Texas A&M University – College of Engineering – Department of Computer Science & Engineering
Undergraduate Degree Plan in Computer Engineering − Computer Science Track (BS-CECN)
Valid for Catalog 143, 2020-21

COMPUTER SCIENCE [1]
CSCE 121 (4)
222 (3)
221 (4)
350 (4) [8]
313 (4)
315 (3)
462 (3)
481 (1) [2]
483 (3)

ELECTRICAL ENGR
ECEN 248 (4)
214 (4)
314 (3)
325 (4)
454 (3)

ENGINEERING
ENGR 102 (2)
216 (2)
217 (2)

ENGR ELECTIVE
_____ (3) [7]

MATH & STAT
MATH 151 (4)
152 (4)
251 (3)
308 (3)
311 (3)

STAT 211 (3)
or ECEN 303

SCIENCES
CHEM 107 (3)
117 (1)
PHYS 206 (3)
207 (3)

COMMUNICATION
ENGL 103 (3)
or ENGL 104
ENGL 210 (3)
or COMM 205 *or* 243

AREA ELECTIVES (tracks)
Track 1: _____
_____ (3) [7]
_____ (3) [7]
Track 2: _____
_____ (3) [7]

AREA ELECTIVES (open)
_____ (3) [7]
_____ (3) [7]

LANG, PHIL & CULT
_____ (3) [4,5]

CREATIVE ARTS ELECTIVE
_____ (3) [4,5]

SOC & BEHAV SCI ELECTIVE
_____ (3) [4,5]

AMERICAN HISTORY
HIST ____ (3) [4,5]
HIST ____ (3) [4,5]

GOVT/POLITICAL SCI
POLS 206 (3) [6]
POLS 207 (3) [6]

INTERNATIONAL AND CULTURAL DIVERSITY
_____ (3) [3]

CULTURAL DISCOURSE
_____ (3) [3]

HIGH IMPACT EXPERIENCE
CSCE 399 (0) [9]

TOTAL HOURS 128

NOTES:

1. Courses inside box must be completed with grade of C or better.
2. CSCE 481 should be taken in the student's Junior year.
3. International and Cultural Diversity (ICD) and Cultural Discourse (CD) requirements may be met by courses satisfying the creative arts, social and behavioral sciences, history, and the language, philosophy and culture requirements if they are also on the approved list of ICD and CD courses. See icd.tamu.edu.
4. See http://core.tamu.edu/ for classes.
5. At least two of these classes should also be ICD and CD if possible.
6. Additional courses may be approved in the future for this requirement. See core.tamu.edu.
7. List of approved Engineering electives and Area electives available on our website.
8. ECEN 350 can be taken in place of CSCE 350 since they are cross-listed.
9. All students are required to complete a high-impact experience. See CSCE advising for information.

Instructions

These instructions are to be used as a guide in preparing the Departmental of Computer Science and Engineering (CSCE) Degree Plan Form for the Bachelor's Degree in Computer Engineering – Computer Science track (BS-CECN). A degree plan is required to be filed in Howdy by the student's third semester at the University.

Degree audits are produced by the Registrar's Office and can be viewed on-line at howdy.tamu.edu. The audit should be carefully reviewed by the student with his/her advisor, to determine the progress toward a degree.

Total Hours Required

The total hours on the degree plan must be at least 128. Note that the 128 hours **do not** include the International and Cultural Diversity (ICD) and Cultural Discourse (CD) classes. This is because these classes can be used to satisfy the ICD or CD requirement and another requirement on the degree plan simultaneously; see the advising office for a list of the courses that can be used in this way. This is the only place where one course can be used in two places on the degree plan.

Please note that the **128 total hours do not include a required foreign language**. It is the student's responsibility to meet the University's foreign language requirement.

Comments and Observations

Before visiting the Undergraduate Advisor about a degree plan, the student should make as many decisions as possible. One problem area is transfer credits. It is sometimes difficult to know which courses may be used. Efforts are made to allow 'reasonable' substitutions. A student **must** submit a copy of his/her transcript evaluation and a completed substitution form along with the degree plan form if credit for transferred courses is desired. To approve courses that transfer "By Title" to TAMU documentation of the courses content, such as a catalog description, will be required.

