



College of Engineering
UNIVERSITY OF WISCONSIN-MADISON

Computer Engineering

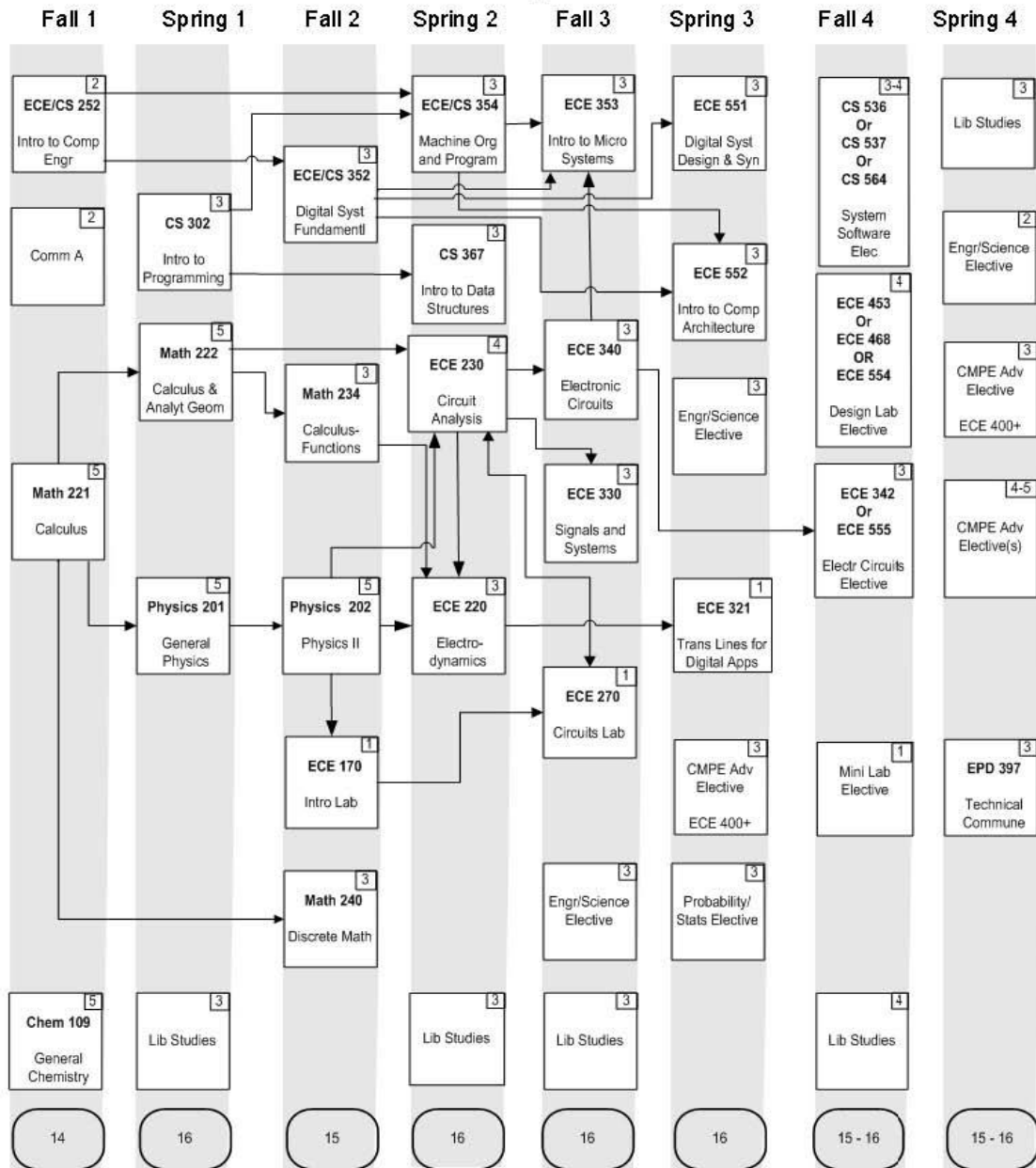
Undergraduate Student Handbook and Curriculum Requirements

Curriculum Effective
Fall 2006

This handbook is published by the Department of Electrical and Computer Engineering (ECE) to provide guidance to undergraduates in managing their programs and in selecting courses toward the BS Computer Engineering (BSCMPE) degree. This booklet supplements information in the UW-Madison Undergraduate Catalog. (See <http://pubs.wisc.edu/ug/index.htm>). *Handbook last updated in August 2011.*

Computer Engr

Effective for Students Entering CMPE Fall 2006 and Later



A full curriculum guide may be found at:

<http://www.engr.wisc.edu/cmsdocuments/ECE-CMPE-advising-curriculum-handbook.pdf>

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I. INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING

Important Contact Information

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(608) 890-0804

Undergraduate Advising Chair – Prof. Bill Sethares
sethares@ece.wisc.edu

Office: 2556 Engineering Hall
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Student Services Coordinator – Stacy Harnett
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Office: 2304a Engineering Hall
(608) 890-4594

Your Computer Engineering Curriculum

Electrical engineers and computer engineers design and develop anything and everything that uses electricity: from the power systems that bring electricity to our homes and communication systems that allow us to keep in touch with family and friends, to the electronic devices, electrical appliances, computers, sensors, and medical equipment that shape our everyday lives. Typical careers may find computer engineers collaborating with medical doctors to model and simulate complex systems, embedding computers in advanced communications and transportation networks, and interacting with other engineers and professionals in the design of new kinds of computational devices. Many computer engineering graduates work as scientists, inventing new kinds of electronic technology, programming new kinds of instruments, and developing new devices to help people.

In order to prepare you for a career as a computer engineer, the faculty and staff of the UW-Madison have developed a curriculum that we believe will help you master the material you will need to get your career off to a great start. This includes many courses throughout science, math, and the humanities, as well as many specialized courses within the Electrical and Computer Engineering (ECE) department itself. Because the rules can be intimidating, we have prepared this booklet to provide guidance in managing your programs and in selecting courses toward the BS Computer Engineering (BSCMPE) degree. This booklet supplements information in the UW-Madison *Undergraduate Catalog* (<http://pubs.wisc.edu/ug/index.htm>). It should be used in conjunction with the Degree Audit Reporting System (DARS). Students can request DARS reports from MyUW, which is accessible as a link from the university home page (<http://www.wisc.edu>). After logging into MyUW, enter the Student Center and select “View my DARS” under the Academic History heading. MyUW offers the ability to request reports for currently declared programs as well as “what-if” reports.

The Undergraduate Advising and Scholarship Committee within ECE and the South Student Services Center welcome suggestions for improving the presentation of this material.

II. REGULATIONS, POLICIES, & PROCEDURES

Admission

Initial Classification

<http://studentservices.engr.wisc.edu/regulations/1.html>

New students admitted to the College of Engineering but not yet to a degree-granting department are assigned the classification of Engineering General Resources (EGR). EGR students should transfer to a degree-granting department as soon as they are eligible. Students may not begin a semester with the EGR classification once they have completed four semesters as an EGR student. Summer session is not considered a semester.

Admission to a Degree-Granting Classification

<http://studentservices.engr.wisc.edu/regulations/3.html>

To be considered for admission to an academic department in the College of Engineering, a student must have:

1. Satisfied the General Education Communication Skills Part A requirement.
2. A minimum of 24 credits.
3. A minimum of 17 credits of calculus, statistics, chemistry, computer science, statics, and physics courses required for an engineering degree. These credits must include Math 222 or Math 276.
4. A grade point average of at least 2.50 for all math courses 217 and above, statistics courses 224 and above, chemistry (all classes), computer science (all classes), EMA 201, and physics courses 201 and above. For one and only one of these courses that a student has repeated, the more recent of the two grades will be used in the calculation.
5. A grade-point average at least 2.00 for all courses not included above in Requirement 4.
6. Successful completion of introductory chemistry (Chem 103/104 or 109 or 116); calculus-based mechanics (EMA 201 or Physics 201, 207, or 247); math through Math 222 or Math 276; and either InterEGR 101 or 160 or another introduction to engineering class from an approved list.

When the number of qualified applicants exceeds the capacity of the program, admissions will be limited to that capacity. Under these conditions, admission of students will be based on grade point averages, test scores, geographical background, personal background, and diversity. This basis for admission is intended to implement the University's goals of (1) maximizing the success of students who are admitted to a program and (2) achieving a heterogeneous and ethnically diverse student body. It is the student's responsibility to submit a timely application to the Dean's office for admission to the degree-granting classification.

Application periods are as follows:

For Fall Semester:	January 15 to March 1
For Spring Semester:	September 15 to November 1
For Summer Session:	January 15 to March 1

Students not admitted to an academic department may file an appeal with the Dean.

Admission to Courses

<http://studentservices.engr.wisc.edu/regulations/4.html>

Departments may specify courses as 1) not open to EGR students, or 2) open only to students in that specific department.

Transfer Admissions

<http://studentservices.engr.wisc.edu/regulations/5.html>

<http://studentservices.engr.wisc.edu/regulations/6.html>

Individuals, who are already attending another university, including those in the University of Wisconsin System, will need to meet the entry requirements of the degree program for which they are applying.

While making the decision to apply for a transfer to a UW-Madison program, please note that all students must meet the following requirements in order to graduate:

1. All students must complete at least 30 credits in residence in the College of Engineering, including 15 credits of work in their specific major.
2. All students must complete their last two semesters in residence in the College of Engineering as a full-time student.
3. All students must complete course substitution forms for transfer courses they wish to use as substitutes for curriculum requirements during their **first** semester.

Transfer students sometimes find themselves short of credits in mathematics, physics, or computer science. If you find yourself in that situation, seek advice from an academic advisor in the North or South Student Services Center. See page 13 for contact information.

Admission to an Additional Major

http://pubs.wisc.edu/ug/engr_geninfo_addmajor.htm

Engineering students may earn an additional major in the College of Letters and Science and have the additional major noted on their transcript at the time of graduation. To qualify, the student must have approval in advance from both the department in the College of Letters and Science offering the major and the academic dean of the College of Engineering, and must satisfy all requirements for the Letters and Science major by the time the engineering degree is completed. These requirements include those established by that department, as well as those of the College of Letters and Science (e.g., 15 credits minimum of advanced work in the major of residence at UW-Madison). For further details, contact the College of Engineering Student Service Office, 2620 Engineering Hall.

