Memorandum of Understanding Regarding Voluntary Course Transfer Agreement Pertaining to Bachelor of Science Degrees in Civil, Electrical, Industrial, and Mechanical Engineering

This voluntary agreement is entered into by and among the signatory institutions of higher education within the State of Texas. Its purpose is to foster enhanced transfer processes for students pursuing a bachelor's degree in various engineering disciplines, and to increase the number and preparedness of students matriculating from a two-year pre-engineering program (PENG) at community colleges into a baccalaureate engineering program (BSENG) at four-year universities. The intention of this transfer compact is not to change the curriculum of a four-year institution. The intention of this compact is to provide guidance to students with respect to what PENG courses offer the best mechanism for obtaining a baccalaureate engineering degree.

This agreement recognizes the following terms and conditions:

1. **Course Offerings:** When offering any or all of the mathematics, engineering, and science courses specifically listed in Annex A, signatory institutions will offer the course(s) consistent with the indicated course description(s) and student learning outcomes as listed in the Academic Course Guide Manual (ACGM).

2. **Admission:** A student will be admitted into a BSENG program at a signatory university, or a PENG program at a signatory community college, if he or she:
   A. has earned a grade of at least "C" for all completed PENG courses as shown in Annex B for the program at one or more of the signatory institutions; AND
   B. satisfies all admission requirements applicable to all students for the institution and engineering program selected, including enrollment capacity limitations and cumulative GPA requirements.

   Note: Students who do not satisfy these criteria may still be eligible for admission to the institution and program selected, but they should be encouraged to contact an admissions advisor at the institution.

3. **Transfer of Courses:** Students who successfully complete courses shown in Annex A will be able to transfer the course credit hours to a signatory four-year institution upon successful admission to the institution. If the courses completed are part of a degree program to which the student has been admitted, the institution will apply those courses as satisfaction of program requirements, up to the number of credit hours that would be achieved at the four-year institution for a particular course in the degree program. If a course completed is part of a degree program but has fewer credit hours than specified in the program, the institution must determine how to deal with the difference to the overall academic benefit of the student. However, no course with a grade of less than "C" will be transferred or applied to the baccalaureate engineering degree program.

4. **Assessment:** The signatory institutions will assess the effectiveness of this transfer compact on a periodic basis of at least once every three years, including student performance in upper-division courses and the number of students transferring.

5. **Retention of Agreement:** Each signatory institution and the Texas Higher Education Coordinating Board will maintain a copy of this transfer compact.

6. **Advertising:** All signatory institutions will make the broad statewide opportunities afforded under this transfer compact known to the students.

Note: Nothing in this compact is intended to cause an institution to offer a degree program or courses.

I hereby agree that my institution will participate in the following Statewide Engineering Transfer Compacts (please select one or more engineering disciplines below by checking the box and initialing to the right):

☐ **Civil ____** ☐ **Electrical ____** ☐ **Industrial ____** ☐ **Mechanical ____**

_____
Institution Name

_____ _____
President Signature Date

ANNEX A

In addition to the Academic Course Guide Manual (ACGM), the course descriptions and student learning outcomes for the courses listed below can be viewed at www.thecb.state.tx.us/Tuning_Engineering_in_Texas (or, if a CD-Rom or flash drive is included with this document, by opening the file "Course Descriptions for Transfer Agreements").

Courses for which revised course descriptions and the addition of student learning outcomes were approved for the Fall 2010 ACGM	Courses for which revised course descriptions and the addition of student learning outcomes were approved for the Fall 2011 ACGM
Calculus I, II, III	**"C" Programming**
Differential Equations	**Discrete Math**
Dynamics	**Electrical Circuits I**
Engineering Graphics I	**Electrical Circuits I Lab**
Fundamentals of Circuit Analysis	**Engineering Economics**
Fundamentals of Circuit Analysis Lab	**Introduction to Digital Systems**
General Chemistry I, II	**Introduction to Digital Systems Lab**
General Chemistry Laboratory I, II	**Linear Algebra**
Introduction to Engineering	**Plane Surveying**
Statics	
University Physics I	
University Physics I, II	
University Physics Laboratory I, II	

Notes:

1. The addition to the ACGM of student learning outcomes for the course University Physics I was approved by the ACGM Committee on March 31, 2010; these outcomes were revised to add the learning outcome "Solve problems involving the First and Second Laws of Thermodynamics" by the ACGM Committee on October 5, 2011.
2. The addition to the ACGM of the courses Electrical Circuits I and Electrical Circuits I Lab, and, in turn, the deletion from the ACGM of the courses Fundamentals of Circuit Analysis and Fundamentals of Circuit Analysis Laboratory was approved by the ACGM Committee on October 5, 2011.

