

Texas A&M University -- College of Engineering -- Department of Computer Science & Engineering  
Undergraduate Degree Plan in **Computer Science** (CPSC)

Valid for Fall 2016 Catalog (139)

<p><b>COMPUTER SCIENCE</b></p> <p>CSCE 181 (1) 121 (4) 222 (3) 221 (4) 312 (4) 314 (3) 313 (4) 315 (3) 481 (1) <sup>2</sup> 482 (3)</p> <p><b>TECH ELEC (21 HRS)</b></p> <p>CSCE 411 (3)</p> <p><i>3 CSCE courses; one from systems, software, info. tracks (see next page)</i></p> <p>_____ (9)</p> <p><i>3 additional CSCE courses from upper level tracks</i></p> <p>_____ (9)</p> <p><b>EMPHASIS AREA</b> (outside CSCE electives) <i>12 hours required; requires approval of advising office</i></p> <p>_____ (3) _____ (3) _____ (3) _____ (3)</p>	<p><b>MATH &amp; STAT</b></p> <p>MATH 151 (4) 152 (4) 304 (3) MATH _____ (3) 251 or 302 or 308</p> <p>STAT 211 (3)</p> <p><b>ENGINEERING</b></p> <p>ENGR 111 (2) ENGR 112 (2)</p> <p><b>SCIENCE SEQUENCE</b></p> <p>_____ (4) _____ (4)</p> <p><b>ADDITIONAL SCIENCE</b></p> <p>_____ (4) _____ (3)</p> <p><b>AMERICAN HISTORY</b></p> <p>HIST _____ (3) <sup>5,6</sup> HIST _____ (3) <sup>5,6</sup></p> <p><b>GOVT/POLITICAL SCI</b></p> <p>POLS 206 (3) <sup>8</sup> POLS 207 (3) <sup>8</sup></p>	<p><b>COMMUNICATION</b></p> <p>ENGL 104 (3)</p> <p>_____ (3)</p> <p><i>One of: ENGL 210, COMM 203, or COMM 205</i></p> <p><b>LANG, PHIL &amp; CULT</b></p> <p>ENGR/ 482 (3) <sup>7</sup> PHIL _____</p> <p><b>CREATIVE ARTS ELECTIVE</b></p> <p>_____ (3) <sup>5,6</sup></p> <p><b>SOC &amp; BEHAV SCI ELECTIVE</b></p> <p>_____ (3) <sup>5,6</sup></p> <p><b>INTERNATIONAL AND CULTURAL DIVERSITY</b></p> <p>_____ (3) <sup>4</sup> _____ (3) <sup>4</sup></p> <p><b>TOTAL HOURS</b>      <b>126</b></p>
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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
4. Courses taken for ICD credit may be courses taken to meet another requirement
5. See <http://core.tamu.edu/> for classes.
6. At least two of these classes should also be ICD if possible.
7. Writing intensive section of ENGR 482 required; transfer courses are unlikely to meet this requirement.
8. Additional courses may be approved in the future for this requirement. See [core.tamu.edu](http://core.tamu.edu).

## CPSC Upper Level Track

### Track 1: Algorithms and Theory

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<input checked="" type="checkbox"/>	CSCE 411	(prereq 221, 222)_____	Analysis of Algorithms
<input type="checkbox"/>	CSCE 433	(prereq 315)_____	Formal Languages and Automata
<input type="checkbox"/>	CSCE 440	(prereq 315)_____	Quantum Algorithms
<input type="checkbox"/>	CSCE 442 <sup>#</sup>	(prereq 221; coreq MATH 304 or 308)_____	Scientific Programming

### Track 2: Systems

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<input type="checkbox"/>	CSCE 410 <sup>***</sup>	(prereq 313, 315)_____	Operating Systems
<input type="checkbox"/>	CSCE 456 <sup>#</sup>	(prereq 313, MATH 152)_____	Real-Time Computing
<input type="checkbox"/>	CSCE 462	(prereq 313)_____	Microcomputer Systems
<input type="checkbox"/>	CSCE 463	(planned prereq 313)_____	Networks & Distributed Prog.
<input type="checkbox"/>	CSCE 464	(prereq 313)_____	Wireless and Mobile Systems
<input type="checkbox"/>	CSCE 465	(prereq 313 and 315)_____	Computer & Network Security
<input type="checkbox"/>	CSCE 469 <sup>#</sup>	(prereq 350)_____	Advanced Computer Architecture