Adding additional majors from colleges other than Letters and Science is not accepted. For example, majors such as art (School of Education) and forestry (College of Agriculture and Life Sciences) cannot be completed in conjunction with an engineering degree. Likewise, students cannot pursue more than one undergraduate engineering degree concurrently.

Registration

Credit Load Constraints

<http://studentservices.engr.wisc.edu/regulations/8.html>

The minimum credit load is 12 enrolled credits per semester. The maximum credit load is 20 enrolled credits per semester. For summer sessions and other sessions, there is no minimum credit load and the

maximum credit load equals the number of weeks in the session. A student may freely choose to carry any number of credits between a minimum credit load and a maximum credit load, provided that the student is not on academic probation. A student may carry more than a maximum credit load, but only with the recommendation of an advisor and with written approval of the Dean.

A student who wishes to carry less than a minimum credit load must request written permission from the Dean to become a part-time student. Permission can only be requested for definitive reasons. Such reasons may include but are not limited to having one or more of the following:

- a documented disability.
- a necessity of employment or other outside obligation exceeding 15 hours per week.

Part-time permissions must be renewed during the first two weeks of each semester. Part-time students must satisfy all regulations other than the minimum credit load. For any semester for which part-time permission is granted and the semester following it, the academic status of the student is the responsibility of the Dean.

A student on academic probation is advised to carry not more than 14 credits per semester unless repeating a course. For every three credits being repeated, the student is advised to carry not more than one additional credit beyond 14, up to a maximum of 16 credits.

Credit Load Recommendations

The curriculum requirements for a Computer Engineering or Electrical Engineering degree can be satisfied in eight semesters of study by completing 14-16 credits of work each semester. Please see the flowchart on the inside of the front cover for a sample eight semester plan. Many students, however, choose to take longer than eight semesters. A nine-semester or ten-semester program may be selected to achieve broader coverage of an area of specialization, penetrate an area more deeply, pursue a certificate program, or pursue a second major. In addition, many students participate in the engineering cooperative education (co-op) program, which requires one or two additional semesters.

Performance & Evaluation

Academic Probation

<http://studentservices.engr.wisc.edu/regulations/29.html>

A student is placed on Academic Probation when he or she has, in the semester just completed:

1. Attained a GPA less than 2.0; or
2. Passed fewer than 12 credits without part-time permission from the Dean.

Once on probation, the student is continued on probation until either he or she is removed from probation or dropped from the program. It is advised that students on probation take no more than 14 credits per semester until removed from probation.

Removal from Probation

<http://studentservices.engr.wisc.edu/regulations/30.html>

Once on probation, the student is continued on probation until either he or she is removed from probation or dropped from the program. Removal from probation takes place when:

1. the student earns a cumulative grade point average becomes a 2.0 or higher;
2. the student earns a semester GPA of 2.0 in the last semester completed;
3. the student has passed 12 or more credits in the last semester completed; and
4. the student has passed at least 24 degree credits in the two most recent semesters in residence.

Drop from the College of Engineering

<http://studentservices.engr.wisc.edu/regulations/31.html>

A student on academic probation will be dropped at the end of any semester for which that student has submitted a GPA of less than 2.0 or passed fewer than 12 credits for a student without part-time permission from the Dean or passed less than $\frac{3}{4}$ of the credits attempted for a part-time student.

A student not on academic probation will be dropped at the end of any semester for which that student has passed fewer than half of the credits attempted.

Incomplete

<http://studentservices.engr.wisc.edu/regulations/23.html>

<http://studentservices.engr.wisc.edu/regulations/24.html>

An incomplete may be reported for a student who has carried a subject with a passing grade, but because of illness or other unusual and substantiated cause beyond the student's control has been unable to complete the final examination or some limited amount of term work. A student who stays away from a final examination without proof of being prevented from attending as indicated above will receive a grade of F, N, or U (whichever is appropriate). Even with such proof, if the term work has convinced the instructor that the student cannot pass, the grade shall be F, N, or U (whichever is appropriate).

College of Engineering Graduation Requirements

<http://studentservices.engr.wisc.edu/regulations/34.html>

It is the student's responsibility to ensure that graduation requirements have been met. All students should regularly consult their DARS (Degree Audit Reporting System) document in conjunction with their faculty advisor and/or academic advisor to ensure that all of the following requirements are met:

1. Have fulfilled the published graduation requirements of that curriculum, with all substitutions formally approved, and have achieved a minimum 2.0 GPA overall.
2. Have a PCR¹ of at least 2.0 for those semesters and sessions containing the last 60 credits taken at UW-Madison or for all credits taken at UW-Madison if fewer than 60.
3. Have a PCR¹ of at least 2.0 for all courses taken in the degree-granting department that count toward graduation.
4. Have completed at least 30 credits in residence in the College of Engineering, including 15 credits of work in the degree-granting department.
5. Have completed the last two semesters in residence in the College of Engineering as a full-time student.
6. Have a GPA of at least 2.0 both for the last semester and also for the combined last two semesters.

¹ PCR (Point-Credit Ratio) differs from the grade point average in that it involves only those credits that count toward graduation and the related grade points. When a course is repeated, the credits and grade points earned only for the final attempt are included in the point-credit ratio.

Department of Electrical and Computer Engineering Graduation Requirements

In addition to the College of Engineering graduation requirements listed above, students must also satisfy the following ECE graduation requirements to earn a CMPE or EE undergraduate degree:

1. Degree candidates must take EPD 397 and at least 15 credits of ECE Advanced Electives in residence.
2. Degree candidates declare the appropriate graduation term in your Student Center within your MyUW portal by the announced deadline.
3. Degree candidates submit an Advanced Elective Approval form, signed by his/her faculty advisor, to the South Student Services Center (2304a Engineering Hall) by the announced deadline.
4. Degree candidates must complete the Educational Benchmarking, Inc. (EBI) survey by the announced deadline.
5. If a degree candidate is clearing an incomplete grade during his/her semester of graduation, in a course applied toward your degree, the final grade for that course must be **dated** on or before the last day of final exams. An incomplete cleared later will prevent the degree candidate from graduating.
6. If a degree candidate is taking a UW Extension course during his/her semester of graduation, and the course is required for graduation, the Dean's office must receive a transcript dated on or before the last day of final exams. The Dean's office suggests that degree candidates take the final exam in his/her UW Extension course on the first day of the final exam period to allow enough time for paperwork to be processed.

Please remember, it is the degree candidate's responsibility to ensure that all graduation requirements are met.

Graduation Requirements for an Additional Major

Students must complete their additional major requirements no later than the semester of graduation with their engineering degree. Students who have finished all of their engineering degree requirements may **not** delay graduation in order to finish their additional major. Students who complete an additional major will only receive one diploma (noting their engineering degree); their additional major will be noted on an official transcript at the time of graduation.

Commencement

For information regarding the Commencement schedules, ordering attire, and parking please visit the following website: <http://www.secfac.wisc.edu/commence/>

Second Bachelor's Degree

<http://pubs.wisc.edu/ug/enr/geninfo/secdegree.htm>

Persons with a Bachelor of Science or Bachelor of Arts degree from UW-Madison or other accredited institutions may, if eligible, pursue a second bachelor's degree from the College of Engineering.

Candidates from other institutions and UW-Madison graduates who have been out of school for one semester or more must apply for admission (or readmission) with the regular UW System Undergraduate Admissions application. Continuing UW-Madison students do not need to submit this form but must file a transfer application, available at the EGR Office. All candidates need permission from the Admissions Coordinator of the Engineering Student Services Office. The following graduate requirements must be met for the second bachelor's degree: Students must complete a minimum of 30 credits in residence, including 15 credits of work in the degree-granting department. Candidates must complete all university, college, major, and curricular degree program requirements.

III. UNDERGRADUATE ADVISING

The College of Engineering (COE) encourages students to seek guidance from multiple sources throughout their undergraduate studies. Just as no one mentor can fulfill all of a developing professional's needs, no one advisor can fulfill all of a student's needs. A student will receive richer and more valuable advice by seeking that advice from multiple advisors.

Role of the Student in the Advising Process

The COE requires, and expects, students to be active in educational planning and advisement. Students are expected to know what their degree requirements are; to monitor their academic progress, which includes knowing what courses have been completed, what courses remain, and what good academic standing means; to be aware of policies and procedures which guide their studies; to consult regularly with an advisor, especially before every registration period; and to be aware of how he/she learns in order to balance course schedules.

DARS

The Degree Audit Reporting System (DARS) is part of UW–Madison's commitment to academic advising for undergraduate students. An automated summary of a student's academic progress toward a degree, a DARS report, is particularly helpful when combined with the personal wisdom and insight of skilled advisors. DARS reports should always be reviewed with transcripts.

Most students may order a DARS report on the Web through My UW–Madison at my.wisc.edu on the Student Records tab. DARS shows which requirements have already been completed and which remain unsatisfied.

DARS is not intended to replace students' contact with academic and faculty advisors. Instead, the quick and thorough analysis provided by DARS allows more time in an advising appointment to discuss course options, research opportunities, plans for graduate school, or issues of personal interest or concern to students.

Please remember that DARS is just a computer program and it may occasionally make mistakes or place courses in a non-optimal fashion. If you see something on your DARS report that does not seem right, or does not make sense, please contact an advisor and we can help you sort it out.

Course Guide

The Course Guide provides a broad spectrum of course information in a consistent format and in a single location. It is an enriched, searchable course catalog with aggregated information from many campus sources. The Course Guide is available for use by students, faculty and instructional staff, departments, advisors, and staff. In addition, it is available to prospective students and their parents along with anyone interested in UW-Madison course information. For students, faculty and instructors, advisors, and UW-Madison staff (i.e., those with a UW-Madison NetID), log onto MyUW at <http://my.wisc.edu> and click on the Course Guide tab. Prospective students, parents, high school counselors or anyone without a UW-Madison NetID should access the Course Guide at <http://public.my.wisc.edu/>

Engineering General Resources (EGR) Advisors

All undergraduate students who have been admitted to the COE but are not yet affiliated with a degree-granting department are given the general classification of Engineering General Resources (EGR). All EGR students receive advising from an EGR advisor in the EGR office (1150 Engineering Hall). Students are welcome to discuss a wide variety of topics with their EGR advisor such as: (a) personal interests and career goals, (b) majors in or outside of engineering, (c) curriculum requirements and course selection, (d) academic support, such as tutoring services and study groups, (e) admission to engineering departments, (f) extracurricular activities, (g) campus resources and services, and (h) referrals for nonacademic problems.