ANNEX B

The following pages contain a Program of Study for transfer and a Prerequisite Flowchart for each of these four engineering disciplines:

Civil
Electrical
Industrial
Mechanical

Community College Program of Study for Transfer to a Civil Engineering Program

FRESHMAN YEAR

First Semester (Fall)

Course		SCH
MATH 2413	Calculus I	4
CHEM 1311	General Chemistry	3
CHEM 1111	Chemistry I Laboratory	1
ENGR 1201	Introduction to Engineering	2
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

Second Semester (Spring)

Course		SCH
MATH 2414	Calculus II	4
PHYS 2325	University Physics I	3
PHYS 2125	University Physics I Laboratory	1
ENGR 1304	Engineering Graphics	3
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**17**

SOPHOMORE YEAR

First Semester (Fall)

Course		SCH
MATH 2415	Multi-Variable Calculus (Calculus III)	4
ENGR 1307	Plane Surveying	3
ENGR 2301	Engineering Mechanics: Statics	3
ENGR 2304	Programming for Engineers	3
or	COSC 1436/1336 Programming Fundamentals	
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

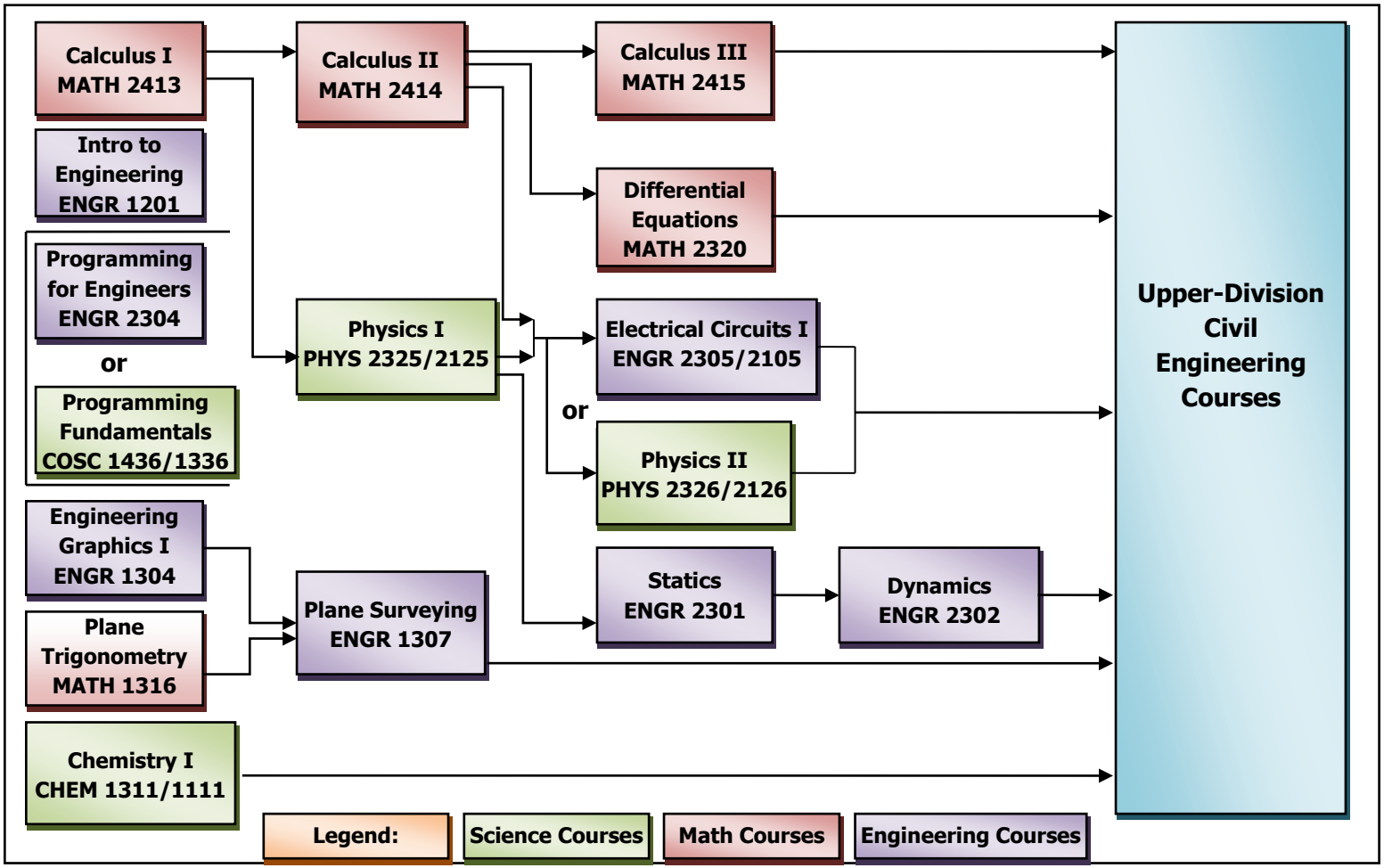
Second Semester (Spring)

