

Transfer Model Curriculum

IMPORTANT

This TMC awaits the implementation of IGETC for STEM majors. It is provided here for informational purposes only. A template will not be available through the Chancellor's office until IGETC for STEM majors is fully approved.

CCC Major or Area of Emphasis: Chemistry

CSU Major or Majors: Chemistry

Total units 34 (all units are semester units)

Degree Type (indicate one): AA-T _____ OR AS-T X

"Core" Courses:

34 units

Title (units)	C-ID Designation	Rationale/GE applicability
General Chemistry I & II (10)	CHEM 120S	Required lower division preparation for major. Counts for areas B1 & B3
Organic Chemistry I & II (8)	CHEM 160S	Required for major.
Physics I (4)	PHYS 205	Required lower division preparation for major.
Physics II (4)	PHYS 210	
Calculus I (4)	MATH 210 or 221	Counts for area B4 Required lower division preparation for major.
Calculus II (4)	MATH 220 or 221	Required lower division preparation for major.

***Discipline Units 34**

*Presumes completion of a modified transfer GE pattern that leaves 6 units of non-STEM GE work for completion after transfer for STEM majors."

**Transfer Model Curriculum
Updated 12/4/12**

CCC Major: *Computer Science*

CSU Major or Majors: *Computer Science*

Total units: 28

(all units indicated are minimum semester units)

Degree Type : AS-T X

“Core” Courses –

Minimum Units 28 units (7 units double count as GE credit)

Title (typical units)	C-ID Designation	Rationale
Programming Concepts & Methodology I (CS1) Min. units 3	COMP 122	ACM/IEEE recommendation for a four semester introductory sequence
Programming Concepts & Methodology II (CS2) Min. units 3	COMP 132	
Computer Architecture & Organization Min. units 3	COMP 142	
Discrete Structures Min. units 3	COMP 152	
Single Variable Calculus I and II – Early Transcendentals (min. 8 units) or Single Variable Calculus I and II – Late Transcendentals (min. 8 units) or Single Variable Calculus Sequence (min. 8 units)	MATH 210 and 220 or MATH 211 and 221 or MATH 900S	Double count for GE B4
Calculus-Based Physics for Scientists and Engineers: A Min. Units 4	PHYS 205	Double count for GE B1 and B3
Calculus-Based Physics for Scientists and Engineers: B Min. Units 4	PHYS 210	

Summary of Feedback Including Issues and Concerns - Items of concern from the vetting process that were addressed included: Requirement of Physics and Calculus. The results were that after reviewing the curricular needs students will definitely need the Physics and Calculus to be successful. There was some concern whether this TMC followed the industry standards and after discussion it was agreed that it in fact mirrored ACM standard.

The requirement for discrete structures was a concern for the community colleges since many of them do not offer this course, but the CSUs said that they needed to have this to fulfill their courses and the community colleges stated that they might need to either write new courses or refer students to other community colleges for fulfillment of this requirement.

**Geography Transfer Model Curriculum
(Revised May 24, 2012) (Updated 12/4/12)**

CCC Major or Area of Emphasis: **Geography**

CSU Major or Majors: **Geography**

Total units **18-20** (all units are semester units)

Degree Type (indicate one): AA-T

Core courses are almost universally required for the major upon transfer.

Core Courses: 6-7 units

Title (units)	C-ID Designation	CSU GE
Introduction to Physical Geography (3) or	GEOG 110 or	Fulfills Area B1
Introduction to Physical Geography, with Lab (4) or	GEOG 115 or	Fulfills Area B1 & B3
Introduction to Physical Geography (3) and Physical Geography, Laboratory (1)	GEOG 110 and 111	Also fulfills B1 & B3
Introduction to Human Geography (3)	GEOG 120	Fulfills Area D

List A: Select 6-7 units from the following:

Physical Geography, Laboratory (if GEOG115 or 111 not taken above) (1)	GEOG 111	Area B3
World Regional Geography (3)	GEOG 125	Area D
California Geography (3)	GEOG 140	Area D
Introduction to Geographic Information Systems and Techniques, with Lab (2)	GEOG 155	
Map Interpretation and Analysis (2)	GEOG 150	
Introduction to Weather and Climate (3)	GEOG 130	Area B1
Regional Field Studies (1)	GEOG 160	

List B: Select 6 units from the following:

Introduction to Cultural Anthropology (3)	ANTH 120	Fulfills Area D
Physical Geology (3)	GEOL 100	Fulfills Area B1

Or any courses not selected above (from List A), any CSU transferable geography courses and/or other courses (in or outside the discipline) that are articulated as lower division major preparation for the geography major at a CSU.

