The University of Connecticut
School of Engineering

COMPUTER ENGINEERING
GUIDE TO COURSE SELECTION
AY 2005-2006
Revised April 22, 2005

for
Computer Engineering (CMPE) Majors
in the School of Engineering

Prepared by the
Electrical & Computer Engineering Curricula & Courses Committee
School of Engineering, University of Connecticut.

http://www.engr.uconn.edu/ece/ece_ce_guide.htm
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1.0 INTRODUCTION

The objective of this Guide is to outline courses offered by the Computer Science and Engineering (CSE) and Electrical & Computer Engineering (ECE) Departments leading toward a degree in Computer Engineering (CMPE) which will prepare the student for a career in the chosen field, meet the curricular requirements of the Department, the School and the University, and meet nationally recognized standards for Electrical Engineering as established by the Accreditation Board for Engineering and Technology (ABET). This Guide is intended to be used in conjunction with the University of Connecticut General Catalog as a source of information regarding degree requirements in Computer Engineering.

This Guide describes the Computer Engineering (CMPE) curriculum which is intended to provide the core of knowledge expected of a professional Computer Engineer. In addition to the required core courses, there is a number of unspecified senior year Professional Requirement courses. The choice of the Professional Requirement courses, subject to the rules noted below, is up to the student and his or her advisor. Finally, all plans of study developed by the student must satisfy the curriculum requirements in CMPE and the minimum requirements for engineering science and design established by ABET (as discussed in section 4.0).

1.1 Preparation of Plans of Study

Prior to registration during the first semester of the Junior year, or for transfer students in the second semester at UConn, whichever is later, each student must complete a Plan of Study form documenting the program he/she intends to follow to satisfy the degree requirements of the chosen major in engineering. In order to help students in developing a suitable Plan of Study form which meets graduation requirements, the CSE and ECE departments usually hold Plan of Study meetings, normally scheduled during the 4th or 5th week of each semester. All students intending to file a Plan of Study form in CMPE must attend one of these meetings to receive copies of this Guide as well as other information regarding the various options available within the CMPE curriculum.

Preparation of a Plan of Study form is accomplished by carefully reading both the University of Connecticut General Catalog and this Guide in order to select an area of specialization which meets the student's interests. Note that a Plan of Study form should be approved through the Departmental level (by both the ECE and CSE departments) prior to registration in the semester that the student is required to file a Plan of Study form. Failure to have the Plan of Study form approved prior to registration can result in scheduling problems if the student does not take care in planning his/her remaining semesters carefully. In some cases this can result in delaying the student's anticipated graduation date.

2. COMPUTER ENGINEERING PROGRAM
The Computer Engineering Program at the University of Connecticut is continuously evolving and improving in response to feedback from our constituents and program assessment results.

We have developed a set of Program Educational Objectives which are periodically reviewed by all constituents. The feedback provided by our constituents is used to refine and improve the Program Educational Objectives.

We have determined a set of Program Outcomes which are necessary for the achievement of the Program Educational Objectives. We use several assessment tools (including employer surveys, alumni surveys, exit interviews, senior surveys, and course assessment surveys) to measure our success with respect to the Program Outcomes. The assessment results are reviewed periodically and used for the continuous improvement of the program and our courses.

The two-loop process involving the definition of the Program Educational Objectives (loop one) and the assessment / program improvement (loop two) is shown below.

**The Two Loops of EC2000**

Figure 2.1. The two-loop process of Engineering Criteria 2000, as defined by Accreditation Board for Engineering and Technology.

### 2.1 Computer Engineering Program Educational Objectives
Following the mission of the University and the School, the Electrical and Computer Engineering department is committed to excel in teaching and research. Traditionally, the ECE Dept. mission statement (periodically updated based on revisions in the School and University mission statements and the input from our various constituencies) has served as a proxy for the CMPE Program Educational Objectives. In Fall 2003, a formal process was put in place to formulate and revise the Program Educational Objectives within an integrated framework of an outcome-based assessment process and related curricular strategies. The CMPE Program Educational Objectives (as revised by the Computer Engineering ABET Committee on 10/14/03) are outlined below:

1. Our graduates will have a breadth of technical knowledge and experience that will allow them to contribute to computer engineering projects in various roles including participation in multidisciplinary teams.