EGR students are required to meet with their EGR advisor at various times throughout their tenure as an EGR student. EGR students should check with the EGR office for detailed information on required advising.

Faculty Advisors

All undergraduate students who have been admitted to a degree-granting department will also be assigned to a faculty advisor. All students are **strongly encouraged** to take the initiative to build a mentoring relationship with their faculty advisor as well as with other faculty members. Building a mentoring relationship with faculty is best done by meeting in person with faculty for scholarly advice such as guidance on research/independent study projects and advice on post-graduation plans. Faculty advisors are the best advisors to see for questions about course content, questions about course intensity and for help selecting advanced coursework or advanced electives to align with your post-graduation plans.

Students majoring in Computer Engineering (CMPE) or Electrical Engineering (EE) are required to see their faculty advisor to obtain approval on their selection of advanced course electives

Academic Advisors

All undergraduate students who have been admitted to a degree-granting department will be assigned to an academic advisor (i.e., a staff advisor). The academic advisor advises students on curriculum requirements; COE and UW-Madison policies and procedures; and the graduate school or professional school application process. An academic advisor can work with students to develop individual educational plans, answer questions about DARS reports, and connect students with other campus resources (e.g., Office of Student Financial Services, Engineering Transfer Admissions, International Engineering Studies and Programs, Engineering Career Services, etc.). The way to meet with an academic advisor in the South Student Services Center (serving CEE/ECE/GLE students) is to make an individual appointment or to stop in during drop-in advising times. To schedule an individual appointment or to inquire about drop-in advising with an academic advisor, use the Online Scheduling Tool (<https://tools.wiscal.wisc.edu/available/>) or contact Sherry Liantonio via telephone at 608/260-2420 or stop by her office in 2304a Engineering Hall.

South Student Services Center (SSSC)

The South Student Services Center (SSSC) is the office that the academic advisors for CEE, ECE, and GLE undergraduate students work. Additional information on the mission, vision, and objectives of the SSSC follows. The SSSC is located in 2304a Engineering Hall and can be reached via phone at 608/890-2420.

Mission Statement

The South Student Services Center (SSSC) within the College of Engineering at the UW-Madison provides support to both undergraduate and graduate students. We support undergraduate students who are declared Civil Engineering, Computer Engineering, Electrical Engineering, or Geological Engineering majors and graduate students studying Civil and Environmental Engineering, Electrical Engineering, or Geological Engineering.

Vision

The vision of the South Student Services Center (SSSC) within the College of Engineering at the UW-Madison is to: (1) be, and be recognized as, an effective and efficient student services center for both the students and the academic programs that we serve; (2) provide quality academic advising in partnership with the student's faculty advisor; and (3) continually ask ourselves "is this good for our students?"

Objectives

The South Student Services Center (SSSC) within the College of Engineering at the UW-Madison will strive to attain its vision by...

...creating a welcoming, inclusive, and supportive learning environment for SSSC students

...providing services of the highest quality that help SSSC students to develop and enrich their academic abilities, personal aspirations, and professional goals

...facilitating students' entry into and success within SSSC graduate programs

...continually improving the recruitment and retention of engineering students by enhancing the College of Engineering's interaction with: (1) UW-Madison students, programs, and student service organizations and (2) prospective SSSC students.

...supporting and collaborating with the student organizations that serve SSSC students

...recruiting, supporting, and retaining the best undergraduate and graduate students, especially women and underrepresented groups

...assessing and evaluating the dual advisor model being piloted by the SSSC

...collaborating with faculty and the appropriate advising and curriculum committees within each program to help students achieve their academic goals

...providing student feedback to the faculty and appropriate committees within each program

...streamlining administrative processes amongst the Civil and Environmental Engineering, Electrical and Computer Engineering, and Geological Engineering programs

IV. SCHOLARSHIPS

University & College Wide Scholarships

<http://scholarships.wisc.edu>

Scholarships@UW-Madison showcases the range of scholarship opportunities available at UW-Madison. To access Scholarships@UW-Madison, log in to your MyUW portal with your NetID and password. Once logged in, click the “Student Services” tab at the top of the page, select “Scholarships@UW-Madison,” and click “Enter Scholarships@UW-Madison.”

Scholarships are awarded to recognize the outstanding academic work of current and future UW-Madison students. Awards range from \$400 to \$6,000. Some scholarships offer awards for a single academic year while others may be renewable for up to four years. While not the only factor, financial need is often considered in the selection process.

Eligibility criteria will vary, even within individual schools and colleges. Pay particular attention to submission deadlines, as they vary by school and college. There is no single date when all scholarships are awarded. Recipients will be notified when final decisions have been made.

ECE Departmental Scholarships

<http://scholarships.wisc.edu>

Scholarships in variable amounts are awarded annually by the Department of Electrical and Computer Engineering (ECE). Scholarships are available to ECE undergraduates and to Engineering General Resources (EGR) students expecting to be admitted to the ECE department for the term of the scholarship. Many departmental awards are based on academic merit and not on financial need. Students will apply for scholarships online using Scholarships@UW-Madison (described above) during the spring semester and will receive notification in late summer or early fall.

Grainger Textbook Scholarship

The Grainger Foundation has established a textbook scholarship for declared Computer Engineering (CMPE) or Electrical Engineering (EE) majors who are either US citizens or permanent residents. Once an eligible student enrolls in a qualifying course, they will be contacted by ECE department staff about picking up their **free** textbooks. The current list of the 13 qualifying courses is as follows:

- ECE 220
- ECE 230
- ECE 235
- ECE 270
- ECE 271
- ECE 320
- ECE 330
- ECE 335
- ECE 340
- ECE 352
- ECE 353
- ECE 354
- CS 367

Grants Information Collection

<http://grants.library.wisc.edu/index.html>

The Grants Information Collection (GIC) is a collection of print and electronic materials available to students who wish to help fund their university expenses with money other than scholarship aid. The GIC houses numerous databases of grants available to individuals. Students are to conduct their own research into grants, however any reference staff member is available to help show students the location of the collection and answer basic questions. The GIC is open during normal library hours.

Nikki Busch
(608) 262-3242
nbusch@library.wisc.edu
262 Memorial Library

V. TUTORING & ACADEMIC ASSISTANCE

<http://studentservices.engr.wisc.edu/classes/tutoring/>

Free academic support is available to engineering students through tutoring, study groups, and supplemental instruction.

CeO Student Support Services

<http://www.education.wisc.edu/ceo/Default.aspx>

The Center for Educational Opportunity (CeO) houses the federally-funded TRIO Student Support Services program. Student Support Services (SSS) provides many services similar to the CeO center including: academic advising, assistance with accessing campus services including financial aid, mentoring, tutoring, opportunities to participate in social/cultural activities, career/graduate school advising, and much more. Students interested in becoming an SSS participant must complete an application for the CeO center.

Chemistry Learning Center

<http://www.chem.wisc.edu/areas/clc/signup.htm>

The mission of the Chemistry Learning Center is to assist students who are enrolled in general and organic chemistry courses in becoming successful and independent learners. Participation is voluntary and there is no fee. They offer a supportive learning environment where students meet in small groups with staff to work out effective strategies for mastering the chemical content. They have resources for students in some lectures of General Chemistry 103 and 104, and some lecture sections of Organic Chemistry 343 and 345. Please note that not all courses nor lecture sections in a course are covered at all times.

Counseling Service, College of Engineering

<http://studentservices.engr.wisc.edu/counseling/>

The College of Engineering's Counseling Service is available because it's easier to concentrate on your studies if you can deal effectively with personal, academic and career concerns. Talking with someone who is objective and empathetic can help you sort through these concerns. Appointments can be made with the College of Engineering Counselor, David Lacocque, by telephoning him at 608/265-5600 or by stopping by the office at 333 East Campus Mall (7th Floor). Confidentiality is assured within applicable legal and ethical guidelines. Nothing will be recorded in your academic file.

Diversity Affairs Office (DAO)

<http://studentservices.engr.wisc.edu/diversity/>

The Diversity Affairs Office (DAO) provides guidance and support to underrepresented students and women in the College of Engineering. DAO also sponsors the Tutor by Request program for all new transfer students and underrepresented students in engineering.

Drop-In Tutoring

http://studentservices.engr.wisc.edu/classes/tutoring/Drop_In/

Bring along your friends, study at tables, finish homework, and prepare for exams. Look for the red table signs. Feel free to study at the tables and consult the tutors as needed. Drop-in tutoring is free and open to all.

Greater University Tutoring Service (GUTS)

<http://guts.studentorg.wisc.edu/>

GUTS offers two options for students seeking help with academics: (1) academic match and (2) drop-in. GUTS also coordinates a study skills program that teaches efficient study habits that help students make the best use of their time.

Mathematics Tutorial Program

<http://www.math.wisc.edu/~tprogram/>

The Mathematics Tutorial Program offers free tutoring in a cooperative learning environment for students enrolled in Math 95, 101, 112, 113, 114, 211, 213, 231, 222, 171/217, and 234.

McBurney Disability Resource Center

<http://www.mcburney.wisc.edu/>

Students who have a documented disability, or suspect that they may have an undiagnosed disability are encouraged to contact the McBurney Disability Resource Center to inquire about obtaining academic accommodations. The McBurney Center provides academic accommodations such as: adaptive/assistive technology access, assistive listening devices, document conversion, elevator keys, ASL interpreting, notetaking support, testing accommodations, and reduced credit load recommendations to name a few. Students must provide documentation and be registered with the McBurney Center to receive at Verified Individualized Services & Accommodations (VISA) before they can obtain accommodations.

Telephone: (608) 263-2741

TTY: (608) 263-6393

Hours: Mon-Fri: 8:00-4:30

Location: 1305 Linden Drive (1st floor)

Physics Club Tutoring & Physics Learning Center

<http://ups.physics.wisc.edu/drupal/?q=node/23>

<http://www.physics.wisc.edu/plc/index.html>

Free drop-in tutorial program and facilitated study groups for Physics courses.