It is the **student's responsibility** to have a degree plan meet minimum requirements. Everyone involved will check, but if a graduating senior's degree plan is not acceptable (e.g., only 127 hours), the student will not graduate until the problems have been corrected.

Required Courses

Take all courses listed on the Degree Plan. **All courses inside the boxes must be passed with a grade of "C" or better.**

Engineering Technical Elective

A three (3) hour Engineering Technical Elective course from the following list must be completed.

- MEEN 221, Statics and Particle Dynamics (3 Cr.)
- MEEN 222/MSEN 222, Materials Science (3 Cr.)
- MEEN 315, Principles of Thermodynamics (3 Cr.)
- MATH 414, Fourier Series and Wavelets (3 Cr.)
- MATH 442, Mathematical Modeling (3 Cr.)
- MATH 471, Communications and Cryptography II (3 Cr.)
- PHYS 221, Optics and Thermal Physics (3 Cr.)
- PHYS 222, Modern Physics for Engineers (3 Cr.)

Click on the links above to view the course information including prerequisites required.

Computer Engineering Area Electives

Fifteen (15) hours of CE area electives are required (5 courses). In meeting this requirement, students are required to take at least two courses from the same area and at least one from a different area listed below. The fourth and fifth courses can be chosen from any area. The fifth course can be also be chosen from approved CSCE, ECEN, or ENGR 385/270/470 classes, as described at the end of the section.

Area 1. Communications and Networks
CSCE 463 (3), Computer Networks
CSCE 464 (3), Wireless and Mobile Systems
#CSCE 465 (3), Computer and Network Security
ECEN 423 (3), Computer and Wireless Networks
ECEN 424 (3), Fundamentals of Networking
#ECEN 434 (3), Optimization for Electrical and Computer Engineering
#ECEN 455 (4), Digital Communications
#ECEN 466/CYBR 466 (3), Unconditionally Secure Electronics
ECEN 478 (3), Wireless Communications
#MATH 470 (3), Comm. & Cryptography

Area 2. Information
CSCE 310 (3), Database systems
CSCE 320/STAT 335 (3), Principles of Data Science
CSCE 421/STAT 421 (3), Machine Learning
CSCE 436 (3), Computer Human Interaction
CSCE 438 (3), Distributed Objects
CSCE 444 (3), Structures of Interactive Info.
CSCE 470 (3), Information Storage & Retrieval
#ECEN 455 (3), Digital Communications
#ECEN 446 (3), Information Theory, Inference and Learning Algorithms

Area 3. Robotics/Embedded Systems
CSCE 420 (3), Artificial Intelligence
CSCE 452 (3), Robotics
CSCE 456 (4), Real-time Computing
ECEN 420 (3), Linear Control systems
ECEN 422 (3), Control Engineering and Design Methodology

Area 4. Signal/Image Processing & Graphics
CSCE 441 (3), Computer Graphics
CSCE 443 (3), Game Development
ECEN 444 (3), Digital Signal Processing
ECEN 447 (4), Digital Image Processing
ECEN 448 (3), Real time DSP

Area 5. Software and Systems
CSCE 314 (3), Programming Languages
CSCE 410 (3), Advanced OS
CSCE 411 (3), Design and Analysis of Algorithms
CSCE 412 (3), Cloud Computing
#CSCE 416/ECEN 416 (3), Hardware Design Verification
CSCE 429 (3), Software Development, Globalization and Culture Abroad
CSCE 430 (3), Problem Solving Programming Strategies
CSCE 431 (3), Software Engineering
CSCE 434 (3), Compiler Design
CSCE 435 (3), Parallel Computing
CSCE 442 (3), Scientific Programming
#CSCE 451 (3), Software Reverse Engineering
#CSCE 469/ECEN 469 (3), Advanced Computer Architecture
#ECEN 434 (3), Optimization for Electrical and Computer Engineering