2. Our graduates will have acquired essential skills such as written and oral communication, project management, recognition of social and ethical responsibilities, and leadership for performing well in an organizational setting.

3. Our graduates will have a thorough grounding in engineering fundamentals, thus preparing them for a successful engineering career amid future technological changes.

4. Our graduates will have a well-rounded education to permit flexible career paths as well as to promote an interest in life-long learning together with the ability to advance professionally.

2.2 Requirements for the degree

For students in the School of Engineering, the engineering requirements which must be met are stated in detail in the Plan of Study current at the time of the student's entry into the School, or any later time prior to graduation. Thus, this Guide provides the details omitted from the University Catalog. Note that a student must have earned at least a 2.0 grade point average for all calculable Upper Division course work to receive the degree.

2.3 General Education Requirements (University Core Curriculum)

As part of all baccalaureate degree programs at the University, students are required to satisfy a common core of coursework known as the General Education Requirements. These are described in what follows.
Foreign Languages

The minimum requirement is met if the student is admitted to the University with three years of a single foreign language in high school, or the equivalent. If the student has not met the minimum requirement through high school coursework, he or she must complete a two semester course sequence in a language at the University.

Expository Writing

All students must take ENGL 110 Seminar in Academic Writing or ENGL 111 Seminar in Writing through Literature. In addition to these courses, all students must complete two Writing (W) courses. As shown in the following pages, two Writing courses are specified in the required coursework in Electrical Engineering.

Arts and Humanities (Content Area One)

All students must take two Arts and Humanities courses. These courses must be from two different departments. All students in the School of Engineering are required to take PHIL 104, which satisfies one of these requirements.

Social Sciences (Content Area Two)

All students must take two Social Sciences courses. These courses must be from two different departments.

Science and Technology (Content Area Three)

All students must take two Science and Technology courses. These courses must be from two different departments. All engineering students satisfy this requirement with required courses.

Diversity and Multiculturalism (Content Area Four)

All students must take two Diversity and Multiculturalism courses. One of these courses may also count toward the Content Area One or Content Area Two. One of these courses must be an international course.

The following list of approved courses has been furnished by the General Education Oversight Committee, and is available at [http://geoc.uconn.edu/CourseList0223.pdf](http://geoc.uconn.edu/CourseList0223.pdf).
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Prerequisite</th>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 115Q</td>
<td>CHEM 127Q</td>
<td>CSE 123C</td>
<td>ENGR 100</td>
<td>ENGL 110 or 111</td>
</tr>
<tr>
<td>MATH 116Q</td>
<td>PHYS 151Q</td>
<td>CSE 133</td>
<td>ECE 101</td>
<td>Arts and Humanities course</td>
</tr>
<tr>
<td>MATH 210Q</td>
<td>PHYS 152Q</td>
<td>CSE 134</td>
<td>CSE 210W</td>
<td></td>
</tr>
<tr>
<td>MATH 211Q</td>
<td>ECE 210W</td>
<td>CSE 254</td>
<td>PHL 104</td>
<td>Social Science course</td>
</tr>
<tr>
<td>MATH 227Q</td>
<td>ECE 202</td>
<td>ECE 212</td>
<td>CSE 243</td>
<td>Arts and Humanities course</td>
</tr>
<tr>
<td>STAT 224</td>
<td>ECE 215</td>
<td>ECE 252</td>
<td>CSE 230</td>
<td>Diversity and Multiculturalism course</td>
</tr>
<tr>
<td>ECE 290</td>
<td>ECE 266 or CSE 268</td>
<td>Professional Requirement</td>
<td>DESIGN LAB</td>
<td>CSE 258</td>
</tr>
<tr>
<td>ECE 291</td>
<td>ECE 240</td>
<td>Professional Requirement</td>
<td></td>
<td>ELECTIVE</td>
</tr>
</tbody>
</table>

Computer Engineering Prerequisite Flow.
2.4 Overview of the Freshman and Sophomore years

The lower division or freshman and sophomore years of the Computer Engineering curriculum are similar to the other engineering curricula and are described in the Engineering Section of the University of Connecticut General Catalog. The required program includes courses in Mathematics, Physics, Chemistry and Engineering with additional coursework in English and the Humanities and Social Sciences.