Supplemental Instruction (SI)/InterEGR 150

<http://studentservices.engr.wisc.edu/classes/tutoring/supplemental.html>

The Supplemental Instruction (SI) Program is an academic support program for “gateway” courses (EMA 201, EMA 202, ME 240, Physics 201 and Physics 202). SI helps to reinforce concepts, bridge gaps between teaching and learning, and supply strategies to promote problem solving skills with understanding. Students interested in SI are asked to commit time to two 60-minute group discussions facilitated by upper class CoE students. Students enroll in InterEGR 150, which is a zero credit course.

Statistics Tutorial Lab

<http://www.stat.wisc.edu/>

Free tutoring for students in Stats 224, Stat 301, Stat 324, or Stat 371.

Tutor by Request (one-on-one help)

http://studentservices.engr.wisc.edu/classes/tutoring/Tutoring_By_Request/

New transfer students in their first two semesters at UW-Madison and underrepresented students in engineering may be qualified for one-to-one tutoring, if an engineering tutor is available. If you qualify, you are likely to be preauthorized to enroll by visiting the Website listed above and following the instructions.

Writing Center

<http://writing.wisc.edu/>

The UW Writing Center provides free of charge face-to-face and online consultations which focus on a number of different writing scenarios (i.e. drafts of course papers, resumes, reports, application essays, cover letters, theses, etc). Writing Center instructors will not edit or proofread papers. Instead, their goal is to teach students to edit and proofread in order to become a better, more confident writer.

VI. ORGANIZATIONS & LEADERSHIP

Student Leadership Center (SLC)/Student Organizations

There are over 750 registered student organizations at the UW-Madison. Over 50 of those organizations are recognized as official student organizations within the College of Engineering. For a complete listing of the student organizations registered at the UW-Madison through the Center for Leadership and Involvement, please visit: http://www.cfli.wisc.edu/student_organizations.htm. For a complete listing of the student organizations recognized by the College of Engineering, please visit: <http://slc.engr.wisc.edu/organizations.html>. The following student organizations are organizations in which many ECE undergraduate students are involved:

American Indian Science and Engineering Society

<http://aises.rso.wisc.edu/>

Engineering EXPO

<http://engineeringexpo.wisc.edu/>

Enlight

<http://enlight.engr.wisc.edu/>

Eta Kappa Nu (HKN)

<http://www.engr.wisc.edu/studentorgs/hkn/>

Hmong Association of Engineers

<http://www.engr.wisc.edu/studentorgs/hae/>

Inst. of Electrical and Electronic Engr. (IEEE)

<http://ieee.slc.engr.wisc.edu/>

IEEE Robot Team (aka UW Robotics Team)

<http://ieeerobo.slc.engr.wisc.edu/>

Kappa Eta Kappa (KHK)

<http://delta.khk.org>

National Society of Black Engineers – Wisconsin Black Engineering Student Society

<http://wbess.slc.engr.wisc.edu/>

Polygon Engineering Student Council

<http://polygon.slc.engr.wisc.edu/>

Society of Hispanic Professional Engineers

<http://shpemadison.weebly.com/>

Society of Women Engineers

<http://swe.slc.engr.wisc.edu/>

Women in Science and Engineering

<http://www.housing.wisc.edu/wise/>

VII. SERVICE UNITS AVAILABLE TO STUDENTS

Engineering Career Services (ECS)

<https://ecs.engr.wisc.edu/public/index.php>

Engineering Career Services provides lifetime tools for successful career development in a rapidly changing world. ECS helps students in preparing for internship/co-op as well as job searches (resume & cover letter writing, listing of potential employers, etc), practicing interviewing skills (mock interviews, sample interview questions), and other important career information such as negotiating job offers and salaries. Students can become lifetime members of ECS by registering and paying a one-time \$20 fee.

The staff at ECS teaches a course called Career Orientation (listed as PRO OR 200 under Professional Orientation). The course generally meets one time per week and is worth one credit. Students gain exposure to the world of work and valuable knowledge and skills related to the job search.

Contact Person: Assistant Dean John Archambault
Telephone: (608) 262-3471
Location: M1002 Engineering Centers Building

Office for Equity and Diversity (OED)

<http://oed.wisc.edu/>

The Office for Equity and Diversity (OED), promotes, integrates, and transfers equity and diversity principles to nurture human resources and advance the mission of the University of Wisconsin-Madison (university). The OED employs multiple approaches to attain its strategic objectives. These include:

- provide leadership and consultation to develop and implement equity and diversity strategies throughout the campus;
- promoting the use of standardized and proactive human resources processes;
- maximizing human resources through the effective use of continuous improvement principles;
- establishing collaborative partnerships with Schools/Colleges and Divisions; and
- coordinating campus compliance with affirmative action and equal opportunity requirements, referred to as AA/EEO compliance.

The UW-Madison is committed to providing equal opportunity and equal access and to complying with all applicable federal and state laws and regulations and University of Wisconsin System and university non-discrimination policies and procedures. The OED has prepared an informative Website (<http://oed.wisc.edu/dishar.html>) containing a series of questions and answers to describe how our discrimination/harassment complaint process works at the university. These questions and answers are meant to help employees, applicants for employment, students, applicants for admission, and anyone using the university's programs or activities, including visitors to campus, understand how they can file a complaint of discrimination/harassment and how the investigative process works.

International Student Services (ISS)

<http://www.iss.wisc.edu/>

To maintain F-1 and J-1 status, international students must be enrolled in a full course of study each fall and spring semester. For undergraduate students, a full course of study is 12 enrolled credits per semester. Summer enrollment is not required by the US federal government for F-1 and J-1 visa holders unless you are a new student (with a summer school reporting date on your I-20 for initial attendance).

Check with an advisor in the International Student Services (ISS) Office if you want to confirm that you are in compliance with your visa regulations.

There are valid academic and medical reasons for an international student to reduce his/her credit load. For any semester an international student intends to reduce his/her course load, he/she must complete the Reduced Course Load for F-1 and J-1 Students Form, have his/her academic advisor or medical professional sign the form, and submit the form to the ISS Office for review. The form is available at:

<http://www.iss.wisc.edu/upload/documents/rcl.pdf>

University Health Services (UHS)

<http://uhs.wisc.edu/>

Students may seek medical assistance through UHS in the following areas: primary care, women's health, HIV and sexually transmitted infections, allergies and immunizations, dermatology, health concerns for those travelling abroad, sports medicine, and psychiatric services. Most medical services are prepaid and included in student fees and tuition.

To schedule an appointment, call: (608) 265-5600

Hours: Mon, Tue, Thur, Fri: 8:30-5:00

Wed: 9:00-5:00

Location: 333 East Campus Mall (5th and 6th floors)

VIII. STUDY ABROAD OPPORTUNITIES

Studying abroad offers valuable cross-cultural experiences and the opportunity to improve your language skills, learn to live and work in culturally diverse surroundings, and improve your value on the job market. **Planning for your study abroad experience is of utmost importance.** This includes meeting with your academic and/or faculty advisor **and** meeting with the coordinator of the study abroad experience. When you meet with your academic and/or faculty advisor, please discuss the courses you plan to take abroad in order to ensure an academically successful experience. Make sure you know what courses you need to take overseas to fulfill degree and graduation requirements so that you do not fall behind in your academic progress. Discuss the following topics with your advisor:

- Advisor approval/clearance forms
- Departmental course equivalencies
- DARS designations for courses that fulfill elective credits
- Grading of courses taken abroad
- Completing the last 30 credits abroad (if applicable)

Students are ultimately responsible for understanding how courses taken abroad will or will not fulfill degree requirements.

International Engineering Studies & Programs (IESP)

<http://international.engr.wisc.edu/>

International Engineering Studies and Programs (IESP) is a service unit within the College of Engineering that prepares UW-Madison engineering students to study abroad. As an IESP participant, you can choose from more than 50 study abroad programs in the Americas, Asia and the Pacific, and Europe and most programs are available for a semester or year. Many programs offer instruction in English. The courses completed abroad can help you make progress towards their engineering degree or allow you to explore additional academic areas.

While abroad on an IESP program, you will maintain student status and you (as an engineering student) will earn pass/fail grades for coursework completed overseas. If you take liberal studies courses while on an IESP program, you can still elect to take up to two additional liberal studies courses pass/fail at UW-Madison. The College of Engineering does not consider study abroad programs in residence; therefore you will need to request a waiver (at the time of application) of the college's residency requirements if you plan to study abroad during your final 30 credits.

The majority of programs are exchanges, which means that you would pay the same tuition as you currently do at UW-Madison. Financial aid is available to all UW degree-seeking students on study abroad programs – even those who have not received aid in the past. A minimum GPA of 3.0 (for most programs) is required to apply. Application deadlines are **October 1** for the spring semester, and **March 1** for the fall semester or for the entire academic year.

In order to obtain a certificate in International Engineering, students must have a five-week (minimum) study abroad experience. Additional information on the International Engineering certificate can be found in the following pages.

Contact Person: Amanda Hammatt
Email: international@engr.wisc.edu
Telephone: (608) 263-2191
Location: M1002A Engineering Centers Building

International Academic Programs (IAP)

<http://www.studyabroad.wisc.edu/>

International Academic Programs (IAP) offers over 150 study abroad programs to UW-Madison students across campus. Instruction is in a wide range of languages, including many options in English. Most programs are limited to course options in social sciences and humanities through a limited number of programs do have engineering courses available. While abroad on an IAP program, you will maintain your student status and you are typically assigned a letter grade for the courses that you will take. If you have questions about the grading basis for a particular course, you will need to talk **both** to IAP **and** to your advisor. The College of Engineering does not consider study abroad programs in residence; therefore you will need to request a waiver (at the time of application) of the college's residency requirements if you plan to study abroad during your final 30 credits.

For more information, contact IAP at: 250 Bascom Hall, 500 Lincoln Drive, Madison, WI 53706, T: 608/265-6329, F: 608/262-6998, peeradvisor@bascom.wisc.edu. Engineering students with additional questions regarding how their IAP study abroad program will or will not satisfy their engineering degree requirements can contact Bonnie Schmidt (1150 Engineering Hall, 608/262-4822, schmidt@engr.wisc.edu)

Other UW-Madison Study Abroad Experiences

If a UW-Madison engineering student chooses to study abroad through another UW-Madison study abroad unit it is **extremely important** that the student meet with the following people **before** going abroad: (1) their academic and/or faculty advisor; (2) the coordinator of the study abroad program; and (3) Bonnie Schmidt (1150 Engineering Hall, 608/262-4822, schmidt@engr.wisc.edu).