### Track 3: Software

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<input type="checkbox"/>	CSCE 431	(prereq 315)_____	Software Engineering
<input type="checkbox"/>	CSCE 434	(prereq 315)_____	Compiler Design
<input type="checkbox"/>	CSCE 435	(planned prereq 313)_____	Parallel Computing
<input type="checkbox"/>	CSCE 438	(prereq 315)_____	Distributed Objects Programming
<input type="checkbox"/>	CSCE 451	(prereq 313)_____	Software Reverse Engineering

### Track 4: Information and intelligent Systems

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<input type="checkbox"/>	CSCE 310 <sup>**</sup>	(prereq 221)_____	Database Systems
<input type="checkbox"/>	CSCE 420	(planned prereq 221)_____	Artificial Intelligence
<input type="checkbox"/>	CSCE 436	(planned coreq 315)_____	Computer-Human Interaction
<input type="checkbox"/>	CSCE 441	(planned prereq 221)_____	Computer Graphics
<input type="checkbox"/>	CSCE 443	(prereq 441)_____	Game Development
<input type="checkbox"/>	CSCE 444	(prereq 315)_____	Structures of Interactive Information
<input type="checkbox"/>	CSCE 445	(prereq 221)_____	Computers and New Media
<input type="checkbox"/>	CSCE 452	(prereq 315)_____	Robotics and Spatial Intelligence
<input type="checkbox"/>	CSCE 470	(prereq 315)_____	Information Storage and Retrieval

#### Notes:

- Students must take CSCE 411 and six additional courses from the list above.
- At least one course from each track must be taken.
- The remaining three courses can be from any track.
- The seventh course also may be from outside of the track for approved options. Options for the seventh course include CSCE 491 (independent research) or co-op/EPICS credits (co-op: ENGR 385; EPICS: ENGR 270, or 470). If co-op/EPICS credits are used exactly 3 credits are required. Fewer than 3 cannot be used and excess credits above 3 cannot be used.
- The required course CSCE 411 (Analysis of Algorithms) counts as one of the courses from the Algorithms and Theory track.
- Prerequisites will still prevail for all courses. Consult the undergraduate catalog for details.
- Approved special topics course (CSCE 489) and graduate courses may be used to fulfill these requirements; each such course will be classified with respect to the tracks; see advisor.
- <sup>\*\*\*</sup>CSCE 410 taken before Spring 2009 will not fill this requirement.
- <sup>#</sup>This course is not being taught on a regular basis.