Area 6. VLSI
#CSCE 416/ECEN 416 (3), Hardware Design Verification
#CSCE 469/ECEN 469 (3), Advanced Computer Architecture
ECEN 326 (4), Electronic Circuits
ECEN 468 (4), Advanced Logic Design
ECEN 474 (4), VLSI Circuit Design
ECEN 475 (4), Intro. to VLSI Sys. Design

Area 7. Security
#CSCE 451 (3), Software Reverse Engineering
#CSCE 465 (3), Computer and Network Security
#ECEN 466/CYBR 466 (3), Unconditionally Secure Electronics
#MATH 470 (3), Comm. & Cryptography

#Courses shown in multiple areas can be used in only one place on your degree plan.
Click on CSCE, ECEN, and MATH links to view the course information including prerequisites required for these classes.

The fifth course (3 hours) can be chosen from approved CSCE, ECEN, or ENGR 385/270/470 classes:

- Computer Science and Engineering Courses (CSCE): Take any 300+ or 400+ courses from the Computer Science and Engineering Department that are not included in the required courses list. Students wishing to

use CSCE 485, CSCE 489, or CSCE 491 must receive approval from the undergraduate advisor (CSCE dept.).

- Electrical and Computer Engineering Courses (ECEN): Take ECEN 322, ECEN 338, 351, 370 or any ECEN 400+ course except for those already required (e.g., ECEN 454) or equivalent to one required (e.g., ECEN 449). Students wishing to take ECEN 485, ECEN 489, or ECEN 491 must receive approval from the CSCE dept. undergraduate advisor.
- Other Courses: ENGR 385 (co-op) credits and EPICS (ENGR 270 and 470) credits may be used to fulfill CE area elective requirements. Excess credits above 3 cannot be used. Students are allowed to combine ENGR 385 credits with EPICS course credits; see CSCE advising for details.

Note that no more than 3 hours from CSCE/ECEN 485; CSCE/ECEN 491; and ENGR 385, 270, 470 combined are allowed to fulfill the area elective requirement.

High Impact Experience

All students must complete a high-impact experience in order to graduate. These are often referred to in the college as ENGR[X] classes. They will generally include classes such as independent research, study abroad, and co-op experience. The list of specific items that can satisfy this requirement as well as indication of any additional documentation required will be available from the CSCE advising office.

University Core Curriculum Courses

Refer to core.tamu.edu for information on the core curriculum courses. The following degree-specific adjustments to the core curriculum should be noted:

- **Communication**: the Communication requirement must be filled by taking two courses:
  - ENGL 103 or ENGL 104
  - One of the following: ENGL 210, COMM 205, COMM 243
- **Mathematics**: the Mathematics requirements must be filled by the courses specified in the degree plan
- **Life and Physical Sciences**: the requirement must be filled by the courses specified in the degree plan.

The University's core curriculum requirements are unchanged in the following areas: Language, Philosophy and Culture; Creative Arts; American History; Government/Political Science; and Social and Behavioral Sciences. The International and Cultural Diversity and Cultural Discourse requirements are unchanged from the University's requirements. Follow the University's instructions in these areas.

Foreign Language Requirement

Proficiency in a foreign language is required to graduate from Texas A&M University. This requirement can be met by:

- Completing two units (two full years) of high school course work in the same foreign language.
- Completing two semesters (one full year) of course work at the college level in the same foreign language, or
- Demonstrating proficiency in a foreign language by examination. See the undergraduate catalog for additional requirements under graduation requirements and Foreign Language.