Non UW-Madison Study Abroad Experiences

If a UW-Madison engineering student chooses to study abroad through a non UW-Madison program (i.e., either through another university's study abroad program, an independent study abroad company, or solely on their own initiative), it is **extremely important** that the student meet with the following people **before** going abroad: (1) Amanda Hammatt in the International Engineering Studies and Programs office in M1002A Engineering Centers Building, (2) their academic and/or faculty advisor, and (3) Bonnie Schmidt (1150 Engineering Hall, 608/262-4822, schmidt@engr.wisc.edu).

Students who participate in a non UW-Madison study abroad program do not enroll at UW-Madison for the semester(s) they will be abroad. Students must apply for re-entry through the Office of Admissions before they can return to UW-Madison. For information about the online application and recommended deadlines, see <http://www.admissions.wisc.edu/reentry.php>. Most financial aid packages do not apply towards non UW-Madison study abroad programs. The academic institution abroad must be accredited in order for a student to apply for transfer credit for the courses taken while abroad. See Bonnie Schmidt (contact information above) to discuss possible course equivalencies. An engineering student who participates in a non UW-Madison study abroad program **must** do so early enough in their academic career so that, at the time of graduation, they are in compliance with the all of these regulations (<http://studentservices.engr.wisc.edu/regulations/34.html>).

IX. HONORS PROGRAMS

There are two undergraduate honors programs available to ECE students, Engineering Honors in the Liberal Arts (EHLA) and Honors in Research. A student who completes either program receives an Honors designation on his or her transcript.

Engineering Honors in the Liberal Arts (EHLA) <http://studentservices.engr.wisc.edu/classes/ehla.html>

High-ability students who enter the College of Engineering as first-year students with particularly broad educational goals and exceptional academic skills may be interested in the EHLA program (Engineering Honors in Liberal Arts). It is a clone of the honors program in the College of Letters in Science, and as such gives selected students both access and motivation to take honors-level classes to fulfill basic engineering degree requirements. Note that the College of Engineering does not offer honors classes, except for a few honors independent studies.

Honors in Research

Objectives and Goals of the Program: The Honors in Research program gives an undergraduate the opportunity to participate in a research project under the direction of a faculty member. It is expected that the student will be actively involved in research that could lead to new knowledge. The project can be independent or a component of a larger team effort. The research culminates in a senior thesis that the student presents in an Honors Seminar.

Admission Requirements: In order to be admitted to the Honors in Research program, a student must:

- 1) Complete at least one semester on the UW-Madison campus,
- 2) Have a cumulative GPA of at least 3.5,
- 3) Major in Computer Engineering (CMPE) or Electrical Engineering (EE),
- 4) Identify an ECE faculty advisor who is willing to supervise the research project.

Admission Process: The student should submit a letter to the South Student Services Center (2304a Engineering Hall) requesting admission to the Honors in Research program. The letter should identify the faculty advisor for the project and the topic under investigation. A one-page summary of the research project should be attached. The student should also submit a supporting letter from the faculty advisor. The ECE Curriculum Committee will review applications and make admission recommendations.

Academic Credit: Students admitted to the program should register for one to three credits of ECE 489 (Honors in Research) and submit a completed Application for Independent Study Credit to the South Student Services Center (2304a Engineering Hall). A letter grade will be assigned each semester. If the project will extend into the next semester, a grade of P (Progress) is given. A final letter grade (A-F) is assigned after the senior thesis is submitted and reviewed by the faculty advisor, or if the student formally withdraws from the program. Previous grades of P are eventually replaced by the final grade. Up to six credits of ECE 489 may count as Advanced Electives.

Senior Thesis: A senior thesis worth three credits of ECE 489 is required. The thesis is a written document that details the objectives of the project, the methods used to carry out the research, and the results of the research activity. The thesis must be approved by the faculty advisor and presented at an Honors Seminar.

Honors Designation: The designation "Honors in Research" will be awarded to CMPE or EE graduates who:

- 1) Complete either the CMPE or EE degree requirements
- 2) Have a cumulative GPA of at least 3.3 at graduation
- 3) Complete a total of at least eight credits of ECE 489
- 4) Receive a final grade of at least B in ECE 489

X. CERTIFICATE PROGRAMS

<http://studentservices.engr.wisc.edu/advising/degrees/certificates.html>

While UW-Madison does not have minors, it does offer organized programs in specific disciplines that lead to a certificate and a transcript notation indicating successful completion.

Biology in Engineering Certificate

<http://studentservices.engr.wisc.edu/advising/degrees/certificates.html>

The Biology in Engineering Certificate, administered by Academic Affairs in the College of Engineering, is designed for engineering students who want to strengthen their biology backgrounds. It is offered especially to encourage engineering students in traditional disciplines to prepare themselves to understand the special engineering problems in biology and medicine. A student successfully fulfilling the requirements will have the notation "Biology in Engineering Certificate" added to their transcript.

The 15-credit Biology in Engineering Certificate (BEC) program was designed and will be administered by a BEC Committee composed of faculty from multiple engineering disciplines. Students normally should begin the program during their sophomore or junior year, but seniors may also apply. For more information, visit 2620 Engineering Hall or call 608/262-3484.

Engineering for Energy Sustainability Certificate

http://www.energy.wisc.edu/?page_id=1077

The objective of the Engineering for Energy Sustainability certificate program is to offer undergraduate students a suite of courses addressing energy sustainability that span across the engineering curriculum, with firm roots in "real world" design and engineering practices. Students interested in completing the certificate program must contact a particular faculty member in his or her major department to apply. The student faculty member must, together complete the Declaration of Intent and Tentative Study Plan (found here: http://www.energy.wisc.edu/wp-content/uploads/2009/08/cees-dec_of_intent.pdf) in order to enter the certificate program.

Certificate in Engineering Risk, Uncertainty, and Decision Analysis

<http://studentservices.engr.wisc.edu/advising/degrees/2009ERUDA.pdf>

The design and analysis of engineering systems are becoming much more dependent on the ability of the engineer to analyze the system in the context of uncertainties in system performance, evaluate the reliability of normal operation and the risk of off-normal operation, and then make appropriate decisions to maintain reliability with optimal performance. As a result, many industries such as manufacturing, chemical, and nuclear are looking for engineering graduates with appropriate understanding and knowledge in these areas. The Certificate in Engineering Risk, Uncertainty and Decision Analysis includes courses in statistics and probability, modern uncertainty analysis, decision analysis, and probabilistic reliability and risk assessment. The primary goal of this program is to significantly increase the number of engineers with a fundamental understanding of uncertainty, reliability and risk-based decision making.

Certificate in Integrated Studies in Science, Engineering and Society (ISSuES)

<http://sts.wisc.edu/education/ISSuES.html>

The Certificate in Integrated Studies in Science, Engineering and Society (ISSuES) is offered to all undergraduate students, but it is aimed especially at undergraduate engineering students. The program is designed to provide students outside of the College of Letters and Sciences coherent exposure to the social sciences and humanities with an emphasis on the relationship between science, technology, engineering, and society. Students will be required to take a variety of courses that relate to and build on each other, each one contributing to a major focus of the certificate. Currently, the ISSuES Certificate offers four focuses, each with a corresponding cluster of courses from all across campus. The four themes are: ethnic focus, leadership focus, design focus, and general focus.

Certificate in International Engineering

<http://studentservices.engr.wisc.edu/advising/degrees/certificates.html>

http://studentservices.engr.wisc.edu/advising/degrees/cert_IntlEngr_req.html

The Certificate in International Engineering provides recognition for a student's efforts to prepare for an international career by learning about one or more countries other than the United States. An undergraduate student in the College of Engineering or the Department of Biological Systems Engineering can earn the Certificate by completing at least 16 credits worth of courses with a primary focus on the language, culture, history, geography, society or institutions of a particular country or region of the world. For reference, information on Areas Studies Programs at UW-Madison is available from the International Institute here: <http://www.intl-institute.wisc.edu/MemberPrograms/index.htm>

Certificate in Japanese Studies for Engineering Students

www.engr.wisc.edu/epd/tjc

The Certificate in Japanese Studies for Engineering Students helps undergraduate engineering students gain conversational and written skills in colloquial Japanese, reading and translation skills in technical Japanese, and an understanding of Japanese culture. Increasing numbers of American companies conduct business in Japan, and many Japanese companies have expanded their activities in the United States. These companies need engineers who can read and communicate in both English and Japanese. The Certificate in Japanese Studies addresses this need.

The certificate requires 27 credits, including three semesters of Japanese language, two semesters of intermediate-level technical Japanese, and one additional course related to Japanese language or culture. Interested students should begin taking Japanese courses in their first year. For more information, contact Professor James L. Davis, Room M1056D Engineering Centers Building, 608/262-4810.

Technical Communication Certificate

<http://tc.engr.wisc.edu/>

The Technical Communication Certificate (TCC) complements all undergraduate engineering degrees. The TCC curriculum helps students gain a broad range of skills in these areas:

- Written, oral, and graphic communication
- Online communication and electronic publishing
- Team projects and interpersonal communication
- Professional communication through the TCC internship

The Technical Communication Certificate has established itself as a program that meets industry and government agencies' demands for engineers with skills as communicators and for communication specialists. Typically, engineers spend half of their time or more communicating in their roles on project teams, as technical experts, or as managers. Because employers value well-developed communication skills, TCC courses will enhance success in co-op/intern positions and post-graduation careers. The more than 200 TCC graduates overwhelmingly confirm not only that the certificate gave them an edge over other candidates during the recruitment process, but also that the communication knowledge, skills, and attitudes they acquired while in the program helped them succeed in their jobs and helped prepare them for the communication and management tasks in today's multifunctional team environments.

The TCC requires 24 credits, including 9 credits in technical courses (many already required for any engineering degree) and 15 credits in technical communication (3 or 5 communication credits might count toward technical, liberal, or free electives, depending on the major). Aside from the relevant courses offered in the TCC, students especially value the close contact with faculty through advising, independent study projects, and collaboration. Students in the program often take on leadership roles in other college or campus-wide student organizations and projects, further developing their communication, team, and management skills. For up-to-date information, visit the Technical Communication Center website at <http://tc.engr.wisc.edu/> or contact the TCC Office (<http://tc.engr.wisc.edu/contact.html>) at (608) 262-2472 or in M1080 Engineering Centers Building.

