April 5, 2005

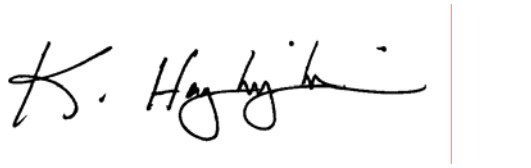
TO: The Faculty of the Schools of Engineering

FROM: The Faculty of the Department of Engineering Education and The First-Year Engineering Curriculum Committee

SUBJECT: Change of Course Requirements for the First-Year Engineering Program

The Faculty of the Department of Engineering Education and the First-Year Engineering Curriculum Committee have approved course requirement changes to the curriculum for the First-Year Engineering program. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Current and proposed plans of study are attached. Detailed descriptions of proposed changes are provided along with reasons for these proposed changes and notes on their implementation.



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CURRENT:

First-Year Engineering Curriculum (Minimum – 32 credit hours)				
FALL	**CR**		**SPRING**	**CR**
MATH 165/161	4-5		MATH 166/162	4-5
CHM 115	4		CHM 116	4
ENGR 106	2		CS 156/158	2-3
ENGR 100/103/104 (seminar)	1		PHYS 152	4
COM 114 or ENGL 106/8	3-4		ENGL 106/8 or COM 114	4-3
CGT 163/164	(2)			
TOTAL	14-16 (16-18)		TOTAL	17-20

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PROPOSED:

Typical First-Year Engineering Curriculum[1] (Recommended – 32 credit hours)				
FALL	**CR**		**SPRING**	**CR**
MATH 165/161	4-5		MATH 166/162	4-5
CHM 115	4		ENGL 106/8 (if not taken in fall) or COM 114 or Gen Ed[2]	4-3
ENGR 126	3		PHYS 152	4
ENGR 100/103/104 (seminar)	1		Science Selective[3]	3-4
ENGL 106/8 or COM 114 or Gen Ed[2]	3-4			
Elective[4,5]	0-3		Elective[4,5]	0-3
Total Recommended	15-18		Total Recommended	14-18

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[1]Completion of the common core courses will allow entry into all the Schools of Engineering, subject to individual schools' space management requirements. These include ENGR 100/103/104 and COM 114 or a General Education course, in addition to the following courses upon which the Engineering Admissions Index (EAI) will be based: MA 165/161, MA 166/162/173, CHM 115/123, ENGL 106/108, ENGR 126, PHYS 152, and the Science Selective.

[2]A General Education Elective may be taken in place of COM 114 in the first year. While COM 114 will still be encouraged for all students in the first year, it will not be a first-year requirement. COM 114 can be required by individual schools and students who do not take it in the first year will take it at a time currently designated for a General Education Elective in the upper division curriculum. It will count as a General Education elective if not otherwise required by a school.

[3]Science Selectives:

a. Individual schools will be allowed to require a specific course under the conditions that the student will still be admitted to the school and that the science selective taken as a first-year student may be counted as credits toward graduation upon application by the student and approval by the affected school.
b. Science selectives will be taken from a controlled list of courses. The set of courses includes:
   - Second semester of Chemistry (CHM 116, 124, 136)
   - CS 158 or 190E, ENGR 117
c. Students who are undecided will be strongly advised to take a second semester of chemistry as their science selective.

[4]Students with room in their schedule and an interest in Mechanical or Aeronautical and Astronautical Engineering will be strongly encouraged to enroll in CGT 163. Similarly, those with an interest in Civil, Construction, or Land Surveying and Geomatics Engineering will be encouraged to enroll in CGT 164.

[5]Students with room in their schedule will be encouraged to take additional elective courses which include ENGR 194 or 180, EPCS 101, MSE 190, ABE 120, NE 110, ROTC and BAND courses.

Characteristics of the First-Year Engineering Curriculum:

A. No choices for the fall semester classes will impact time to graduation or entry into any of the Schools of Engineering.
B. English Composition will be required as a core first year course.
C. Additional courses may be added to the list of Science Selectives with the approval of the First-Year Curriculum Committee.
D. Replacing ENGR 106 in the curriculum is ENGR 126, a 3 credit course more truly reflecting the content of the current ENGR 106 course (2 - 50 minute lectures and 1 lab per week). ENGR 126 will be responsible for laying the basic computing foundation within the engineering context for all professional schools.
E. Renumbering of ENGR 106 is necessary to eliminate the potential for the confusion that would result if different students' records were to show ENGR 106 for two and three credits. This renumbering will also help eliminate confusion for students' counselors and the Registrar's Office during the transition to the updated first-year curriculum.

Reasons:

Over the past four years, there have been several proposals to address problems with our first-year curriculum. While these differed in the details of the specific changes, they all acknowledged that there are problems with the first year, especially the overload of the spring semester. The challenges that we face are not unique and have paralleled similar discussions at other institutions. National trends across engineering programs include first-year engineering curricula with a single semester of chemistry, an early introduction to engineering, and an early introduction to biology. In our debates, we have learned many lessons about the needs of our own programs, including the commitment to the common first-year concept; the understanding of benefits from a balanced course load with a Liberal Arts class in each semester; the necessity of an English composition course; a recognition that computing concepts can be taught in the context of computer tools such as MATLAB; and the necessity of each school to compromise to achieve an effective, balanced and reasonable common first-year curriculum.

We can not afford to continue with the current model that overloads the spring semester with up to 20 required credits. The current curriculum results in poor performance, repeating courses extending graduation dates, required summer courses and students leaving engineering altogether. Students that do continue are looking to "make it through" rather than understanding the material.

The proposed curriculum will make the first year more effective, balanced and reasonable for our students to adjust to Purdue Engineering and to learn the fundamentals needed for success in engineering. The proposed revisions seek to keep the common core curriculum that has served so effectively and even eliminates the decisions that students currently need to make during Day on Campus.

Constraints and Considerations of the First-Year Curriculum:

The constraints that were considered in putting the proposal together were that the curriculum must include:

- Two semesters of calculus,
- At least one semester of chemistry with the option to take a second,
- One semester of physics,
- One introductory computing course with the option for a second, more advanced course,
- One semester of English composition and the opportunity to take a General Education Elective or COM course in the first year,
- A first semester introduction to engineering course or seminar, and
- An introduction to engineering content and contexts