May 13, 2011 (Updated 12/4/12) Geology Transfer Model Curriculum

CCC Major or Area of Emphasis: **Geology**

CSU Major or Majors: **Geology, Geophysics, Earth Science are possibilities**

Total units **26 minimum** (*all units are semester units*)

Degree Type: AS-T

“Core” Courses:

26 minimum units

Title (units)	C-ID Designation	Rationale
Physical Geology with Lab (4) OR Physical Geology (3) AND Physical Geology Laboratory (1)	GEOL 101 OR GEOL 100 AND GEOL 100L	Universally required; fulfills CSU Areas B1 and B3
Historical Geology with Lab (4) OR Historical Geology (3) AND Historical Geology Laboratory (1)	GEOL 111 OR GEOL 110 AND GEOL 110L	Universally required; fulfills CSU Areas B1 and B3
General Chemistry for Science Majors Sequence A (10)	CHEM 120S	Universally required; fulfills CSU Areas B1 and B3
Single Variable Calculus I – Early Transcendentals (4) and Single Variable Calculus II – Early Transcendentals (4) or Single Variable Calculus I – Late Transcendentals (4) and Single Variable Calculus II – Late Transcendentals (4) or Single Variable Calculus Sequence (8)	MATH 210 and 220 OR MATH 211 and 221 OR MATH 900	Universally required; fulfills CSU Area B4
Additional recommended preparation (not part of the TMC):		
RECOMMENDED WHERE AVAILABLE Calculus-Based Physics for Scientists and Engineers: A (4) and Calculus-Based Physics for Scientists and Engineers: B (4)	PHYS 205 and 210	.
RECOMMENDED FOR LIFE SCIENCE GENERAL EDUCATION REQUIREMENT Organismal Biology (4)	BIOL 140	Fulfills CSU Area B2
RECOMMENDED WHERE AVAILABLE Mineralogy (4)	GEOL 280	

The Mathematics Transfer Model Curriculum
 Approved March 24, 2011 – Updated January 4, 2013

CCC Major or Area of Emphasis: Mathematics

CSU Major or Majors: Mathematics

Degree Type: AS-T

Total Units: 18 units minimum

Required Core Courses (minimum of 12 units, all courses are universally required)

Title	Min Unit	C-ID Designation
Single Variable Calculus I – Early Transcendentals Or Single Variable Calculus I – Late Transcendentals	4	Math 210 or Math 211
Single Variable Calculus II – Early Transcendentals Or Single Variable Calculus II – Late Transcendentals	4	Math 220 or Math 221
Multivariable Calculus	4	Math 230

OR

Single Variable Calculus Sequence (2 sem/3 quarters) Or Single Variable Calculus I – Early Transcendentals And Single Variable Calculus II – Early Transcendentals Or Single Variable Calculus I – Late Transcendentals And Single Variable Calculus II – Late Transcendentals	≥8	Math 900S or Math 210 and Math 220 or Math 211 and Math 221
Multivariable Calculus	4	Math 230

OR

Single Variable and Multivariable Calculus Sequence (3 sem/4 quarters)	≥12	
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Choose a minimum of 6 units from below with at least 3 units from Group A.

Group A

Provides Depth of understanding in subject major

Ordinary Differential Equations	3	Math 240
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Linear Algebra	3	Math 250
OR		
Differential Equations and Linear Algebra	5	Math 910

Group B Expands application of discipline

Discrete Math	3	Math 160
Calculus-Based Physics for Scientists and Engineers: A (Any course articulated as preparation for the physics major at a CSU)	4	Physics 205
Mathematical Computing Systems	1	<i>See sample.</i>
Computer Programming	3	Any programming course that is articulated preparatory for the math major at a CSU.
Proof	3	<i>See sample.</i>
Introduction to Statistics	3	Math 110

NOTE: *All units are based on the semester and indicated minimum units. While 3 units are required from Group A, no units are required from Group B. The major must be a minimum of 18 semester units.*

Physics Transfer Model Curriculum (TMC)

May 13, 2011 (Updated 12/4/12)

CCC Major or Area of Emphasis: **Physics**

CSU Major or Majors: **Physics or Physics Education**

Degree Type: AS-T

Total units: **24 units** (all units are semester units, units are a minimum)