Other Certificates – Official List

http://registrar.wisc.edu/documents/85_Official_Certificates.pdf

The Office of the Registrar, under the direction of the Office of the Provost and Vice Chancellor for Academic affairs, maintains the official list of certificate programs authorized for the UW-Madison. Only certificates on this official list (Website listed above) appear on the student's transcript. Listed after each certificate is the code for the College or School through which it can be obtained and the level of student to which it is available.

XI. PROFESSIONAL ENGINEER REGISTRATION

States require licensing of those engineers who engage in professional activities that may affect public health and safety. To be licensed, an engineer must earn the designation Professional Engineer (PE). While an "industrial exemption" covers many who are employed by industry, many engineers working for companies that deal with health and safety issues (e.g. utilities companies) find it advantageous to be registered as PE's. The PE designation is particularly important for those engineers serving as consultants or technical witnesses in court, where matters of public safety are an issue. Information concerning the advantages of registration can be obtained from the National Society of Professional Engineers (NSPE) at <http://www.nspe.org/>

Registration standards are set and governed by each state. In Wisconsin, this is handled by the Department of Regulation & Licensing. The Examining Board in Wisconsin uses exams from the National Council of Examiners for Engineering and Surveying (NCEES) (see <http://www.ncees.org/>). The NCEES exams are also used by all U.S. states and territories, so obtaining registration in another state does not normally require retaking the exam.

The first step toward registration is to apply to take the Fundamentals of Engineering (FE) exam. This exam focuses on the material you learned in your undergraduate degree program and is held twice per year, once every April (register by mid-January) and October (register by mid-July). To register for the exam online, you need to first create an account online with NCEES (<http://www.ncees.org/Exams/States/WI.php>). Complete the account creation and make note of your NCEES ID number. The second step is to schedule and pay the exam fee to Professional Credential Services (PCS). You will need your NCEES ID number to do this. Start by visiting the PCS Website (<http://www.pcshq.com>) and clicking "Applicant Information" on the far left.

Satisfactory completion of the FE exam and graduation with a BS in engineering earns the applicant the Engineer-in-Training (EIT) certification. After four years of training and practical experience, the Engineer-in-Training is eligible to take the Principles and Practice of Engineering exam (and a short exam on Barrier Free Design). Passing these exams then qualifies the applicant for registration as a PE.

The Fundamentals of Engineering exam consists of 180 multiple-choice questions in Mathematics, Engineering Probability and Statistics, Chemistry, Computers, Ethics and Business Practices, Ethics and Business Practices, Engineering Mechanics (Statics and Dynamics), Strength of Materials, Material Properties, Fluid Mechanics, Electricity and Magnetism, and Thermodynamics. It is not expected that every applicant will be knowledgeable in all areas; however, an adequate breadth and mastery of the material is needed in order to pass the exam. The Principles and Practice of Engineering exam consists of 80-100 multiple-choice questions tailored to the specific engineering disciplines (e.g. civil, mechanical, and electrical). Electrical and computer engineers choose an exam in one of three sub-disciplines; computer engineering, power engineering, or electrical and electronics engineering. Information booklets and sample exam questions can be ordered from NCEES.

PE registration is not mandatory for every engineering position. In fact, most electrical and computer engineering graduates go to work for private industry, government, or other employers without taking any of the steps toward registration. However, if registration is important in the type of engineering work in which you wish to be engaged, it is wise to carefully choose the engineering electives in your program so that you will not have difficulty passing the exams. If you are not certain whether you will need registration later, you may wish to take the appropriate steps now rather than studying for the exams 10 years from now!

XII. SENIOR-GRADUATE STATUS

<http://www.wisc.edu/grad/education/acadpolicy/guidelines.html#160>

<http://grad.wisc.edu/catalog/admis.html#sengrad>

Senior-graduates are UW-Madison undergraduate seniors who are within 1-6 credits of completing the requirements for a bachelor's degree and enroll in the Graduate School simultaneously. The student applies through the normal Graduate School process and must meet minimum admission requirements. In addition, the student must submit a senior-graduate form that verifies courses/credits needed to complete the bachelor's degree. The admitting department/program must recommend admission in full standing. Senior-graduates may not be admitted on probation (GPA below 3.0). The Senior-Grad Request Form by contacting the Graduate School Office of Admissions, 228 Bascom Hall, (608) 262-0735.

Senior-grads must follow the undergraduate enrollment guidelines to be considered full-time student. In other words, senior-grads must enroll in 12 credits minimum per semester. All senior-graduates pay graduate fees and are eligible for teaching assistantship or project assistantship appointments, including tuition remission. However, they are not eligible for fellowships or research assistantships.

Courses taken as a senior-grad will be noted on the student's undergraduate transcript. All grade points earned as a senior-graduate are counted in the computation of the cumulative undergraduate grade-point average. Graduate credit will be awarded only if the requirements for the bachelor's degree are completed by the end of the semester of senior-graduate enrollment. Failure to earn the bachelor's degree within one semester will result in termination of senior-graduate status and loss of credits toward the graduate degree. The student will be granted graduate standing the semester following receipt of the bachelor's degree.

Application for senior-graduate status is made at time of application to Graduate School. For more information, contact the Graduate School Office of Admissions and Academic Services, 228 Bascom Hall, 262-2433.

Senior-Grad Frequently Asked Questions

Q: What are the eligibility requirements to be a senior-grad?

A: To be eligible for the senior-grad status, you must be a UW-Madison undergraduate student within 1-6 credits of completing the requirements for your bachelor's degree.

Q: Do I need permission from an advisor before applying to be a senior-grad?

A: While meeting with an advisor would be a good idea to verify that you indeed are within 1-6 credits of completing your bachelor's degree; permission from an advisor is not required to apply to the program.

Q: How do I apply to be a senior-grad?

A: Students apply through the normal Graduate School process and must meet the minimum admission requirements. In addition, the student must submit, at the time of application, a senior-grad request form that verifies courses/credits needed to complete the bachelor's degree. The admitting department/program must recommend admission in full standing. Senior-grads may not be admitted on probation.

Q: Where can I get the senior-grad request form?

A: You can get the senior-grad request form by contacting the Graduate School Office of Admissions, 228 Bascom Hall, 608/262-0735.

Q: How many credits do I need to enroll in as a senior-grad to be considered a full time student?

A: Senior-grads must follow the undergraduate enrollment guidelines to be considered full time students. In other words, senior-grads must enroll in 12 credits to be considered a full time student.

Q: Am I charged undergraduate tuition and fees or graduate tuition and fees as a senior-grad?

A: All senior-grads pay graduate tuition and fees. Current graduate tuition and fees can be obtained from the Office of the Registrar (<http://registrar.wisc.edu/tuition & fees.htm>).

Q: As a senior-grad am I eligible for any funding?

A: Senior-grads are eligible for teaching assistantship or project assistantship appointments, including tuition remission. They are not eligible for fellowships or research assistantships.

Q: Is there an official notation somewhere to prove that I am/was a senior-grad?

A: Yes, a senior-grad notation is made on a senior-grad's undergraduate transcript.

Q: Are the courses I take as a senior-grad noted on my undergraduate transcript or my graduate transcript?

A: Courses taken as a senior-grad will be noted on a senior-grad's undergraduate transcript. All grade points earned as a senior-grad are counted in the computation of the cumulative undergraduate grade-point average. Graduate credit will be awarded only if the requirements for the bachelor's degree are completed by the end of the semester of senior-grad enrollment. Failure to earn the bachelor's degree within one semester will result in termination of senior-grad status and loss of credits toward the graduate degree. The student will be granted graduate standing the semester following receipt of the bachelor's degree.

Q: When should I apply for undergraduate graduation in my Student Center? Are there any special requirements?

A: The term that you select as your undergraduate graduation term in your Student Center should be the term that you will complete your undergraduate degree requirements. There are no special requirements.

Q: Where can I get more information if I have additional questions?

A: If you have additional questions, please contact the Graduate School Office of Admissions and Academic Services, 228 Bascom Hall, 262-2433.

XIII. GRADUATE STUDIES

<http://www.grad.wisc.edu/>

<http://www.grad.wisc.edu/catalog/>

<http://www.grad.wisc.edu/education/mas/toc.html>

<http://www.engr.wisc.edu/ece/ece-future-graduates-main.html>

Students interested in pursuing a graduate degree are encouraged to discuss this with their faculty advisors and/or an academic advisor in the South Student Services Center (2304a Engineering Hall). More information on UW-Madison graduate studies and graduate financial support (including fellowships) can be found by visiting the links listed above.

XIV. COMPUTER ENGINEERING (CMPE) CURRICULUM

Unless the ECE department provides information to the contrary, **the curriculum you should follow is the one in effect during your first semester in the ECE Department.** Exceptions to this rule may occur in the case of students who are readmitted. The program you follow must be based on the *Advising Information* booklet for **your curriculum** (please note that this may not be the most recent edition of the *Advising Information* booklet).

The Computer Engineering (CMPE) undergraduate curriculum ensures sufficient breadth and depth in CMPE, science, mathematics, and non-technical subjects. Course requirements within the CMPE program can be divided into two levels. The first level consists of courses that every CMPE student must complete. These courses form the CMPE Core, consisting of eleven classroom courses and two labs. They form a common basis upon which successive courses are built.

The second level is comprised of CMPE Advanced Electives. At this level, there are some general choices to be made corresponding to your interests, but within certain constraints. You are required to take at least one course from each of four groups, consisting of classroom course and labs. To aid you in making these decisions, descriptions of five areas of specialization within Computer Engineering are included in this booklet in Section XV. Area recommendations on course selection appear throughout this section.

Few students know exactly which areas they wish to emphasize when they begin the CMPE curriculum. It is important that you begin thinking about your choice early so that you can take full advantage of your electives in developing a coherent program. Through exposure to the required courses and consultation with your advisor, you should choose one or two areas by your senior year.

In addition to ECE courses, students must take courses in Mathematics, Science, Communication Skills, and Liberal Studies. Guidelines for the choice of these courses can be found later in this section. In the CMPE curriculum, credit requirements are distributed as follows:

<u>Requirement</u>	<u>Credits</u>
Mathematics	19
Science	29
Liberal Studies	16
CMPE Core	33
CMPE Advanced Electives	22
Communication Skills	<u>5</u>
	124

Sometimes a student may wish to make a course substitution in order to enhance a specific aspect of his or her program. If the student can demonstrate that such a request is well-founded, a substitution can often be made, but it must be approved by the Associate Chair for Undergraduate Activities. Such a request is also subject to review by a series of departmental and college committees.