Course		SCH
MATH 2320	Differential Equations	3
PHYS 2326/2126	University Physics II/Physics II Lab	4
or	ENGR 2305/2105 Electrical Circuits I/Circuits I Lab	
ENGR 2302	Engineering Mechanics: Dynamics	3
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

Notes:

1. Texas Common Course Numbers are used for all TCCN-numbered courses.
2. Some civil engineering programs require Chemistry II in addition to Chemistry I. The student is advised to check with the school to which he or she intends to transfer for specific requirements.
3. Either Physics II or Electrical Circuits I may be required. The student is advised to check with the school to which he or she intends to transfer for specific applicability of this course to the engineering major.
4. Some civil engineering programs will accept the course ENGR 1201 for transfer credit and as applicable to the engineering major, while others will accept the course for transfer credit only. The student is advised to check with the school to which he or she intends to transfer for specific applicability of this course to the engineering major.
5. Civil engineering programs will accept the course COSC 1436/1336 in place of ENGR 2304.

Prerequisite Flow Chart for Transfer to a Civil Engineering Program



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Community College Program of Study for Transfer to an Electrical Engineering Program

FRESHMAN YEAR

First Semester (Fall)

	Course	SCH
MATH 2413	Calculus I	4
CHEM 1311	General Chemistry	3
CHEM 1111	Chemistry I Laboratory	1
ENGR 1201	Introduction to Engineering	2
ECON 2301 or 2302	Micro- or Macroeconomics	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

Second Semester (Spring)

	Course	SCH
MATH 2414	Calculus II	4
PHYS 2325	University Physics I	3
PHYS 2125	University Physics I Laboratory	1
MATH 2305	Discrete Math	3
or	ENGR 2308 Engineering Economics (prereq. ECON 2301 or 2302)	
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**17**

SOPHOMORE YEAR

First Semester (Fall)

	Course	SCH
MATH 2415	Multi-Variable Calculus (Calculus III)	4
PHYS 2326	University Physics II	3
PHYS 2126	University Physics II Laboratory	1
ENGR 2306	Digital Systems	3
ENGR 2106	Digital Systems Laboratory	1
COSC 1320	"C" Programming	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**18**

Second Semester (Spring)

	Course	SCH
MATH 2320	Differential Equations	3
ENGR 2305	Electrical Circuits I	3
ENGR 2105	Electrical Circuits I Laboratory	1
MATH 2318	Linear Algebra	3
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

Notes:

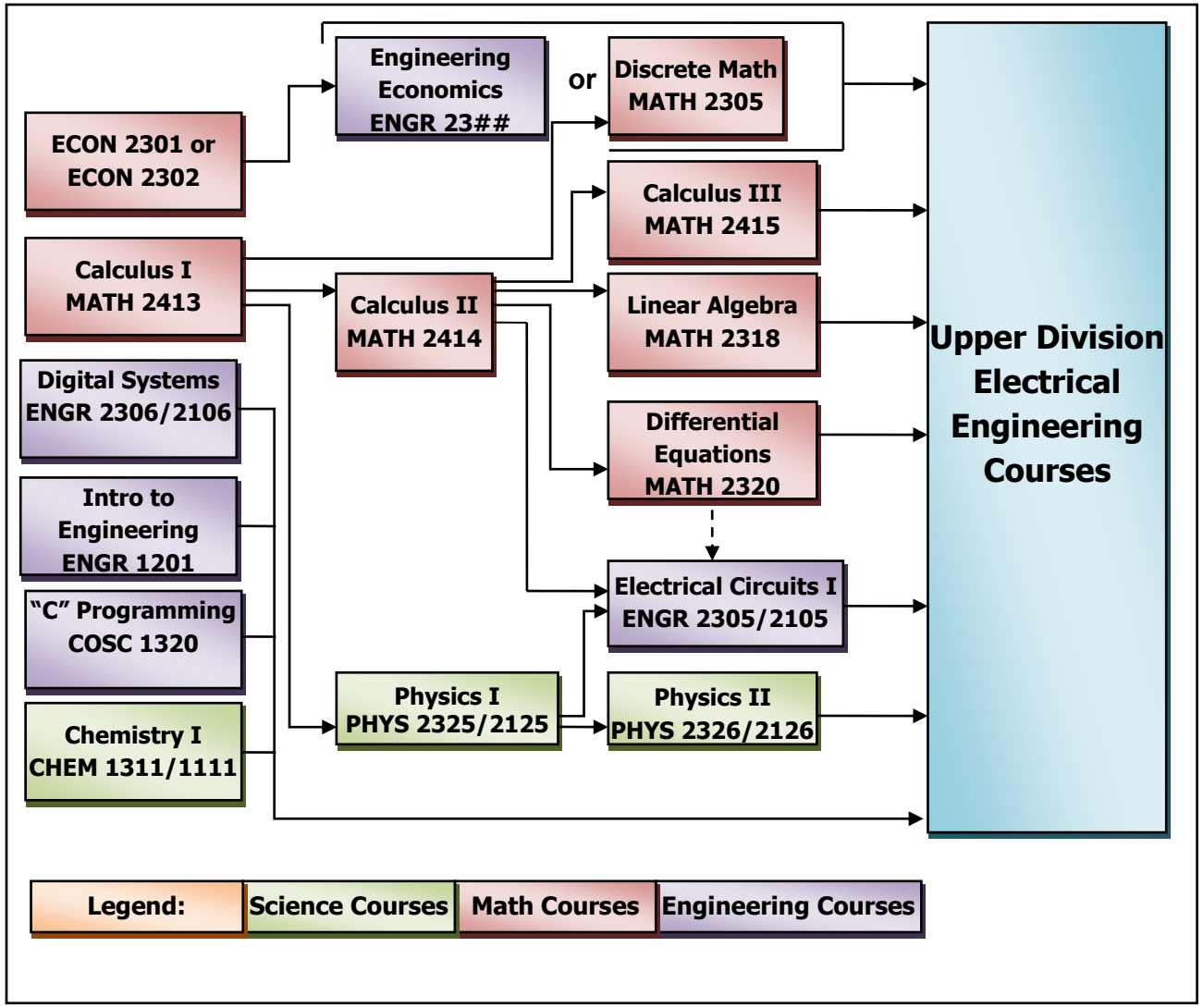
1. Texas Common Course Numbers are used for all TCCN-numbered courses.

2. Some electrical engineering programs require Chemistry II in addition to Chemistry I. The student is advised to check with the school to which he or she intends to transfer for specific requirements.