**Recommended Sequence of Courses**

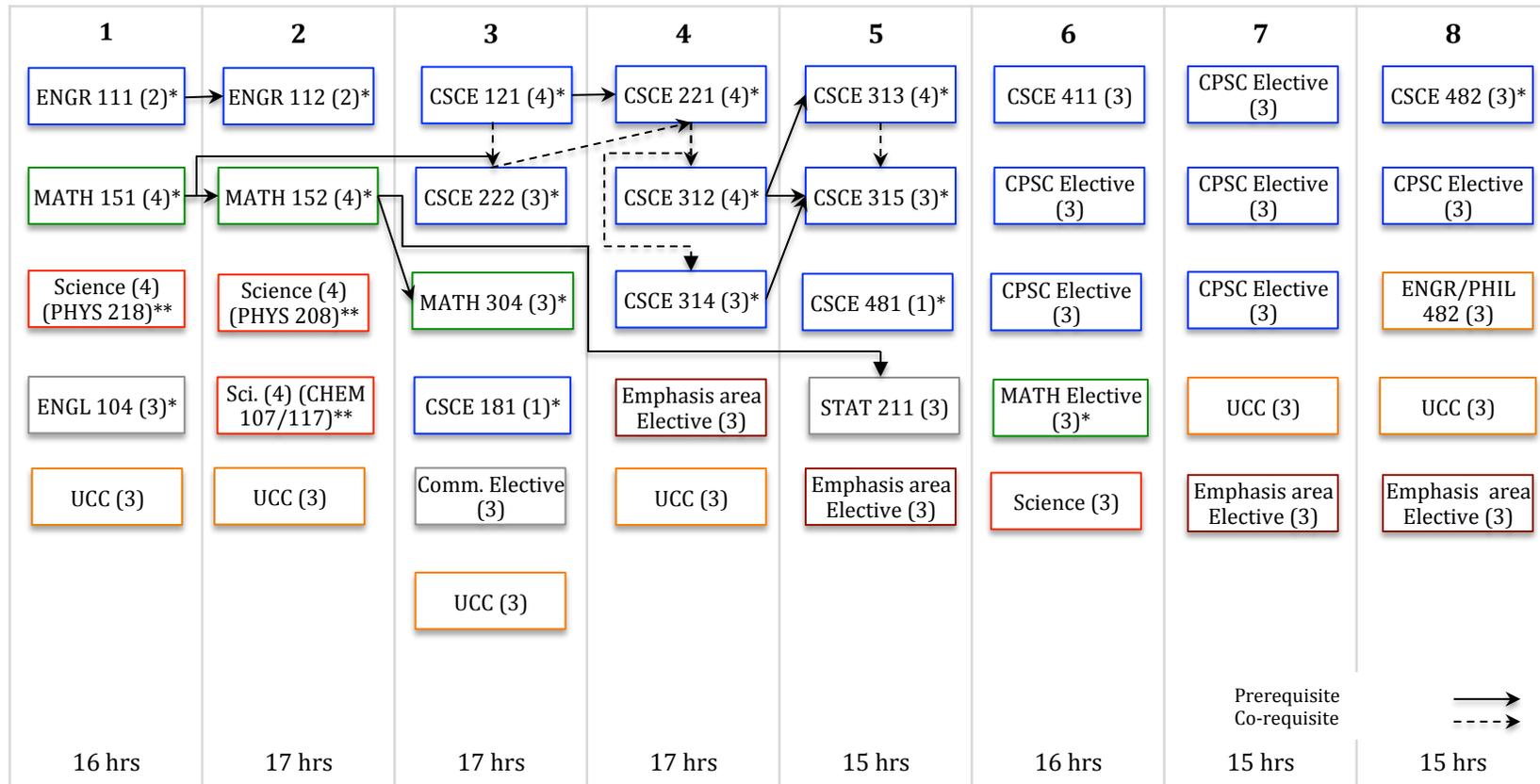
<b>FIRST YEAR (Common Engineering First Year)</b>			
<b>Semester 1</b>		<b>Semester 2</b>	
ENGR 111	2	ENGR 112	2
MATH 151	4	MATH 152	4
PHYS 218	4	PHYS 208	4
ENGL 104	3	CHEM 107/117	4
UCC Elective	3	UCC Elective	3
<b>TOTAL</b>	<b>16</b>	<b>TOTAL</b>	<b>17</b>

<b>SECOND YEAR</b>			
<b>Semester 3</b>		<b>Semester 4</b>	
CSCE 121	4	CSCE 221	4
CSCE 222	3	CSCE 312	4
CSCE 181	1	CSCE 314	3
MATH 304	3	Concentration Elective	3
Communications Elective	3	UCC Elective	3
UCC Elective	3	<b>TOTAL</b>	<b>17</b>
<b>TOTAL</b>	<b>17</b>		

<b>THIRD YEAR</b>			
<b>Semester 5</b>		<b>Semester 6</b>	
CSCE 313	4	CSCE 411	3
CSCE 315	3	Computer Science Elective	3
CSCE 481	1	Computer Science Elective	3
STAT 211	3	MATH Elective	3
Concentration Elective	3	Science Elective	3
<b>TOTAL</b>	<b>14</b>	<b>TOTAL</b>	<b>15</b>

<b>FOURTH YEAR</b>			
<b>Semester 7</b>		<b>Semester 8</b>	
Computer Science Elective	3	CSCE 482	3
Computer Science Elective	3	Computer Science Elective	3
Computer Science Elective	3	ENGR/PHIL 482	3
UCC Elective	3	UCC Elective	3
Concentration Elective	3	Concentration Elective	3
<b>TOTAL</b>	<b>15</b>	<b>TOTAL</b>	<b>15</b>