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 115Q - Calculus I</td>
<td>4</td>
<td>MATH 116Q-Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 127Q-Gen. Chem. I</td>
<td>4</td>
<td>PHYS 151Q-Engineering Phys. I</td>
<td>4</td>
</tr>
<tr>
<td>CSE 123C-Intro. to Computing</td>
<td>2</td>
<td>CSE 133-Object Oriented Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 110 or ENGL 111-Acad. Writing</td>
<td>4</td>
<td>Arts and Humanities course(^2)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 100-Orientation to Engr.</td>
<td>1</td>
<td>ECE 101-Computer Tools</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 210Q-Multivariable Calculus</td>
<td>4</td>
<td>MATH 211Q-Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 152Q-Engineering Phys II</td>
<td>4</td>
<td>ECE 210W- Electric Circuits</td>
<td>4</td>
</tr>
<tr>
<td>CSE 134- Data Structures &amp; Algorithms</td>
<td>3</td>
<td>CSE 254-Intro to Discrete Systems</td>
<td>3</td>
</tr>
<tr>
<td>CSE 210W Logic Design</td>
<td>4</td>
<td>PHIL 104 - Phil. and Social Ethics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Social Sciences course(^2)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

\(^1\) The three-semester sequence of MATH 112Q-113Q followed by Math 116Q may be taken instead to satisfy this requirement. MATH 112Q can not be used toward the required 126 credits for the Engineering degree.

\(^2\) The courses from content areas one (Arts and Humanities) and two (Social Sciences) must be from four different departments. One course from either content area one (Arts and Humanities) or content area two (Social Sciences) may also be used to fulfill one of the requirements from content area four (Diversity and Multiculturalism). One course from content area four must be an international course.
2.5 Overview of the Junior and Senior years

The Computer Engineering upper division curriculum, as described below, includes required courses and a number of professional requirements.

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 212- Electronic Devices and Circuits</td>
<td>4</td>
<td>ECE 215- Digital Integrated Circuits</td>
<td>3</td>
</tr>
<tr>
<td>ECE 202-Signals and Systems</td>
<td>3</td>
<td>ECE 252- Digital Systems Design</td>
<td>3</td>
</tr>
<tr>
<td>CSE 243-Intro. to Comp. Arch. and Hardware/Software Interface</td>
<td>4</td>
<td>CSE 230-Intro. to Software Engr.</td>
<td>3</td>
</tr>
<tr>
<td>MATH 227Q-Linear Algebra</td>
<td>3</td>
<td>STAT 224Q- Prob. Models for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>Arts and Humanities course(^2)</td>
<td>3</td>
<td>Diversity and Multiculturalism course(^2)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td><strong>Total</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 266-Microprocessor Applications Laboratory or CSE 268-Microprocessor Laboratory</td>
<td>3</td>
<td>ECE 249-VLSI Design &amp; Simulation</td>
<td>4</td>
</tr>
<tr>
<td>CSE 258-Operating Systems</td>
<td>3</td>
<td>Professional Requirement(^3)</td>
<td>3</td>
</tr>
<tr>
<td>Professional Requirement(^1)</td>
<td>3</td>
<td>Professional Requirement(^3)</td>
<td>3</td>
</tr>
<tr>
<td>Design Laboratory(^4)</td>
<td>3</td>
<td>Diversity and Multiculturalism course(^2)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td><strong>Total</strong></td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td><strong>Total</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

\(^1\) The three-semester sequence of MATH 112Q-113Q followed by Math 116Q may be taken instead to satisfy this requirement. MATH 112Q can not be used toward the required 126 credits for the Engineering degree.