Required "Core" Courses: 24 units All core courses are universally required

Title	Minimum Units	C-ID Designation	Possible CSU GE
Calculus Based Physics for Scientists and Engineers: ABC or Calculus Based Physics for Scientists and Engineers: A and Calculus Based Physics for Scientists and Engineers: B and Calculus Based Physics for Scientists and Engineers: C	12	PHYS 200S or PHYS 205 and PHYS 210 and PHYS 215	B1 and B3 (3 units)

AND

Single Variable Calculus I – Early Transcendentals (4) Or Single Variable Calculus I – Late Transcendentals (4) Single Variable Calculus II – Early Transcendentals (4) Or Single Variable Calculus II – Late Transcendentals (4) Multivariable Calculus (4)	12	MATH 210 or MATH 211 MATH 220 or MATH 221, MATH 230	B4 (3 units)
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OR

Single Variable Calculus Sequence (8) and Multivariable Calculus (4)	12	MATH 900S and MATH 230	B4 (3 units)
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Transfer Model Curriculum (draft 1/24/2013)

CCC Major or Area of Emphasis: Biology

CSU Major or Majors: Biology

Total units: 32-37 (10 units double count for GE) *(all units are semester units)*

Degree Type: AS-T

Required “Core” Courses

8-12 units of Biology (use your transfer institution requirements - note: depending on the articulation agreement, not all units may meet the Biology Baccalaureate)

Title (units)	C-ID Designation	Rationale
Cell and Molecular Biology (4 units)	BIOL 190	Course meets requirements for GE areas B2 and B3
AND EITHER		
OPTION 1: Organismal Biology (4 units)	BIOL 140	Course meets requirements for GE areas B2 and B3
OR		
OPTION 2: Organismal Biology, Ecology and Evolution (8 units) (contains content in Zoology, Ecology, Botany and Evolution)	BIOL130S	Course meets requirements for GE areas B2 and B3

AND 21-22 units of Physical Science and Mathematics

General Chemistry for Science Majors Sequence A (10 units)	CHEM 120S	Course meets requirements for GE areas B1 and B3
Calculus for Life and Social Sciences I (3 units) or Single Variable Calculus I – Early Transcendentals (4 units) or Single Variable Calculus I – Late Transcendentals (4 units)	See example or MATH 210 or MATH 211	Course meets requirements for GE area B4
Physics: Algebra/Trigonometry-Based Physics A and B (8 units) or	PHYS 105 and 110 or	Course meets requirements for GE areas B1 and B3

Calculus-Based Physics for Scientists and Engineers: A and B (8 units) or Algebra/Trigonometry-Based Physics:AB or Calculus-Based Physics for Scientists and Engineers: ABC (min. 8 units)	PHYS 205 and 210 or PHYS 100S or 200S	
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List A, select a minimum of one (1) additional course (use your transfer institution requirements as a guideline in choosing this course):

Calculus for Life and Social Sciences II (3 units) or Single Variable Calculus II – Early Transcendentals (4 units) or Single Variable Calculus II – Late Transcendentals (4 units)	See example or MATH 220 or MATH 221	
<u>OR</u>		
Biostatistics (min. 3 units)	See example	
<u>OR</u>		
An additional Biology course that meets a specific major requirement (min. 3 units)	See examples	
<u>OR</u>		
Organic Chemistry for Science Majors I, with Lab (4 units)	CHEM 150	

It is highly recommended that counselors at community colleges discuss other possible courses that are part of major preparation at a local CSU campus and encourage students to take some of these additional courses prior to transfer.

Students should:

1. contact their local transfer institution for the specific transfer requirements and grade requirements.
2. complete the transfer pattern of biology for majors at their community college.
3. complete any series once it is begun; students are advised to complete the series at one institution.
4. Complete CSU certification for Area A

DRAFT MODEL CURRICULUM: 11/9/2012

CCC Major or Area of Emphasis: Engineering (EE and Computer Engr)

CSU Major or Majors: Electrical or Computer Engineering

Total units 35 minimum (semester units)

Unit values for each course varies at different colleges, each CCC AS will almost surely have significantly more units than these minimum values, but each CCC AS should match these courses.

Degree Type (indicate one): AA _____ OR AS_x_____ (Not an AS-T)

Required Engineering "Core" Courses: 7 units

Course Title	C-ID Designation	Rationale
Introduction to Engineering (1) ¹	ENGR 110	
Circuit Analysis (3)	ENGR 260	
Introduction to Programming Concepts and Methodologies for Engineers (3)	ENGR 120	
Other ³	??	

