Field of Study Curriculum for Engineering

Engineering is a very broad field that covers many disciplines; consequently, there is significant variance in engineering curricula among our state institutions. Even within an engineering specialty like chemical or electrical engineering there are differences that reflect varied areas of focus or innovations from one institution to the next. Nevertheless, the field of study curriculum for engineering is designed to promote maximum transferability for students while still preserving appropriate curricular diversity for institutions. As indicated in the following table, some field of study courses apply to any undergraduate engineering program, while other courses apply when the engineering program at the receiving institution requires such courses.

Therefore, there are no discrete field of study courses for specific specialties of engineering (chemical, civil, electrical, mechanical, etc.) Rather, a course is considered part of the field of study curriculum for an engineering program if:

1. it is listed in the table as applying to "all programs;"

   or

2. it is listed as applying to "only those programs requiring the course" **and** is required by the program at the receiving institution.*

If a course is not listed as a field of study course, then (as is the usual practice), a student can still transfer the course if there is a local agreement between the sending and receiving institutions.

The content areas of the field of study courses are from two areas of mathematics, two areas of science, and two areas of engineering. For a number of students, credits in some of these math and science courses would also satisfy components of the core curriculum. Note that additional matrices that follow the field of study table specify in more detail how certain configurations of coursework transfer.

Courses contained in the field of study curriculum for engineering (as defined by this document) will transfer freely among Texas public institutions of higher education. Receiving institutions may, however, require transfer students to successfully complete courses that are not part of this field of study curriculum if completion of those courses is required of all students in order to receive a baccalaureate degree in engineering. In addition, the receiving institution can specify minimum acceptable grades for courses accepted in transfer.

*For example, a student at Community College X completed a General Chemistry II (Chem II) course and wishes to transfer to a mechanical engineering program at a university. General Chemistry II is designated in the Field of Study as "only those programs requiring Chem II."

Therefore, if the mechanical engineering program at University A requires Chem II, then this institution would have to accept the course in transfer. But if the mechanical engineering program at University B does not require Chem II, then this institution would not be obligated to accept the course in transfer as part of the major.

Further, if the mechanical engineering program at University A at some point eliminates the General Chemistry II requirement, then the institution must accept Chem II in transfer as part of the major only if the student completed the course when the Chem II requirement (indicated in the university's catalog for that year) was still in effect. If the mechanical engineering program at University B at some point adds General Chemistry II as a requirement, the institution must then start accepting Chem II in transfer to be applied to the major.

FIELD OF STUDY CURRICULUM FOR ENGINEERING

Content Area	Academic Course Guide Manual (ACGM) Title	ACGM Course No.	SCH	Applicable Engineering Programs
Calculus	Any combination of: Calculus I (3 or 4 SCH versions); Calculus II (3 or 4 SCH versions); Calculus III (3 or 4 SCH versions) that total a minimum of 8 SCH	MATH 2313 MATH 2413 MATH 2314 MATH 2414 MATH 2315 MATH 2415	8 - 12[1]	All
DifferentialEquations/Linear Algebra	Differential Equations (3 or 4 SCH version)	MATH 2320 MATH 2420	3 - 8	Only those programs requiring these course(s) - See matrix #1
	Linear Algebra (3 or 4 SCH version)	MATH 2318 MATH 2418		
	Differential Equations and	MATH xxxx		

	Linear Algebra (3 or 4 SCH version)	MATH xxxx		
Chemistry	General Chemistry II (lecture & lab) OR General Chemistry II (lecture) AND General Chemistry Laboratory II	CHEM 1412 CHEM 1312 CHEM 1112	4	Only those programs requiring CHEM II
Physics (Calculus-based)	University Physics I (lecture) **OR** University Physics I (lecture and lab) **AND** University Physics II (lecture) **OR** University Physics II (lecture and lab)	PHYS 2325 PHYS 2425 PHYS 2326 PHYS 2426	6 - 8[1]	Lecture component required by all - See matrix # 2
	University Physics Laboratory I **AND** University Physics Laboratory II	PHYS 2125 PHYS 2126		
Circuits	Circuits I for majors	ENGR xxxx	3	Only those programs requiring Circ I (major and

	OR Circuits I for majors with Lab	ENGR xxxx		non majors)
Engineering Mechanics	Engineering Mechanics I - Statics (3 or 4 SCH version)	ENGR 2301 ENGR 2401	3 - 8	Only those programsrequiring these course(s) - See matrix # 3
	Engineering Mechanics II - Dynamics (3 or 4 SCH version)	ENGR 2302 ENGR 2402		
	Statics and Dynamics (3 or 4 SCH version)	ENGR 2303 ENGR 2403		

TOTAL SCH 27 - 43

[1] A student completing coursework totaling less than the minimum SCH requirements for calculus and physics lecture will obtain transfer credit at the receiving institution for **each** course successfully completed at the sending institution.

The following three matrices show how specified courses and combinations of these courses would transfer from the sending to the receiving institution for field of study engineering courses.

T = transfers; x = does not transfer; other is explained by text.

Matrix 1. Differential Equations and Linear Algebra

	Receiving Institution			
Sending Institution	Course	Differential Equations	Linear Algebra	Differential Equations and Linear Algebra (combined)
	Differential Equations	T	x	The Differential Equations course and the Linear Algebra course **together** transfer as the combined course
	Linear Algebra	x	T	
	Diff. Eq. and	Decided by	Decided by	T

	Linear Alg. (combined)	receiving institution	receiving institution	

Note: The transferable courses in this table are considered part of the field of study curriculum **if** the program of the receiving institution requires them.

The interpretation of this matrix is as follows:

- A student who has taken **only** Differential Equations (DE) would receive credit for DE (if it was required by the receiving institution) but would not receive credit for Linear Algebra (LA) or the combined DE/LA course.
- Similarly, a student who has taken **only** LA would receive credit for LA (if it was required by the receiving institution) but would not receive credit for DE or the combined DE/LA course.
- A student who has taken **both** DE and LA would get credit for both DE and LA (if both courses were required by the receiving institution) **or** the student would receive credit for the combined DE/LA course (if it was required). In the latter case, a student would receive the number of credits in the **combined** course. For example, if a student has taken a 3 SCH DE course and a 3 SCH LA course and transfers to a university that offers and requires only a 3 SCH DE/LA course, then that student would receive transfer credit of 3 SCH for the combined DE/LA course.
- A student who has taken the combined DE/LA course would get credit for the combined course (if it were required by the receiving institution). However, if the receiving institution required either the separate DE course or the LA course or both, then the receiving institution could decide whether to award any credit for the student's combined DE/LA course.

Matrix 2. University Physics

	Receiving Institution			
Sending Institution	Course	Physics - lecture only (3 SCH)	Physics - lab only(1 SCH)	Physics - lecture and lab combined (4 SCH)
	Physics lecture	T	x	The lecture course and the lab course **together** transfer as the combined lecture and lab course
	Physics lab	x	T	
	Physics lect. and lab (combined)	Transfers as the lecture only or as both the lecture course and the lab course		T

Note: The lecture component is a required field of study course. The lab component is a field of study course **if** the program of the receiving institution requires it.

Matrix 3. Engineering Mechanics-Statics and Dynamics

	Receiving Institution			
Sending Institution	Course	Statics	Dynamics	Statics and Dynamics (combined)
	Statics	T	x	The Statics course and the Dynamics course **together** transfer as the combined course
	Dynamics	x	T	
	Statics and Dynamics (combined)	Decided by receiving institution	Decided by receiving institution	T

Note: The transferable courses in this table are considered part of the field of study curriculum **if** the program of the receiving institution requires them.