competitions

- Employers see these as differentiators

- Such activities enhance placement, career advancement and salary, but can delay time to graduation

Time to Graduation in SUS Engineering Programs

Freshman Cohort Year	2012		2013	
	Graduated within 4 years	Graduated within 5 years	Graduated within 4 years	Graduated within 5 years
UF	26.60%	85.50%	29.70%	91.70%
FAU	26.00%	66.00%	29.19%	57.66%
FGCU	27.00%	71.00%	15.00%	47.00%
FIU	17.90%	54.50%	25.60%	56.30%
FPU	n/a	n/a	n/a	n/a
FAMU-FSU	32.90%	88.60%	43.00%	96.10%
UCF	31.60%	90.90%	32.30%	79.00%
UNF	21.10%	84.20%	20.00%	76.00%
USF	38.67%	85.00%	40.96%	95.22%
UWF	7.00%	29.00%	13.00%	30.00%

Summary

- All SUS degree programs are within national norms for credits to degree for their respective degrees

- All programs have consulted with their constituents as required by ABET to ensure their curricula are in accord with employer needs
  - SUS programs serve different sectors of the technology workforce and must be responsive to their various employers
  - Credits to degree have been declining over time raising some concerns with constituents

- Engineering students in SUS institutions typically take 5 years to graduate
  - Powerful co-curricular activities enhance job prospects but delay time to graduation
  - Rigor of the curricula encourages students to take fewer credits per semester

THE
MOMENTUM
TO MAKE A DIFFERENCE