Mathematics Requirements (19 credits)

DARS Category	ECE Requirement	Credit Requirement	Course
1) Calculus	Calculus 1	3 semesters required	Math 221 (5 cr.) OR Math 275 (5 cr.)
1) Calculus	Calculus 2		Math 222 (5 cr.) OR Math 276 (5 cr.)
1) Calculus	Calculus 3		Math 234 (3 cr.) OR Math 375 (5 cr.) ²
2) Discrete Mathematics	Discrete Mathematics	3 cr.	Math 240 (3 cr.) OR Math 475 (3 cr.)
3) Probability/Statistics Elective	Probability/Statistics	3 cr.	ECE 331 (3 cr.) OR Math 431 (3 cr.) OR Stat 311 (4 cr.)
TOTAL CREDITS		19 cr.	

² If you take Math 375, 2 credits will be applied to the Math/Science Elective subrequirement.

Science Requirement (29 credits)

DARS Category	ECE Requirement	Credit Requirement	Course	Alternative Courses	Alternative Courses
1) Computer Science	Algebraic Language Programming	6 cr.	CS 302 (3 cr.)		
1) Computer Science	Data Structures		CS 367 (3 cr.)		
2) Physics	Mechanics	10 cr.	Physics 201 (5 cr.)	EMA 201 (3 cr.) AND EMA 202 (3 cr.)	EMA 201 (3 cr.) AND ME 240 (3 cr.)
2) Physics	Electricity and Magnetism		Physics 202 (5 cr.)		
3) Chemistry	Chemistry	5 cr.	Chem 109 (5 cr.)	Chem 103 (4 cr.) AND Chem 104 (5 cr.)	
5) Math / Science Elective	General Science	3-8 cr.	<p>Students must choose courses from any of the following categories to bring the total number of Science credits to at least 29:</p> <p>(1) Courses having a Timetable designation of B, N, or P (Biological, Natural, or Physical Science) that are NOT offered by, or crosslisted with, ECE or CS.</p> <p>(2) Math course numbered 300-699.</p> <p>(3) College of Engineering courses 200-699 that are NOT offered by, or crosslisted with, ECE, CS, EPD, or PRO OR.</p> <p>(4) InterEgr 160</p> <p>(5) CS 425, 475, 513, 514, 515, and 525</p> <p>(6) ECE courses 320-641³ (excluding ECE 376, 377, 399, 489, and 491) and CS courses 400-679. <i>Note: No more than three credits from this sixth category may be applied to the CMPE degree.</i></p>		
TOTAL CREDITS		29 cr.			

³ ECE 320 and ECE 321 cannot both be taken for degree credit.

Area Mathematics/Science Recommendations

The following table lists mathematics/science course recommendations by area of specialization. Courses should be selected carefully, since some are prerequisite for advanced electives. Entries are ranked as: (1) strongly recommended, (2) recommended, or (3) useful. Additional information is available from faculty advisors in each area.

<u>Area</u>	<u>Probability/Statistics</u>	<u>General Science</u>
Electrical Engineering Applications	(1) Stat 311	(1) Math 319, 340
Electronic Design Automation	(1) Stat 311	(1) Math 319, 340
Embedded Systems Design	(1) ECE 331 (2) Math 431	(1) Math 320 (3) InterEgr 160
Networking and Communications	(1) ECE 331	(1) Math 319, 340
VLSI Systems Design	(1) Stat 311	(1) Math 320 (2) ECE 235 (3) InterEgr 160

CMPE Core Requirement (33 credits)

DARS Category	ECE Requirement	Credit Requirement	Course
1) Computer Engineering	CMPE Core	17 cr.	ECE 252 (2 cr.) ⁴
1) Computer Engineering	CMPE Core		ECE 352 (3 cr.)
1) Computer Engineering	CMPE Core		ECE 353 (3 cr.)
1) Computer Engineering	CMPE Core		ECE 354 (3 cr.)
1) Computer Engineering	CMPE Core		ECE 551 (3 cr.)
1) Computer Engineering	CMPE Core		ECE 552 (3 cr.)
2) Electrical Engineering	CMPE Core	10 cr.	ECE 230 (4 cr.)
2) Electrical Engineering	CMPE Core		ECE 330 (3 cr.)
2) Electrical Engineering	CMPE Core		ECE 340 (3 cr.)
3) Electrodynamics	CMPE Core	4 cr.	ECE 220 (3 cr.)
3) Electrodynamics	CMPE Core		ECE 321 (1 cr.) ⁵
4) Laboratory	CMPE Core	2 cr.	ECE 170 (1 cr.)
4) Laboratory	CMPE Core		ECE 270 (1 cr.)
TOTAL CREDITS		33 cr.	

⁴ ECE 252 fulfills the Introduction to Engineering component of the General College Requirements

⁵ ECE 320 may be taken in place of ECE 321. The excess 2 credits of ECE 320 are then used toward additional advanced electives. ECE 320 and ECE 321 cannot both be taken for degree credit.

Advanced Electives (22 credits)

Select courses from the following five categories, for a total of at least 22 credits. At least 12 credits must be taken in residence at UW-Madison.

1) **Electronic Circuits Elective:** ECE 342 or ECE 555.

2) **Design Laboratory Elective:** ECE 453, ECE 468, or ECE 554.

3) **Mini-Laboratory Elective:** ECE 271, ECE 438, or one course from ECE 301-317.

4) **System Software Elective:** CS 536, CS 537, or CS 564.

5) **Additional Advanced Electives:** Choose courses to bring the total number of Advanced Elective credits to 22. These must be either ECE courses numbered 320-699 or CS courses numbered 400-679 or 699. The courses you choose must satisfy the following eight conditions:

1) At least 6 credits must be in ECE courses numbered 400 and above.

2) ECE 376 and ECE 377 may not be used.

3) ECE 320 and ECE 321 cannot both be taken for degree credit.

4) If your cumulative GPA is at least 2.5, you may register for ECE 399 (Independent Study), ECE 699 (Advanced Independent Study), or CS 699 (Directed Study) and apply up to 3 credits toward the requirement. You must submit an Application for Independent Study Credit to the South Student Services Center (2304a Engineering Hall) **prior to the semester in which the course is taken.**

5) If your cumulative GPA is at least 3.5, you may register for ECE 489 (Honors in Research) and apply up to 6 credits toward the requirement. You must submit an Application for Independent Study Credit to the South Student Services Center (2304a Engineering Hall) **prior to the semester in which the course is taken.**

6) If your cumulative GPA is at least 2.5, you may register for ECE 491 and apply 3 credits toward the requirement. You must submit an Application for Independent Study Credit to the South Student Services Center (2304a Engineering Hall) **prior to the semester in which the course is taken.**

7) You may use one degree credit of ECE 001 (Cooperative Education Program).

8) If you are interested in using ECE 379 as an advanced elective, consult your faculty advisor **prior** to enrolling for approval.

9) You may apply other courses to this category only with the approval of your faculty advisor. Courses must have a clear pertinence to your selection of ECE advanced electives.

Selection of CMEE Advanced Electives is a matter of major importance; it should be done in consultation with your faculty advisor. Since not all advanced courses are offered every semester, you are advised to plan ahead and to begin taking some of these courses prior to your final year. For a schedule of advanced courses, see the handout "ECE Department *Tentative* Course Offerings," available online (<http://www.engr.wisc.edu/cmsdocuments/ECE-Tentative-Course-Offerings.pdf>) or in the South Student Services Center (2304a Engineering Hall).

By the deadline corresponding to your graduation date, you must submit a CMPE Advanced Elective Approval form, signed by your faculty advisor, to the South Student Services Center (2304a Engineering Hall).

Area Advanced Elective Recommendations

The following table lists CMPE Advanced Elective course recommendations by area of specialization. Courses should be selected carefully, since some are prerequisite for other advanced electives. Entries are ranked as: (1) strongly recommended, (2) recommended, or (3) useful. Additional information is available from advisors in each area.

<u>Area</u>	<u>Electronic Circuits</u>	<u>System Software</u>	<u>Design Lab</u>	<u>Mini-Lab</u>	<u>Additional</u>
Electrical Engineering Applications	No recommendation	(1) CS 536	(1) ECE 453 (2) ECE 468	(1) ECE 315	(1) CS 412, 577 (2) ECE 420, 431, 438, 447, 533, 543 CS 559 (3) ECE 447
Electronic Design Automation	(1) ECE 555	(1) CS 536	(1) ECE 554	(1) ECE 315	(1) ECE 553, 556 CS 412, 577 (2) CS 525 (3) CS 425
Embedded Systems Design	(1) ECE 342	(1) CS 537	(1) ECE 453 (2) ECE 468	(1) ECE 315	(1) ECE 332, 334, 409, 431 (2) ECE 417, 438 (3) ECE 463, 553
Networking and Communications	(1) ECE 555	(1) CS 537	(1) ECE 453 (2) ECE 554	(1) ECE 315	(1) ECE 437, 438, 537 (2) ECE 431 CS 640 (3) ECE 436, 447
VLSI Systems Design	(1) ECE 555	(1) CS 537	(1) ECE 554	(1) ECE 315	(1) ECE 431, 553 (2) ECE 335, 541, 556 (3) ECE 437

Communication Skills (5 credits)

DARS Category	ECE Requirement	Credit Requirement	Course
1) Basic Communications (Communications Part A Requirement) ⁶	Communication Skills	2 cr.	Com Arts 100 (3 cr.) OR English 100 (3 cr.) OR English 118 (3 cr.) OR EPD 155 (2 cr.) OR Life Sciences Com 100 (3 cr.)
2) Professional Expression	Communication Skills	3 cr.	EPD 397 (3 cr.)
TOTAL CREDITS		5 cr.	

⁶ Students are expected to satisfy the Communications Part A requirement prior to admission to the CMPE program. Students may be exempted from the Communications Part A requirement by approved college coursework while in high school, AP test scores, or placement testing. Exemption does **NOT** reduce the total 124-credit requirement for the BSCMPE degree.

Liberal Studies Requirement (16 credits)

http://pubs.wisc.edu/ug/engr_liberal.htm

The College of Engineering requires one semester's worth (approximately 16 credits) of liberal elective courses in humanities and social studies for graduation. The college specifies that students should obtain both **breadth** (i.e., both social studies and literature or humanities), and **depth** (i.e., more than one course in at least one area).