Required Science Courses: 13 units

Calculus-Based Physics for Scientists and Engineers: A – Mechanics (4) ²	PHYS 205	Areas B1 and B3
Calculus-Based Physics for Scientists and Engineers: B– E&M (4) ²	PHYS 210	
General Chemistry for Science Majors I, with Lab (5) ⁴	CHEM 110	

Required Math Courses: 15 units

Single Variable Calculus I Early Transcendentals (4) or Single Variable Calculus I Late Transcendentals (4)	MATH 210 or MATH 211	Area B4
Single Variable Calculus II Early Transcendentals (4) or Single Variable Calculus II Late Transcendentals (4)	MATH 220 or MATH 221	
Multivariable Calculus (4)	MATH 230	
Ordinary Differential Equations (3)	MATH 240	

Notes:

1 – Community Colleges offer *Intro to Engineering* ranging from a total of 1 to 4 units. Higher unit courses are usually due to a lab component. Flexibility over units, lab components, and other local differences shall be accepted as long as C-ID course requirements are satisfied.

2 - Each of the following floating topics must be covered in Physics C-ID 205 and/or Physics C-ID 210:

1. Simple Harmonic Motion
2. Mechanical Waves
3. Properties of EM Waves
4. Fluids
5. Laws of Thermodynamics
 - a. Heat Engines
 - b. Kinetic Theory
 - c. Entropy

3 – No Consensus among Engineering FDRG members regarding inclusion of Digital Design as required engineering core. Discussion and lack of agreement also around including a Computer Architecture course. No Consensus that there should be at least one engineering course for each semester in a two-year program.

4- C-ID CHEM 110 is the first part in a two course sequence. From C-ID CHEM 110 it is not conclusive as to what is covered in the first semester. Therefore, FDRG assumed C-ID 110 CHEM would most likely be similar to the typical first semester college chemistry course (i.e. CHEM 1A).

DRAFT MODEL CURRICULUM: 11/9/2012

CCC Major or Area of Emphasis: Engineering (Mech., Civil, Aero, Manuf.)

CSU Major or Majors: Mechanical, Civil, Aero., or Manuf. Engineering

Total units 51 minimum (semester units)

Unit values for each course varies at different colleges, each CCC AS will almost surely have significantly more units than these minimum values, but each CCC AS should match these courses.

Degree Type (indicate one): AA _____ OR AS _x_____ (not AS-T)

Required Engineering “Core” Courses: 23 units

Course Title	C-ID Designation	Rationale
Introduction to Engineering (1) ¹	ENGR 110	
Engineering Graphics (3)	ENGR 150	
Statics (3)	ENGR 130	
Materials Science and Engineering (4)	ENGR 140	
Introduction to Programming Concepts and Methodologies for Engineers (3)	ENGR 120	
Circuit Analysis (3)	ENGR 260	
Strength of Materials (3)	ENGR 240	
Dynamics (3)	ENGR 230	
Surveying Note: Recommended for CE if available. (3)	ENGR 180	
Two of the above courses must contain a lab.		

Required Science Courses: 13 units

Calculus-Based Physics for Scientists and Engineers: A – Mechanics (4) ²	PHYS 205	Area B1 and B3
Calculus-Based Physics for Scientists and Engineers: B – E&M (4) ²	PHYS 210	
General Chemistry for Science Majors I, with Lab – (5) ³	CHEM 110	

Required Math Courses: 15 units

Single Variable Calculus I Early Transcendentals (4) or Single Variable Calculus I Late Transcendentals (4)	MATH 210 or MATH 211	Area B4
Single Variable Calculus II Early Transcendentals or Single Variable Calculus II Late Transcendentals(4)	MATH 220 or MATH 221	
Multivariable Calculus (4)	MATH 230	
Ordinary Differential Equations (3)	MATH 240	

Notes:

1 – Community Colleges offer *Intro to Engineering* ranging from a total of 1 to 4 units. Higher unit courses are usually due to a lab component. Some Four-year institution courses offer an introduction to only one engineering discipline. Flexibility over units, lab components, and other local differences shall be accepted as long as C-ID course requirements are satisfied.

2 - Each of the following floating topics must be covered in C-IDs PHYS 205 and/or PHYS 210:

1. Simple Harmonic Motion
2. Mechanical Waves
3. Properties of EM Waves
4. Fluids
5. Laws of Thermodynamics: Heat Engines, Kinetic Theory, Entropy

3- CHEM C-ID 110 is the first part in a two course sequence. Descriptor CHEM 110 it is not conclusive as to what is covered

in the first semester. Therefore Engineering FDRG assumed CHEM C-ID 110 would likely be similar to the first semester college chemistry course (i.e. Chem 1A) offered at most colleges.