\(^2\) The courses from content areas one (Arts and Humanities) and two (Social Sciences) must be from four different departments. One course from either content area one (Arts and Humanities) or content area two (Social Sciences) may also be used to fulfill one of the requirements from content area four (Diversity and Multiculturalism). One course from content area four must be an international course.

\(^3\) Choose three (3) from: ECE 232, ECE 234, ECE 247, ECE 241, ECE 242, ECE/CSE 257, CSE 221, and CSE 245.

\(^4\) Choose one (1) from: ECE 280, CSE 261/ECE 281, ECE 268, and ECE 292.
3.0 DOUBLE MAJORS, MINORS, AND ADDITIONAL DEGREES

Opportunities exist to pursue a double major program in Computer Engineering and one of the other undergraduate engineering curricula, to pursue a minor degree program in conjunction with the CMPE degree, or to pursue an additional degree within the University.

Double Major with another Engineering program

Opportunities exist to pursue a double major program in Computer Engineering and one of the other undergraduate engineering curricula. Of the other curricula, the Electrical Engineering (EE) and Computer Science & Engineering (CSE) majors have the most overlap with that of the CMPE curriculum and present the best opportunities for double majors. If a student wishes to be a double major within Engineering, he or she should notify the Dean. Careful planning of course selection should be done each semester in consultation with the student's advisor. A separate Plan of Study form from each department must be prepared and submitted for approval.

Minors

Several minors are available within the University that may be attractive to students pursuing the Computer Engineering degree. Examples include minors in Mathematics and Statistics, within the College of Liberal Arts & Sciences, as well as the Biomedical Engineering minor within the School of Engineering.

Additional Degree with another major outside of Engineering

From time to time students wish to obtain an additional degree in a field outside of the School of Engineering. One example of an additional degree would be that found in the EUROTECH program in which the completion of a degree in German Studies within the College of Liberal Arts & Sciences is achieved at the same time the student completes the primary degree in a major within the School of Engineering. Students who have such an interest should discuss the procedure for pursuing the additional degree with the Dean.
5.0 FILLING OUT THE PLAN OF STUDY FORM

All students in the first semester of their Junior year in the Engineering curriculum must prepare a written Plan of Study form. These students should work with their advisors to determine a Plan of Study which meets the degree requirements of the School of Engineering and the University.

After an initial consultation with the advisor, the student should prepare two (2) original copies of the Plan of Study form (http://www.engr.uconn.edu/ece/ece_ce_pos.htm) by following the guidelines given below. Once the two original copies are prepared, the student should make an appointment with his/her advisor to have him/her review and approve the form. Both the advisor and the student should check his/her transcript to be sure that all Lower Division (freshman/sophomore) requirements have been met and should check that the proposed Upper Division (junior/senior) plan satisfies Department, School and University requirements. After the form is approved by the advisor, the two originals should be forwarded to the Associate Department Head, Prof. John Ayers, for approval, prior to being forwarded to the Director of Undergraduate Advising, Prof. David Jordan. Note: the student should check back with his/her advisor to see if any corrections must be made after the form has been reviewed by Associate Department Head.

The Associate Department Head will evaluate and indicate his approval of the Plan of Study, and then will send the two originals to the Director of Undergraduate Advising. The Director of Undergraduate Advising will evaluate the Plan and indicate his approval of it. In the event that approval is not given, the difference of opinion must be worked out among the advisor, the student and the Director of Undergraduate Advising or Associate Department Head, as appropriate.

The Dean's Office will return two copies of the approved tentative Plan of Study form to the advisor: one of the two "originals" which is to be kept in the student's counseling folder, the other being a photocopy to be given to the student.