The college has established general liberal elective guidelines that have been adopted by all departments, some of which have additional stipulations. Please see the fourth subrequirement (listed below) for the additional subrequirement required for all EE and CMPE students.

As a graduation requirement, and to fulfill campus general education guidelines, all engineering undergraduate students must take 16 credits of liberal electives (15 in curricula requiring 120 credits). These credits must fulfill the following subrequirements:

- I. A minimum of two courses from the same department or program. At least one of these two courses must be above the elementary level. (i.e., must have I, A, or D level designator), as indicated in the Schedule of Classes (*Timetable*).
- II. A minimum of 6 credits designated as humanities (H or L or Z credit), and an additional minimum of 3 other credits designated as social studies (S or Z). Foreign language courses count as H credits⁷.
- III. At least three credits in courses designated as ethnic studies (lower case "e" in the Schedule of Classes [*Timetable*]). These credits may help satisfy subrequirements I or II as well, but they count only once toward the total required.
- IV. No more than 3 liberal elective credits may be from the School of Business or from classes crosslisted with the School of Business.

⁷ **Exception:** "Retrocredits," which are credits awarded by foreign language departments for successful completion of a higher level course, do not count toward this subrequirement, nor toward the total credits required (15 or 16). They are still helpful: If a student takes even one foreign language course at the intermediate level and is awarded retrocredits, then subrequirement I above is satisfied because the student is judged to have achieved "depth" in liberal studies.

Curriculum Checklist

Course requirements for the BSCMPE degree are summarized in the following table. Note that this information complements both the flow chart at the beginning of this handbook and your DARS report. You should fill in the table at the end of each semester or session and bring it with you whenever you see your advisor.

Mathematics	Credits	Grade
Math 221	5	
Math 222	5	
Math 234	3	
Math 240/475	3	
Probability/Statistics	3	
Subtotal	19	

Science	Credits	Grade
Physics 201	5	
Physics 202	5	
CS 302	3	
CS 367	3	
Chem 109	5	
Math/Science Elective	3-8	
Subtotal	29	

Liberal Studies	Credits	Grade
Subtotal	16	

Total Credits: 124

CMPE Core	Credits	Grade
ECE 170	1	
ECE 220	3	
ECE 230	4	
ECE/CS 252	2	
ECE 270	1	
ECE 321	1	
ECE 330	3	
ECE 340	3	
ECE/CS 352	3	
ECE 353	3	
ECE/CS 354	3	
ECE 551	3	
ECE/CS 552	3	
Subtotal	33	

CMPE Advanced Electives	Credits	Grade
ECE 342/555	3	
ECE 453/468/554	4	
ECE 271/438/301-317	1	
CS 536/537/564	3-4	
ECE 400+	3	
ECE 400+	3	
Subtotal	22	

Communication Skills	Credits	Grade
Comm A	2	
EPD 397	3	
Subtotal	5	

Eight Semester Plan⁸

The following table describes one possible plan for graduation with a BSCMPE degree in eight semesters.

<u>FRESHMAN I</u>	<u>Credits</u>	<u>FRESHMAN II</u>	<u>Credits</u>
Math 221	5	Math 222	5
Chem 109	5	Physics 201	5
ECE/CS 252	2	CS 302	3
Comm A	<u>2</u>	Liberal Studies	<u>3</u>
	14		16
<u>SOPHOMORE I</u>	<u>Credits</u>	<u>SOPHOMORE II</u>	
Math 234	3	ECE 220	3
Math/CS 240	3	ECE 230	4
Physics 202	5	CS 367	3
ECE 170	1	ECE/CS 354	3
ECE/CS 352	<u>3</u>	Liberal Studies	<u>3</u>
	15		16
<u>JUNIOR I</u>		<u>JUNIOR II</u>	
ECE 270	1	ECE 551	3
ECE 330	3	ECE 552	3
ECE 340	3	CMPE Advanced Elect.	3
ECE 353	3	Probability/Statistics	3
Liberal Studies	3	ECE 321	1
General Science	<u>3</u>	General Science	<u>3</u>
	16		16
<u>SENIOR I</u>		<u>SENIOR II</u>	
Mini-Laboratory Elect.	1	CMPE Advanced Elect.	3
Electronic Circuits Elect.	3	CMPE Advanced Elect.	4-5
Design Laboratory Elect.	4	General Science	2
System Software Elect.	3 - 4	Liberal Studies	3
Liberal Studies	<u>4</u>	EPD 397	<u>3</u>
	15 - 16		15 - 16

⁸ Some ECE Advanced Electives are not offered every semester; therefore, this plan may require modification in the last three semesters. See the handout "ECE Department Tentative Course Offerings," available online (<http://www.engr.wisc.edu/cmsdocuments/ECE-Tentative-Course-Offerings.pdf>) or in the South Student Services Center (2304a Engineering Hall), for more information.

Areas of Specialization in Computer Engineering

The CMPE curriculum provides broad elective opportunities for students to specialize in one or more areas of particular interest. Students should begin to plan the area or areas they would like to pursue at least two years prior to graduation.

Brief descriptions of the general areas within CMPE are given below. Faculty in each area and references for introductory reading are also included.

Electronic Design Automation

Faculty: Compton, Davoodi, Hu, Kim, Saluja

Electronic Design Automation (EDA) deals with the design of software used by computer and electrical engineers to perform hardware and software design and associated analysis. Examples of EDA tools you might have used are Mentor Graphics Design Architect and Quicksim and PSpice. To work in EDA, the student needs to know the underlying hardware as well as the techniques required to design the EDA software. Students in this area typically go to work for companies such as Mentor Graphics, Synopsys, or Cadence as well as many computer and semiconductor companies that have their own internal EDA departments.

Embedded Systems Design

Faculty: Compton, Draper, Hu, Ramanathan, Schulte

Computers are becoming ubiquitous in society today. Everyone is familiar with the concept of the personal computer, and engineering students are likely to have encountered powerful workstations as well. These obvious “computers,” however, are far outweighed by the billions of computer per year that are part of other systems ranging from TV remote controls to automobiles and large passenger aircraft and industrial assembly lines. The embedded systems area deals with the design of systems that contain computer hardware and software as a part of the system. Instead of designing computer chips and computers, graduates in this area use computer chips and other hardware and write software to implement the applications for the system being designed. Graduates in this area have a wide-range of opportunities across the spectrum from very large to very small companies.

Networks and Communications

Faculty: Draper, Hu, Ramanathan, Sayeed

Because of the explosive growth of the Internet and the transition from analog to digital electronic technologies, we are experiencing an information revolution. In dealing with both hardware and software, the networks and communications engineer has a central role in this exciting revolution with its broad impact on how we do things. The roles of the network and communications engineer include the design of networking hardware and software, setting up and managing major networking installations, and interfacing networking hardware and software to other products. Graduates in this area may work for companies manufacturing network gear or establishing large networking operations including those involving wireless communication.

VLSI Systems Design

Faculty: Compton, Davoodi, Kim, Lipasti, Ramanathan, Saluja, Schulte

Due to the growth of the computer and communication industries, there is a significant demand for digital designers. VLSI (Very Large-Scale Integrated) Systems design deals with this design of integrated circuit chips, boards that include these chips and systems that use the boards. In addition, as the complexity of integrated circuit chips increases, analog hardware often accompanies the digital hardware on a chip. As a consequence, analog design and mixed signal design are also potential components of this area. A graduate in this area will typically work for a semiconductor company, a computer company, or any company that designs and/or manufactures chips and systems.

USEFUL WEBSITES (NOT MENTIONED ELSEWHERE)

Academic Calendar	http://www.secfac.wisc.edu/acadcal/
Adult Career and Special Student Services	http://www.dcs.wisc.edu/info/
Associated Students of Madison	http://www.asm.wisc.edu/
Bursar's Office	http://www.bussvc.wisc.edu/bursar/bursar.html
Campus Safety	http://www.safeu.wisc.edu/
Child Care and Family Resources	http://ocfr.wisc.edu/
Code of Conduct	http://students.wisc.edu/saja/misconduct/misconduct.html
College of Engineering Student Services	http://studentservices.engr.wisc.edu/
Commencement	http://www.secfac.wisc.edu/commence/
Computer-Aided Engineering	http://www.cae.wisc.edu/
Information Technology, Division of	http://www.doit.wisc.edu/
Innovation Days	http://innovation.wisc.edu/
International Student Services	http://iss.wisc.edu/
Job Center, UW Student	http://jobcenter.wisc.edu/
LGBT Campus Center	http://lgbt.wisc.edu/
Morgridge Center for Public Service	http://www.morgridge.wisc.edu/index.html
Multicultural Student Center	http://msc.wisc.edu/msc/
New-Student Programs	http://www.newstudent.wisc.edu/
Recreational Sports, Division of	http://www.recsports.wisc.edu/
Registrar, Office of the	http://www.registrar.wisc.edu/
SAFE Nighttime Services	http://transportation.wisc.edu/transportation/safeservices.aspx
Schedule of Classes	http://registrar.wisc.edu/schedule_of_classes.htm
Software Training for Students	http://www.doit.wisc.edu/training/student/
Steuber Prize for Excellence in Writing	http://tc.engr.wisc.edu/steuber/
Student Advocacy and Judicial Affairs	http://students.wisc.edu/saja/index.html
Student Financial Aid, Office of	http://www.finaid.wisc.edu/
Student Health Insurance Plan	http://www.uhs.wisc.edu/ship/insurance.shtml
Student Life, Division of	http://students.wisc.edu/
Student Shop, College of Engineering	http://coestudentshop.engr.wisc.edu/
Transfer Student Services	http://www.newstudent.wisc.edu/transfer/
Transportation Services	http://www2.fpm.wisc.edu/trans/
Undergraduate Catalog	http://pubs.wisc.edu/ug/index.htm
University Apartments	http://www.housing.wisc.edu/universityapartments/
University Housing	http://www.housing.wisc.edu/
University Police Department	http://www.uwpd.wisc.edu/
Veteran Services	http://students.wisc.edu/veterans/veterans.html
Visitor and Information Programs	http://www.vip.wisc.edu/
Wendt Library	http://wendt.library.wisc.edu/
Wisconsin Experience	http://www.learning.wisc.edu/
Wisconsin Union	http://www.union.wisc.edu/