3. Some electrical engineering programs will accept the courses ENGR 1201 and ENGR 2306/2106 for transfer credit and as applicable to the engineering major, while others will accept the course for transfer credit only. The student is advised to check with the school to which he or she intends to transfer for specific applicability of this course to the engineering major.

4. If a student opts to take ENGR 2308, Engineering Economics, during semester 2 (instead of Discrete Math), ECON 2301 or 2302, Macro- or Microeconomics must be taken as a prerequisite.

Prerequisite Flow Chart for Transfer to an Electrical Engineering Program



Community College Program of Study for Transfer to an Industrial Engineering Program

FRESHMAN YEAR

First Semester (Fall)

Course		SCH
MATH 2413	Calculus I	4
CHEM 1311	General Chemistry	3
CHEM 1111	Chemistry I Laboratory	1
ENGR 1201	Introduction to Engineering	2
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

Second Semester (Spring)

Course		SCH
MATH 2414	Calculus II	4
PHYS 2325	University Physics I	3
PHYS 2125	University Physics I Laboratory	1
ENGR 1304	Engineering Graphics	3
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**17**

OPHOMORE YEAR

First Semester (Fall)

Course		SCH
MATH 2415	Multi-Variable Calculus (Calculus III)	4
PHYS 2326	University Physics II	3
PHYS 2126	University Physics II Laboratory	1
ENGR 2301	Engineering Mechanics: Statics	3
ENGR 2304	Programming for Engineers	3
or COSC 1436/1336	Programming Fundamentals	
ECON 2301 or 2302	Micro or Macroeconomics	3
	Semester Credit Hours	**17**

Second Semester (Spring)

Course		SCH
MATH 2320	Differential Equations	3
ENGR 2305	Electrical Circuits I	3
ENGR 2105	Electrical Circuits I Laboratory	1
ENGR 2308	Engineering Economics	3
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

Notes:

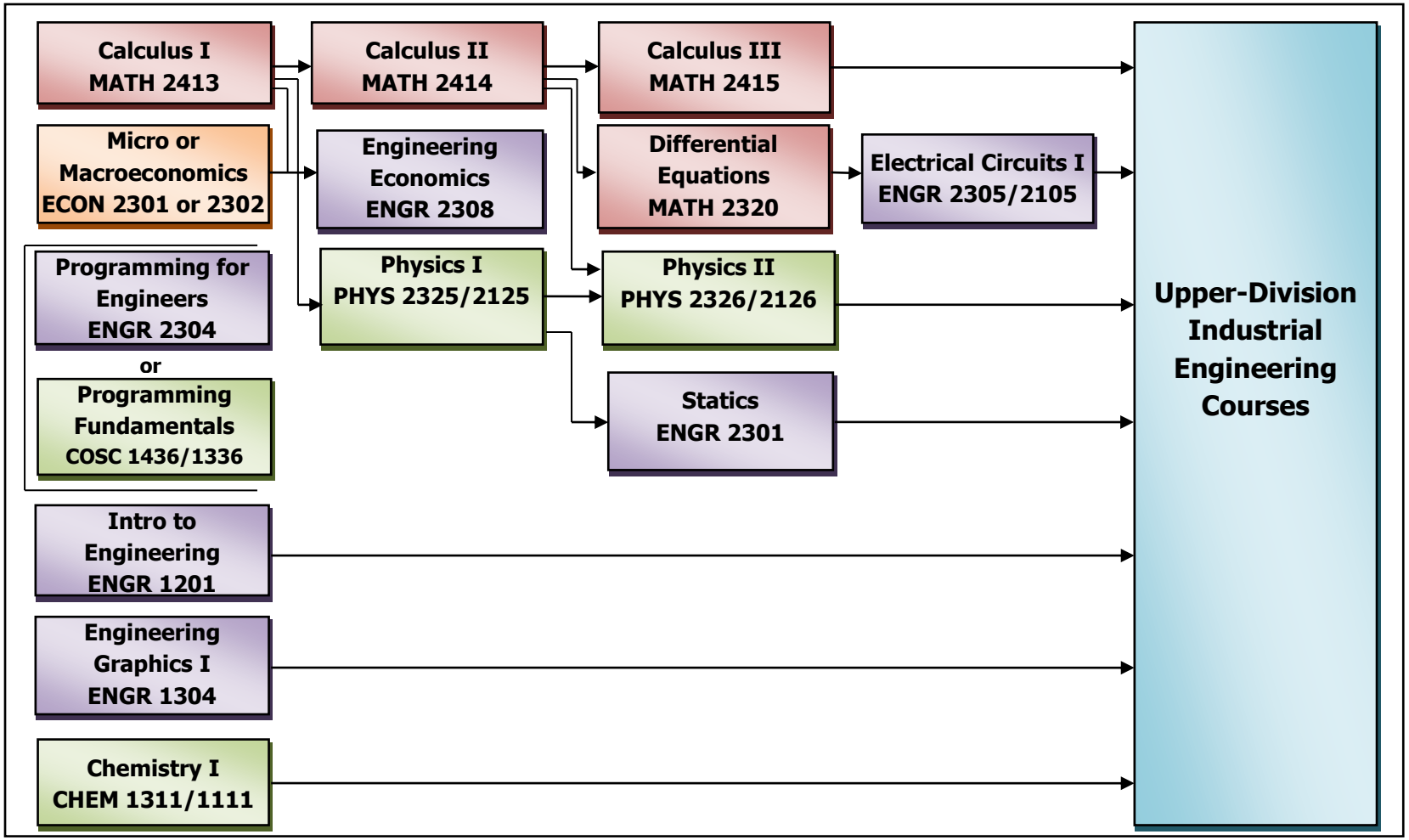
1. Texas Common Course Numbers are used for all TCCN-numbered courses.