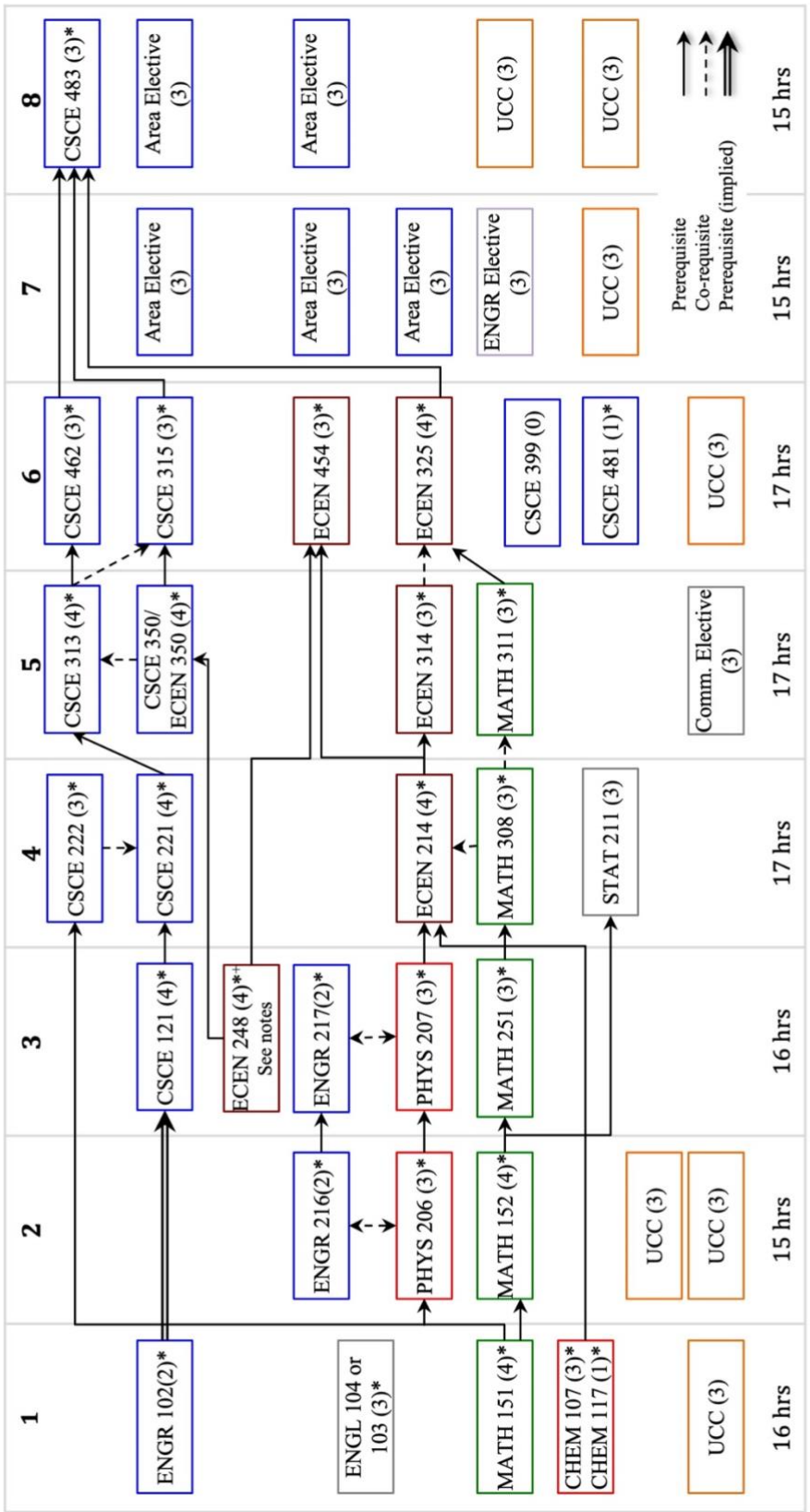
Course Sequence

FRESHMAN YEAR					
First Semester	**(Th-Pr)**	**Cr**	**Second Semester**	**(Th-Pr)**	**Cr**
CHEM 107 Gen. Chem. for Eng. Students	(3-0)	3	ENGR 216 Experimental Physics and Engineering Lab II: Mechanics	(1-3)	2
CHEM 117 Gen. Chem. for Eng. Stu. Lab	(0-3)	1	MATH 152 Engineering Mathematics II	(3-2)	4
ENGL 103 Introduction to Rhetoric and Composition or ENGL 104 Composition and Rhetoric	(3-0)	3	PHYS 206 Newtonian Mechanics for Engineering and Science	(3-0)	3
ENGR 102 Engineering Lab I - Computation	(1-3)	2	University Core Curriculum elective[1]		6
MATH 151 Engineering Mathematics I	(3-2)	4			
University Core Curriculum elective[1]		3			
		16			**15**
SOPHOMORE YEAR					
First Semester			**Second Semester**		
CSCE 121 Intro. Prog. Design and Concepts	(3-2)	4	CSCE 221 Data Struct. and Algo.	(3-2)	4
ECEN 248 Digital Sys. Design	(3-3)	4	CSCE 222 Discrete Struct. for Computing	(3-0)	3
ENGR 217 Experimental Physics and Engineering Lab III: Electricity and Magnetism	(1-3)	2	ECEN 214 Electrical Circuit Theory	(3-3)	4
MATH 251 Engineering Mathematics III	(3-0)	3	MATH 308 Differential Equations	(3-0)	3
PHYS 207 Electricity and Magnetism for Engineering and Science	(3-0)	3	STAT 211 Principles of Statistics I	(3-0)	3
		16			**17**
JUNIOR YEAR					
First Semester			**Second Semester**		
CSCE 313 Intro. to Computer Systems	(3-2)	4	CSCE 315 Programming Studio	(2-2)	3
CSCE 350 Comp. Arch and Design	(3-3)	4	CSCE 462 Microcomputer Sys	(2-2)	3
ECEN 314 Signals and Systems	(3-0)	3	CSCE 481 Seminar	(0-2)	1
MATH 311 Topics in Applied Math I	(3-0)	3	ECEN 325 Electronics	(3-4)	4
Communication elective[4]	(3-0)	3	ECEN 454 Digital Int. Circuit Des	(2-2)	3
			University Core Curriculum elective[1]	(3-0)	3
			CSCE 399 High Impact Experience		0
		17			**17**
SENIOR YEAR					
First Semester			**Second Semester**		
University Core Curriculum elective[1]		3	CSCE 483 Computer Sys. Design	(1-6)	3
ENGR Elective[3]		3	Area elective[2]		3
Area elective[2]		3	Area elective[2]		3
Area elective[2]		3	University Core Curriculum elective[1]		3