Note that an approved Plan of Study form can be modified at any time if course offerings and student objectives warrant it. However, no modification that jeopardizes the meeting of requirements will be approved. Modification must be made in consultation with the student's advisor and will usually involve the submission of a "revised" Plan of Study form for approval, in the same manner as the "original" form was prepared and submitted. Although not required until the last semester, it is suggested that a "revised" form be submitted each semester rather than waiting until the final semester. This way any problems can be caught as early as possible. This "revised" Plan of Study form may be created as done initially by forming two new originals, or by marking the changes on the approved "original" and having this "revised" form circulated for approval. Alterations to the courses listed should be made by crossing out the course(s) not taken, writing in those that were, and having the advisor initial and date each change. If extensive changes are to be made, or if a second revision is necessary, a new "original" Plan of Study form must be submitted.
The Plan of Study form should be reviewed at each subsequent registration period. In the student's last semester, he/she is required to file a "final" Plan of Study form which accurately lists all the courses that were taken to satisfy degree requirements. Any modifications to an already approved Plan of Study form should then be submitted for final approval following the above procedure.

The Plan of Study forms should be filled out neatly and in ink. All approval initials and signatures should also be in ink and dated. Expected date of graduation and year of catalog requirements must be clearly shown. The following guidelines should be adhered to:

**Double Major:** If you plan to follow a double major, indicate at the bottom of the Plan of Study form what it will be; i.e. "Double Major: department ". Note that some double majors will require submitting a completed Plan of Study form from each department. The approval of the Department Head from the double major department is also required as indicated on the form. Note: Double majors with Materials Engineering (Metallurgy & Materials Engineering department) should indicate which courses are being used as materials courses.

**Catalog year and date of graduation:** It is extremely important that you accurately list what catalog year you are filing under and your intended date of graduation. Both items are needed for use by the Registrar so that completion of your degree requirements may be certified by your graduation date.

**Courses taken:** The Plan of Study form must show exactly the courses being used to satisfy degree requirements. Exemption from specific School of Engineering course requirements or substitution of alternative courses must be clearly indicated on the Plan of Study form, explained in the "Comments" section and/or with an attachment, and may require approval via petition by the Director of Undergraduate Advising (see "Exemption and Substitution" below).

**Foreign Language Requirement:** The Foreign Language requirement calls for three years of a single foreign language in High School or a two semester course sequence in a language at the University. The words "High School" should be circled if the student has met this requirement in High School. If not, the appropriate university courses should be listed.

**Expository Writing Requirement:** The General Education Requirement for Expository Writing is met through ENGL 110 or ENGL 111 and two "W" (writing) courses which are part of the engineering curriculum for each department (for CMPE majors, CSE 210W and ECE 210W are required). Thus, the Plan of Study form (and the student transcript) must show these courses. If, for some reason beyond the student's control, the major "W" courses are not taken, the student will have to take the required "W" courses outside the department curriculum.
**Arts and Humanities (Content Area One):** All students must take two Arts and Humanities courses. These courses must be from two different departments. All students in the School of Engineering are required to take PHIL 104, which satisfies one of these requirements.

**Social Sciences (Content Area Two):** All students must take two Social Sciences courses. These courses must be from two different departments.

**Science and Technology (Content Area Three):** All students must take two Science and Technology courses. These courses must be from two different departments. All engineering students satisfy this requirement with required courses.

**Diversity and Multiculturalism (Content Area Four):** All students must take two Diversity and Multiculturalism courses. One of these courses may also count toward the Content Area One or Content Area Two. One of these courses must be an international course.

**Required courses:** Required courses are shown on the form. If there are alternatives listed, the course(s) that the student has taken or intends to take should be circled (e.g. ENGL 110 or ENGL 111, circle 110 or 111 depending on which one was taken).

**Professional Requirements:** The Professional Requirements which are not specified on the Plan of Study form are chosen in consultation with the student’s advisor.

**Restrictions:** The following courses may not be counted for credit toward graduation: MATH 112Q and 118Q along with other mathematics courses numbered below 110Q; PHYS 101Q, 103Q; CSE 101C; STAT 100; and courses labeled "independent study" or "variable topics" (e.g. courses numbered 298 and 299) taken in departments outside of the School of Engineering. No course taken on a Pass/Fail basis may be counted for credit toward graduation or used to meet any course requirement of the School of Engineering. Many general University restrictions are shown in the Academic Regulations and Procedures section of the University Catalog.