2. Some industrial engineering programs require Chemistry II in addition to Chemistry I. The student is advised to check with the school to which he or she intends to transfer for specific requirements.

3. Some industrial engineering programs will accept the course ENGR 1201 for transfer credit and as applicable to the engineering major, while others will accept the course for transfer credit only. The student is advised to check with the school to which he or she intends to transfer for specific applicability of this course to the engineering major.

4. Industrial engineering programs will accept the course COSC 1436/1336 in place of ENGR 2304.

Prerequisite Flow Chart for Transfer to an Industrial Engineering Program



Legend:	Science Courses	Math Courses	Engineering Courses	Core Courses

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Community College Program of Study for Transfer to a Mechanical Engineering Program

FRESHMAN YEAR

First Semester (Fall)

Course		SCH
MATH 2413	Calculus I	4
CHEM 1311	General Chemistry	3
CHEM 1111	Chemistry I Laboratory	1
ENGR 1201	Introduction to Engineering	2
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

Second Semester (Spring)

Course		SCH
MATH 2414	Calculus II	4
PHYS 2325	University Physics I	3
PHYS 2125	University Physics I Laboratory	1
ENGR 1304	Engineering Graphics	3
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**17**

SOPHOMORE YEAR

First Semester (Fall)

Course		SCH
MATH 2415	Multi-Variable Calculus (Calculus III)	4
PHYS 2326	University Physics II	3
PHYS 2126	University Physics II Laboratory	1
ENGR 2301	Engineering Mechanics: Statics	3
ENGR 2304	Programming for Engineers	3
or	COSC 1436/1336 Programming Fundamentals	
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**17**

Second Semester (Spring)

Course		SCH
MATH 2320	Differential Equations	3
ENGR 2305	Electrical Circuits I	3
ENGR 2105	Electrical Circuits I Laboratory	1
ENGR 2302	Engineering Mechanics: Dynamics	3
XXXX ####	Texas Core Curriculum Requirement	3
XXXX ####	Texas Core Curriculum Requirement	3
	Semester Credit Hours	**16**

Notes:

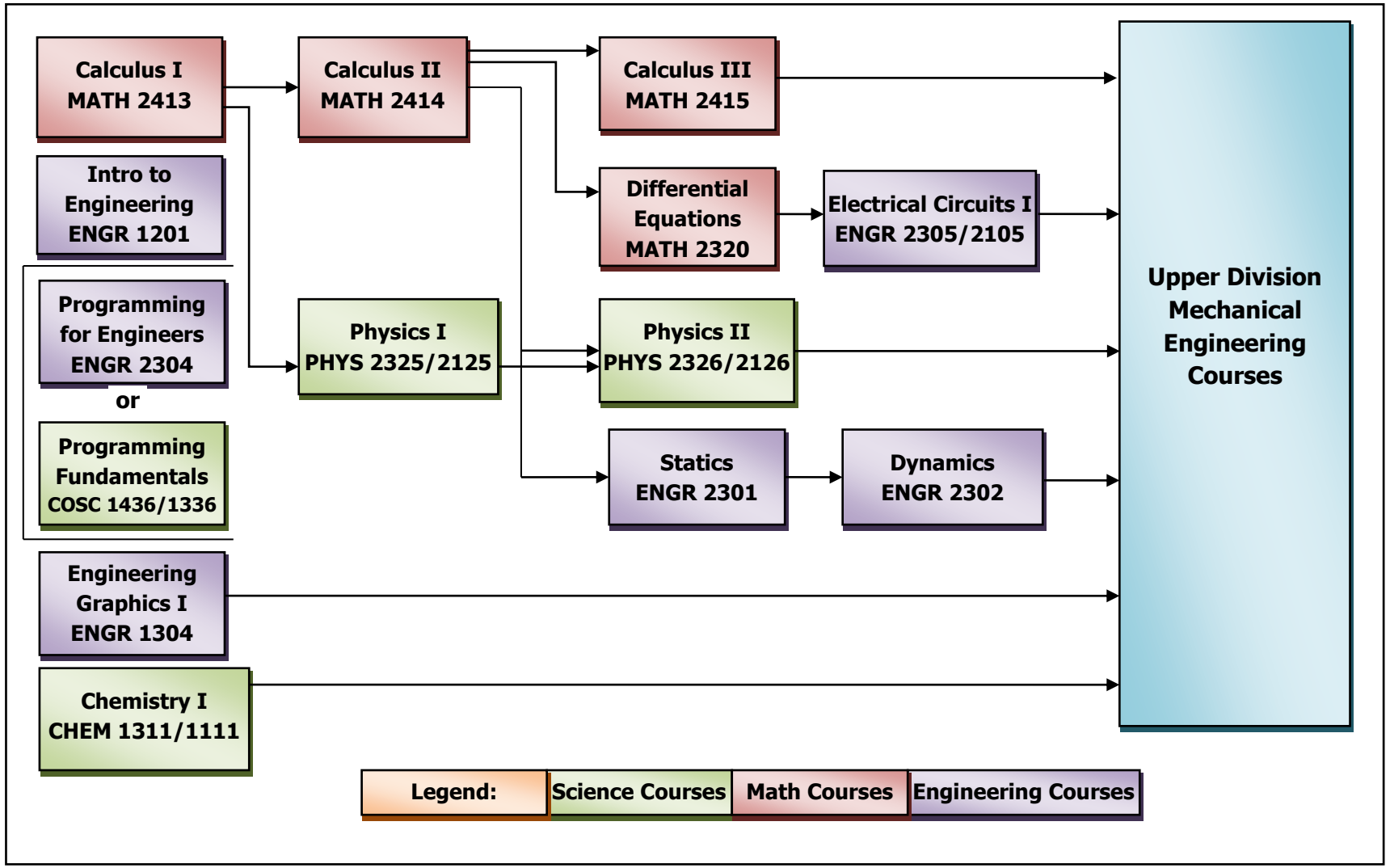
1. Texas Common Course Numbers are used for all TCCN-numbered courses.

2. Some mechanical engineering programs require Chemistry II in addition to Chemistry I. The student is advised to check with the school to which he or she intends to transfer for specific requirements.

3. Some mechanical engineering programs will accept the course ENGR 1201 for transfer credit and as applicable to the engineering major, while others will accept the course for transfer credit only. The student is advised to check with the school to which he or she intends to transfer for specific applicability of this course to the engineering major.

4. Mechanical engineering programs will accept the course COSC 1436/1336 in place of ENGR 2304.

Prerequisite Flow Chart for Transfer to a Mechanical Engineering Program



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