Undergraduate Degree Plan in **Computer Science (CPSC)**, Catalog 139 (2016-2017)  
 Department of Computer Science and Engineering, College of Engineering, Texas A&M University



**NOTES**

- Courses marked with an asterisk (\*) must be completed with grade of C or better. An 8 hour pair of science electives (from those marked with \*\*) must be completed with a grade of C or better. See the instructions for further details on science classes.
- CSCE 481 should be taken in the student's junior year.
- Writing intensive section of ENGR 482 required; transfer courses are unlikely to qualify and must be approved.
- UCC: University core curriculum elective; 3 must be from creative arts, 3 from social and behavioral sciences, 6 from American history, and 6 from Government and Political Science.

- *Comm. Elective*: one of ENGL 210 or COMM 203 or COMM 205
- Prerequisites and co-requisites are only shown for selected key classes. Consult the catalog for full details. Prerequisites and co-requisites for some CSCE classes are not yet reflected in the catalog.
- *Emphasis area electives*: The emphasis area should be chosen only after consultation with a departmental advisor who will help the student arrange a program appropriate to his or her plans following graduation. Students should file a degree plan before taking these courses to ensure their use in the degree plan.
- **Additional Requirements**: 6 hours of International and Cultural Diversity courses (can be used to satisfy another requirement).

# DEGREE PLAN INSTRUCTIONS FOR COMPUTER SCIENCE MAJORS

2016-2017 Academic year

The instructions contained in this packet are to be used as a guide in preparing the Department of Computer Science and Engineering (CSCE) Degree Plan Form for the Bachelor's Degree in Computer Science (CPSC). 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](http://howdy.tamu.edu). The audits should be carefully reviewed by the student with his/her advisor, to determine the progress toward a degree.

## Hours & Technical Electives

The total hours on the degree plan must be at least **126**. Note that the 126 hours **does not** include the two International and Cultural Diversity courses. This is because these classes can be used to satisfy both the International and Cultural Diversity requirement **and** another requirement on the degree plan—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 126 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, in that 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 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 125 hours), the student will not graduate.

## Computer Science Courses

Thirty (30) hours of CSCE classes are required **to be passed with a grade of at least "C"** as follows: **CSCE 121-4, 181-1, 221-4, 222-3, 312-4, 313-4, 314-3, 315-3, 481-1, and 482-3.** **CSCE 411-3** is also required for all majors but does not require C or better. Upper division electives follow a track system; see the separate description. Other non-CSCE courses in the degree plan also require grades of C or better (14 hours of Math; 8 hours of science; ENGL 104).

Please note that courses are not necessarily taken in strict numerical order. For example, CSCE 221 requires CSCE 222 as a co-requisite; CSCE 312 and 314 are generally taken together in the semester preceding CSCE 313 and 315.

## Emphasis Area

Completion of the supporting emphasis area classes (called the “emphasis area” in the online degree plan) requires 12 hours in a single area **approved by a CSCE advisor** that is not otherwise used on the major’s degree plan. With certain exceptions, the emphasis area classes must include 300 and 400 level classes and are generally selected from the physical sciences, engineering, mathematics, business, or liberal arts. There must be a clear connection to computing and the classes must be selected from a *single academic area*.

Here are some **examples** of commonly selected options. If you wish to suggest a different set of classes, see an advisor:

**Math:** Twelve hours beyond those used in the other parts of the CSCE degree plan are required. These 12 hours are to be selected from 400-level math electives (not including MATH 403, which cannot be used), except that at most six hours can be selected from the classes in the MATH 251, 302, 308 grouping that have not been used to fill that 3 hour degree plan requirement. CSCE 442 (when offered) can also be used here, but in this case MATH 417 cannot be used (in this case, CSCE 442 could *not* also be used as a technical elective). Note that these requirements are beyond those required by the Math minor—the Math minor does *not* provide enough credits to meet the supporting field’s requirements but the supporting area *does* provide enough credits to also fill the Math minor’s credits (assuming grades of C or better).