**Exemption and Substitution:** Students who desire to be excused from any of the requirements, or to substitute other courses for those prescribed, must do so by submitting a petition to the Dean. Some examples of this type of departure from a published regulation are as follows: exemption from MATH 115Q for a student who had Calculus in high school and started in our MATH 116Q or substitution of PHYS 121Q, 122Q, 125Q for PHYS 151Q, 152Q. Note that a substitution of three courses for two (as in the Physics example) results in only the credits for the two being counted for graduation, i.e. you are making a substitution for the equivalent work. Note that substitutions for courses taken as departmental Professional Requirements usually do not require a petition for approval by the Dean, but may be indicated on the Plan of Study form directly. Students must not write down or leave unchanged anything on the Plan of Study that they have not actually taken or plan to take.
**Transfer Courses:** Transfer courses should be listed on the Plan of Study form just as any other course, with a superscript of "T" to indicate which courses were transferred. Transfer courses may be counted at their University of Connecticut equivalent credit in the category totals if the transcript does not show the number of credits granted for the particular course.

For transfer work that does not have an exact University of Connecticut equivalent; e.g., 4.25 credits of ECE 100 LEVEL, the credits should be listed as follows:

ECE 100 LEVEL (4.25)\(^T\)

In other words, the discipline followed by the level with an indication of how many credits is needed.

The total transfer credit granted (not the sum of the University of Connecticut equivalents) less any equivalent restrictions (such as subtracting 3 credits if MATH 107Q is listed since this course does not count for credit in the School) should be listed on the line labeled "Transfer Credits". The total of all credits taken at the University of Connecticut should be listed on the line labeled "University of Connecticut Credits". The sum of the "Transfer Credits" and the "University of Connecticut Credits" should be listed on the "Total Credits" line. The total credits must equal or exceed 134.

**Changes:** Changes to a previously submitted Plan of Study form may be made in consultation with the advisor and will require submission of a "revised" Plan of Study form for approval, in the same manner as the "original" form was prepared and submitted. This may be done by marking the changes on the previously approved original Plan of Study form, available from the advisor or the Office of the Dean, and having the advisor initial and date each change. No modifications of a photocopy will be accepted. If a second revision of an "original" is necessary, or if extensive changes are to be made, the submission of a new "original" Plan of Study form is required. In the student's last semester, he/she must submit a "final" Plan of Study form which accurately lists all the courses that were taken to satisfy degree requirements.
The Accreditation Board for Engineering and Technology (ABET) is recognized in the United States as the sole agency responsible for accreditation of educational programs leading to degrees in engineering. The first statement of the Engineers Council for Professional Development (ECPD, now ABET) relating to accreditation of engineering educational programs was proposed by the Committee on Engineering Schools and approved by the Council in 1933. The original statement, with subsequent amendments, was the basis for accreditation until 2000. The statement presented here is required of programs beginning in 2001.

All accredited engineering programs must include engineering in the program title (An exception has been granted for programs accredited prior to 1984 under the title of Naval Architecture.) To be considered for accreditation, engineering programs must prepare graduates for the practice of engineering at a professional level.

It is the responsibility of the institution seeking accreditation of an engineering program to demonstrate clearly that the program meets the following criteria.

Criterion 1. Students:

The quality and performance of the students and graduates is an important consideration in the evaluation of an engineering program. The institution must evaluate, advise, and monitor students to determine its success in meeting program objectives.

Criterion 2. Program Educational Objectives:

Each engineering program for which an institution seeks accreditation or reaccreditation must have in place

(a) detailed published educational objectives that are consistent with the mission of the institution and these criteria
(b) a process based on the needs of the program's various constituencies in which the objectives are determined and periodically evaluated
(c) a curriculum and process that ensures the achievement of these objectives
(d) a system of ongoing evaluation that demonstrates achievement of these objectives and uses the results to improve the effectiveness of the program.

Criterion 3. Program Outcomes and Assessment:

Engineering programs must demonstrate that their graduates have

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a
global and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for
engineering practice.