Area elective[2]		3	University Core Curriculum elective[1]		3
		15			**15**

NOTES: Grade Requirements: A grade of C or better is required for each of the following courses: CSCE 121, CSCE 221, CSCE 222, CSCE 313, CSCE 315, CSCE 350, CSCE 462, CSCE 481, CSCE 483; ENGR 102, ENGR 216, ENGR 217; ECEN 214, ECEN 248, ECEN 314, ECEN 325, ECEN 454; MATH 151, MATH 152, MATH 251, MATH 308, MATH 311; CHEM 107/CHEM 117, PHYS 206, PHYS 207; ENGL 104.

1. To be selected from the University Core Curriculum. Of the 21 hours shown as University Core Curriculum electives, 3 must be from creative arts, 3 from social and behavioral sciences, 3 from language, philosophy and culture, 6 from American history, and 6 from Government and Political Science. The required 3 hours from international and cultural diversity and 3 hours from cultural discourse may be met by courses satisfying the creative arts, social and behavioral sciences, history, and the language, philosophy and culture requirements if they are also on the approved list of international and cultural diversity and cultural discourse courses.
2. 15 hours of area electives chosen in consultation with academic advisor.
3. Three hours of coursework to be approved by student's advisor.
4. Select from ENGL 210 or COMM 205 or 243.

Course Sequence for BS-CECN, Catalog 142 (2019-20)



NOTES

- Courses marked with an asterisk (*) must be completed with grade of C or better.
- +ECEN 248 prerequisites: PHYS 206, MATH 152
- CSCE 481 should be taken in the student's junior year.
- UCC: University core curriculum elective; Of the 21 hrs of UCC, 3 must be from Creative Arts, 3 from Social and Behavioral Sciences, 3 from Language, Philosophy and Culture, 6 from American History, and 6 from Government and Political Science.
- Comm. Elective: one of ENGL 210 or COMM 205 or COMM 243
- ENGR Elective: 3 hours of coursework to be approved by student's advisor .
- **Additional Requirements:** 3 hrs of International and Cultural Diversity and 3 hrs of Cultural Discourse courses (can be used to satisfy another requirement).