**Business:** Take classes towards the official Business minor. We do not require that this minor be completed but encourage students to do so as there are only two classes beyond those that can be used here in the degree plan to take. The following classes from the minor will be used to fill the supporting area requirement: ACCT 209, FINC 409, MGMT 309 and MKTG 409. MGMT 209 can be used towards the degree plan’s General Elective. The remaining class needed to complete the official Business minor (ISYS 209) is not used on the Computer Science degree plan.

**Art:** Complete the Minor in Art offered by the Department of Visualization. The minor should follow the traditional media emphasis if the student intends to apply to the Visualization department’s master’s program.

**Foreign languages:** 12 hours of foreign language classes are allowed. A special exception is made here to allow language training classes, which generally are entirely at the 100 and 200 level. This is distinct from the degree’s foreign language requirement, which usually has already been met with high school classes.

**University-recognized minor:** Complete an official university recognized minor in an **AREA APPROVED BY A CPSC ADVISOR**. The student will be required to complete the courses mandated by the department offering the **MINOR**, which will likely require **15+ credits** to complete. **NOT ALL OFFICIAL MINORS** can be used to complete the supporting field requirement and not all classes in approvable minors are usable. At least 12 usable credits not otherwise used on the CPSC degree plan are required for completion of the supporting field. Please note that this means that the Math minor does *not* provide enough credits to meet the supporting field requirement—additional Math classes will be required beyond the minor’s requirements (see above for details about using Math courses).

Note: An official minor will be noted on your transcript; the 12 hour supporting area will not. Taking the first 12 credits of an official minor does not automatically satisfy the 12 hour requirement for the emphasis area.

If you are seeking a double major or a double degree, courses from your other major are used to fill the emphasis area requirement as long as there are the needed 12 credits.

## Mathematics and Statistics

Fourteen hours of Mathematics and three hours of Statistics are required. The courses listed inside the box must each be passed with a grade of at least "C". The elective mathematics course must be either MATH 251, 302, or 308. The choice of a supporting area often dictates this elective.

NOTE: MATH 151 has a prerequisite of algebra, trigonometry and analytical geometry and requires a sufficient grade on the math placement exam. If MATH 150, 102, 103, or 104 are taken to meet these requirements, they may not be used for credit on the degree plan's requirement of 126 hours.

## Science Courses

15 hours of science coursework are required.

At least 4 hours must be taken from BIOL, CHEM, or PHYS courses listed below.

- A) Complete one of the following two-semester sequences with a grade of C or better (8 hours)
1. Biology:
    - a. 8 hours: Take BIOL 111 and BIOL 112
  2. Chemistry:
    - a. 4 hours: Take CHEM 101 and 111 or CHEM 107 and 117
    - b. 4 hours: Take CHEM 102 and 112
  3. Geosciences:
    - a. 8 hours: Take GEOL 101 and 102 and GEOL 106
  4. Physics:
    - a. 8 hours: Take PHYS 218 and PHYS 208
- B) Take 7 additional hours from the following list (subject to the requirement for at least 4 hours of BIOL, CHEM, PHYS):
- a. Any of the courses listed in part A
  - b. Any of the following courses:
    - i. BIOL 101 (4 hours)
    - ii. BIOL 107 (4 hours)
    - iii. GEOG 203 (3 hours)
    - iv. GEOG 213 (1 hour)
    - v. ATMO 201 (3 hours)
    - vi. ATMO 202 (1 hour)
    - vii. RENR 205 (3 hours)
    - viii. RENR 215 (1 hour)

Note: Just to be explicit, you cannot have both CHEM 101/111 and CHEM 107/117 in your science classes.

## University Core Curriculum Courses (and other University general requirements)

Refer to [core.tamu.edu](http://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 104
- One of the following: ENGL 210, COMM 203, COMM 205

**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.

***Language, Philosophy, and Culture:*** the requirement must be filled by ENGR 482 (or PHIL 482), which is a required course. You must take a writing intensive section (a “900” section) of this course.

The University’s core curriculum requirements are unchanged in the following areas: Creative Arts; American History; Government/Political Science; and Social and Behavioral Sciences. The International and Cultural Diversity requirement is unchanged from the University’s requirements. Follow the University’s instructions in these areas.

### **Foreign Language Requirement**

Proficiency in a foreign language is also 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 catalog for additional requirements under graduation requirements and Foreign Language.