Each program must have an assessment process with documented results. Evidence must be given that the results are applied to the further development and improvement of the program. The assessment process must demonstrate that the outcomes important to the mission of the institution and the objectives of the program, including those listed above, are being measured. Evidence that may be used includes, but is not limited to the following: student portfolios, including design projects; nationally-normed subject content examinations; alumni surveys that document professional accomplishments and career development activities; employer surveys; and placement data of graduates.

The institution must have and enforce policies for the acceptance of transfer students and for the validation of credit courses taken elsewhere. The institution must also have and enforce procedures to assure that all students meet all program requirements.

Criterion 4. Professional Component:

The Professional Component requirements specify subject areas appropriate to engineering but do not prescribe specific courses. The engineering faculty must assure that the program curriculum devotes adequate attention and time to each component, consistent with the objectives of the program and institution. Students must be prepared for engineering practice through the curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier coursework and incorporating engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political. The professional component must include

(a) one year of a combination of college level mathematics and basic sciences (some with experimental experience) appropriate to the discipline
(b) one and one-half years of engineering topics, to include engineering sciences and engineering design appropriate to the student's field of study
(c) a general education component that complements the technical content of the curriculum and is consistent with the program and institution objectives.

Criterion 5. Faculty:
The faculty is the heart of any educational program. The faculty must be of sufficient number; and must have the competencies to cover all of the curricular areas of the program. There must be sufficient faculty to accommodate adequate levels of student-faculty interaction, student advising and counseling, university service activities, professional development, and interactions with industrial and professional practitioners, as well as employers of students.

The faculty must have sufficient qualifications and must ensure the proper guidance of the program and its evaluation and development. The overall competence of the faculty may be judged by such factors as education, diversity of backgrounds, engineering experience, teaching experience, ability to communicate, enthusiasm for developing more effective programs, level of scholarship, participation in professional societies, and registration as Professional Engineers.

Criterion 6. Facilities:

Classrooms, laboratories, and associated equipment must be adequate to accomplish the program objectives and provide an atmosphere conducive to learning. Appropriate facilities must be available to foster faculty-student interaction and to create a climate that encourages professional development and professional activities. Programs must provide opportunities for students to learn the use of modern engineering tools. Computing and information infrastructures must be in place to support the scholarly activities of the students and faculty and the educational objectives of the institution.

Criterion 7. Institutional Support and Financial Resources:

Institutional support, financial resources, and constructive leadership must be adequate to assure the quality and continuity of the engineering program. Resources must be sufficient to attract, retain, and provide for the continued professional development of a well-qualified faculty. Resources also must be sufficient to acquire, maintain, and operate facilities and equipment appropriate for the engineering program. In addition, support personnel and institutional services must be adequate to meet program needs.

Criterion 8. Program Criteria:

Each program must satisfy applicable Program Criteria. Program Criteria provide the specificity needed for interpretation of the basic level criteria as applicable to a given discipline. Requirements stipulated in the Program Criteria are limited to the areas of curricular topics and faculty qualifications. If a program, by virtue of its title, becomes subject to two or more sets of Program Criteria, then that program must satisfy each set of Program Criteria; however, overlapping requirements need to be satisfied only once.
The applicable program criteria for the CMPE major are the “Program Criteria for Electrical, Computer, and Similarly named Engineering Programs” submitted by the Institute of Electrical and Electronics Engineers, Inc., and duplicated below:

PROGRAM CRITERIA FOR ELECTRICAL, COMPUTER, AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by The Institute of Electrical and Electronics Engineers, Inc.

These program criteria apply to engineering programs which include electrical, electronic, computer, or similar modifiers in their titles.

1. Curriculum
The structure of the curriculum must provide both breadth and depth across the range of engineering topics implied by the title of the program.

The program must demonstrate that graduates have: knowledge of probability and statistics, including applications appropriate to the program name and objectives; knowledge of mathematics through differential and integral calculus, basic sciences, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components, as appropriate to program objectives.

Programs containing the modifier "electrical" in the title must also demonstrate that graduates have a knowledge of advanced mathematics, typically including differential equations, linear algebra, complex variables, and discrete mathematics.

Programs containing the modifier "computer" in the title must have a knowledge of discrete mathematics.