

**Date:** November 18, 2008

**To:** Cynthia Rawitch  
 Associate Vice President, Academic Affairs

**From:** Diane Schwartz, Associate Dean  
 College of Engineering and Computer Science

**Subject:** Engineering Degrees and Curriculum Redesign

RE: Memo from G Reichard - Engineering Degrees and Curriculum Redesign 11/05/08

**Summary of the history of the unit distribution in the engineering programs at CSUN-** The College of Engineering and Computer Science currently has six undergraduate engineering programs with program requirements in excess of 120 units. These engineering programs require between 121 and 126 units. Prior to the implementation of the new GE program ( Plan R) in 2006, these programs required between 130 and 135 units. The Plan R GE reduced each of the engineering programs by 9 units.

Why are these engineering majors over 120 units? Each of these engineering programs has approximately 99 units of major requirements and 27 units of GE requirements (See table below). Each of these engineering programs is accredited or undergoing an accreditation review by a national accreditation body. The accreditation bodies do not require that engineering programs be of a certain unit size; however the faculty have indicated that they do not believe that they can construct a 120-unit engineering program that meets the accreditation program criteria plus the campus GE program.

B.S. Degrees in CECS	Major units	GE Units( not double counted)	Free Elective Units	Total Units in Program	Accreditation Body
Electrical Engineering	99	27	0	126	ABET
Computer Engineering	96	27	0	123	ABET
Civil Engineering	99	27	0	126	ABET
Constr Mgmt Technology	97	27	0	124	ACCE( in progress)
Mechanical Engineering	99	27	0	126	ABET
Manufac Syst Engineering	94	27	0	121	ABET
Engineering Management	93	27	0	120	New program
Computer Science	84-86	30	4-6	120	ABET

**General Education Program for Engineering Programs** – All of the engineering programs have been granted 21 units of double counting or waivers in general education. The engineering programs in the college have had 21 units of double counting or waivers for many years and the double counting/waiver exceptions were carried over to the new GE Plan R program in 2006. The campus-wide reduction in GE requirements in 2006 reduced the undergraduate engineering program GE requirements by 9 units, thus taking the engineering programs that were about 135 units down to 126 units. It does not appear that there are any other obvious places to reduce the size of GE through double counting GE courses and engineering major courses.

The following table shows how the 21 units of double counting/waivers for GE are implemented for engineering majors at CSUN. The GE requirements for engineering majors are Analytical Reading and Expository Writing ( 3 units); Oral Communication ( 3 units); U.S. history and government ( 6 units); Arts and Humanities ( 6 units); Social Sciences ( 3 units); and Comparative Cultural Studies ( 6 units) for a total of 27 units. All other GE requirements (21 units) are met by the major.

<b>CSUN GE Section</b>	<b>How met by CSUN Engineering Majors</b>
A.1 Freshman Composition (3 units)	Take 1 GE course
A.2 Critical Thinking (3 units)	Met by major
A.3 Mathematics ( 3 units)	Met by major
A.4 Oral Communication ( 3 units)	Take 1 GE course
B Natural Sciences ( 8 units)	Met by major
C Arts and Humanities ( 6 units)	Take 2 GE courses
D Social Sciences ( 6 units)	Take 1 GE course (3 units); Met by Major ( 3 units)
E Lifelong Learning (3 units)	Met by major
F Comparative Cultural Studies ( 6 units)	Take 2 GE courses
Title V History and Government ( 6 units)	Take 2 GE courses
Floating unit ( 1 unit)	Met by major ( extra math units)

There is no clamor at this time from the CECS engineering departments to reduce the size of their majors to 120 units. They have accepted the need for approximately 99 units of technical courses + 27 units of GE to make up their programs. If there is a need to reduce the major to 120 units they would prefer strategies that would reduce GE for engineering majors by 3 – 6 units.

### **Comments on Gary Reichard Strategies to Reduce Units in the Engineering Programs**

1. Allowing GE Credit for major courses that have been designed to include explicit GE learning outcomes –
  - a. One of our engineering departments is considering a curriculum proposal for an engineering ethics course that could be used to double count for an Arts and Humanities GE course. This would only reduce the size of the major if the major requirements were not increased at the same time from 99 units to 102 units.
  - b. MSE 304 Engineering Economics (or MSE 300) is all ready allowed to double count for a GE Social Science course in all engineering majors.
2. Allowing more double counting among GE courses –
  - a. Engineering majors satisfy GE math, GE science, GE critical reasoning, GE Lifelong Learning and GE social science (3 units) by major courses. It might be difficult to find more engineering courses that can double count with GE, with the exception of the ethics course mentioned in 1a.
3. Granting of exceptions for high unit majors –
  - a. Can engineering majors use one of the Title V history and government courses to meet the Social Science GE requirement? This would effectively take the GE requirements with double counting for CSUN engineering majors to 24 units and reduce the engineering programs by 3 units.

4. Redesign of engineering programs to reduce units – Accreditation requirements and the “rapidly evolving “ engineering fields seem to require the full complement of courses or at least course topics offered in our engineering programs. A redesign of the curriculum to reduce 3 – 6 units of technical courses would be a challenge.
5. Credit for Exams – Students routinely are given AP course credit in science and mathematics required courses. There are no other formal challenge exams in our college. Engineering courses tend to be project or lab oriented and so credit by exam is not a likely scenario. There are some course requirements, such as those in mathematics, which might be feasibly met with a challenge exam.
6. Providing students the full academic preparation required in a **timely** manner – Here we are working with the mathematics department to get our engineering and computer science majors ready for calculus in the quickest possible way. The weak preparation of many of our incoming students is by far the most important reason why students take so long to get their engineering or computer science degrees and take so many units to achieve their degree. Our students need more tutoring and more explicit advice on how to get through the program in 4 to 5 years. Many of them need more financial aid so that they can work fewer hours and spend more time studying. The extra 5 or 6 units at the end of the program is not delaying their graduation nearly as much as the all of the other factors mentioned.