

Handbook for the
Bachelor of Science in Civil Engineering
in the
Department of Civil and Environmental
Engineering
at the
University of Massachusetts Amherst

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Preface

The intent of this Handbook is to provide an overview of the undergraduate program in the Department of Civil and Environmental Engineering at the University of Massachusetts Amherst. The Handbook describes the mission and objectives of the Department with regards to undergraduate education. The Handbook details the requirements that need to be fulfilled to receive a B.S. degree in Civil Engineering. The Handbook also provides details on Department policies, procedures, and requirements for transferred courses, Honors program and other special opportunities that students may pursue. This Handbook addresses specific rules and policies of the Department of Civil and Environmental Engineering and describes other College and University regulations. College and University requirements not mentioned in this Handbook still apply to all students.

The Civil Engineering Program at UMass

Department of Civil and Environmental Engineering Mission

The mission of the Department of Civil and Environmental Engineering is: to educate students at the undergraduate and graduate levels; to conduct research to solve Civil Engineering problems and to discover new knowledge; to offer service to the Commonwealth, the nation, and the Civil Engineering profession; and to develop Civil Engineering leaders.

CE Program Educational Objectives

The Program Educational Objectives of the UMass Civil Engineering Program describe what graduates are expected to attain in the years after graduation. They are:

1. Within three to five years of graduation Program graduates will have become employed in engineering or a related profession or will have continued with graduate studies.
2. Within three to five years of graduation Program graduates will have been recognized by supervisors and colleagues as possessing the knowledge and skills needed for a successful career in engineering or related field and will be progressing toward the appropriate professional license or credentials.
3. Within five to ten years of graduation Program graduates will have demonstrated leadership and service within their profession and in their communities through participation in professional societies and charitable organizations and similar civic service activities.
4. Throughout their careers program graduates will use educational opportunities to continue to expand their knowledge and skills in areas required for their career.

The Civil Engineering Curriculum

The Department awards a Bachelor of Science Degree in Civil Engineering. The degree is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>, and the curriculum includes a mixture of humanities, social science, physical science, communications, and engineering courses. Figure 1 shows the full curriculum with the typical semester in which each course is taken. Many of the basic science and engineering courses are taken in the first two years, followed by engineering courses in the areas of Environmental and Water Resources Engineering, Geotechnical Engineering, Structural Engineering, and Transportation Engineering. In addition, the curriculum has sufficient flexibility to allow concentration in one or more of these areas in the senior year. Some courses are a lecture format, while others rely heavily on interaction among students in small groups to complete design projects. In addition, several courses have laboratory sessions to provide hands-on engineering experience. Because Civil Engineering is a people-serving profession where practitioners have direct contact with clients and the public, the curriculum provides for courses in the humanities and social sciences. In addition, the curriculum requires two writing courses. The design courses have an emphasis on verbal and written communication.

The curriculum is designed to produce well educated and well informed civil engineers who can operate at the cutting-edge of Civil Engineering practice. Many of our graduates either proceed directly into graduate school or return for graduate education after several years of professional experience. In accordance with the requirements of the Engineering Accreditation Commission of ABET at the end of their studies, graduates completing the Civil Engineering curriculum attain the following Student Outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Figure 1: Civil Engineering Curriculum (for students entering after June 2016)

<u>Freshman Year</u>			
EnglWP 112 - College Writing	3	CE-ENGIN 121 - CE Measurements	3
ENGIN 111 - Intro to Civil Engrg	3	Chem 112 - Engrg Chemistry	4
Chem 111 - Engrg Chemistry	4	Math 132 - Calculus II	4
Math 131 - Calculus I	<u>4</u>	Physics 151 - Gen. Physics I	<u>4</u>
	14		15
<u>Sophomore Year</u>			
CE-ENGIN 240 – Statics	3	CE-ENGIN 270 – Sys. Anal. & Econ. for CE	3
CE-ENGIN 244 – Prog. for CE	3	CE-ENGIN 241 & 241A - Strength of Materials	4
CE-ENGIN 260 - Statistics	3	CE-ENGIN 250 - Thermo, Heat Trans., & Energy	3
Math 233 - Multivariable Calculus	3	Economics 103 or 104	4
Physics 152 - Gen. Physics II	<u>4</u>	Math 331 - Ordinary Differential Equations	3
	16		17
<u>Junior Year</u>			
CE-ENGIN 310 - Trans. Systems	3	CE-ENGIN 320 - Soil Mechanics	4
CE-ENGIN 331 - Structural Analysis	3	ENGIN 351 - Writing in Engineering	3
CE-ENGIN 357 – Prin. of Fluid Mech.	3	CE-ENGIN 433 or 434 - Concrete/ Steel Design	3
CE-ENGIN 370 - Env. Engrg. Princ.	4	Biological Science (BS)	<u>4</u>
Social World Elective	<u>4</u>		14
	17		
<u>Senior Year</u>			
Social World Elective	8	CE-ENGIN 488 – Prof. Practice Seminar	1
Civil Engineering Electives*	<u>9</u>	Civil Engineering Electives*	9
	17	Free Elective	<u>3</u>
			13

* One course is required in the Environmental and Water Resources, Geotechnical and Transportation area.

Total Credit Hours Required -- **123**

Guidance for Completing the Civil Engineering Program

Advising Procedures In Civil Engineering

All students in the Department have a faculty advisor. Ideally, this advisor tracks student progress throughout the students' career in the department. However, due to interruptions, such as faculty sabbaticals or leaves, advising assignments may change. Students should feel free at any time to make an appointment with their advisor if they have questions or concerns. Office location, telephone number and the email address of each students advisor is listed in their SPIRE account.

Faculty advisors have an important responsibility for undergraduates: to help them to choose their program of study, and to act as a source of information about academic rules, regulations, and options. Faculty members have an obligation to become familiar with the University's academic rules and regulations and to be familiar with the Civil Engineering Curriculum so that they can intelligently advise students concerning their plans of study. However (as noted in the University Undergraduate Catalog), it is the responsibility of the student to ensure that provisions of the curriculum are met and that academic rules and regulations are observed.

Students and advisors meet each semester at the semi-annual preregistration advising night. The Department and the College Office of Student Affairs (OSA) will notify students of the dates of the Department advising and preregistration night. Before meeting with their advisor students should obtain registration material from the Academic Assistant (or in OSA if you have not yet declared Civil Engineering as your major). Students need to:

1. Read the instructions;
2. Decide on course selections (to the extent possible);
3. Fill in the course selection form (again, to the extent possible) before meeting with the advisor.

During the advising night the student and advisor discuss course choices, and consider any questions that the student may have. If a student misses advising, a hold is placed on their SPIRE account. This hold prevents them from registering for courses for the next semester. After the student participates in the advising process, the hold is lifted and the student can register on SPIRE. The Department policy of imposing holds on SPIRE accounts is intended to avoid problems with students signing up for courses without having an opportunity to discuss their classes with their advisor or to register for courses without the proper prerequisites.

Tutoring

The College Of Engineering provides information on tutoring services available to engineering students. Details can be found at <http://engineering.umass.edu/current-students/tutoring>.

Course Descriptions

A full list of courses, their descriptions and their pre-requisites and co-requisites is available on SPIRE. While some elective courses are offered every year, many elective courses are only offered on an occasional basis.

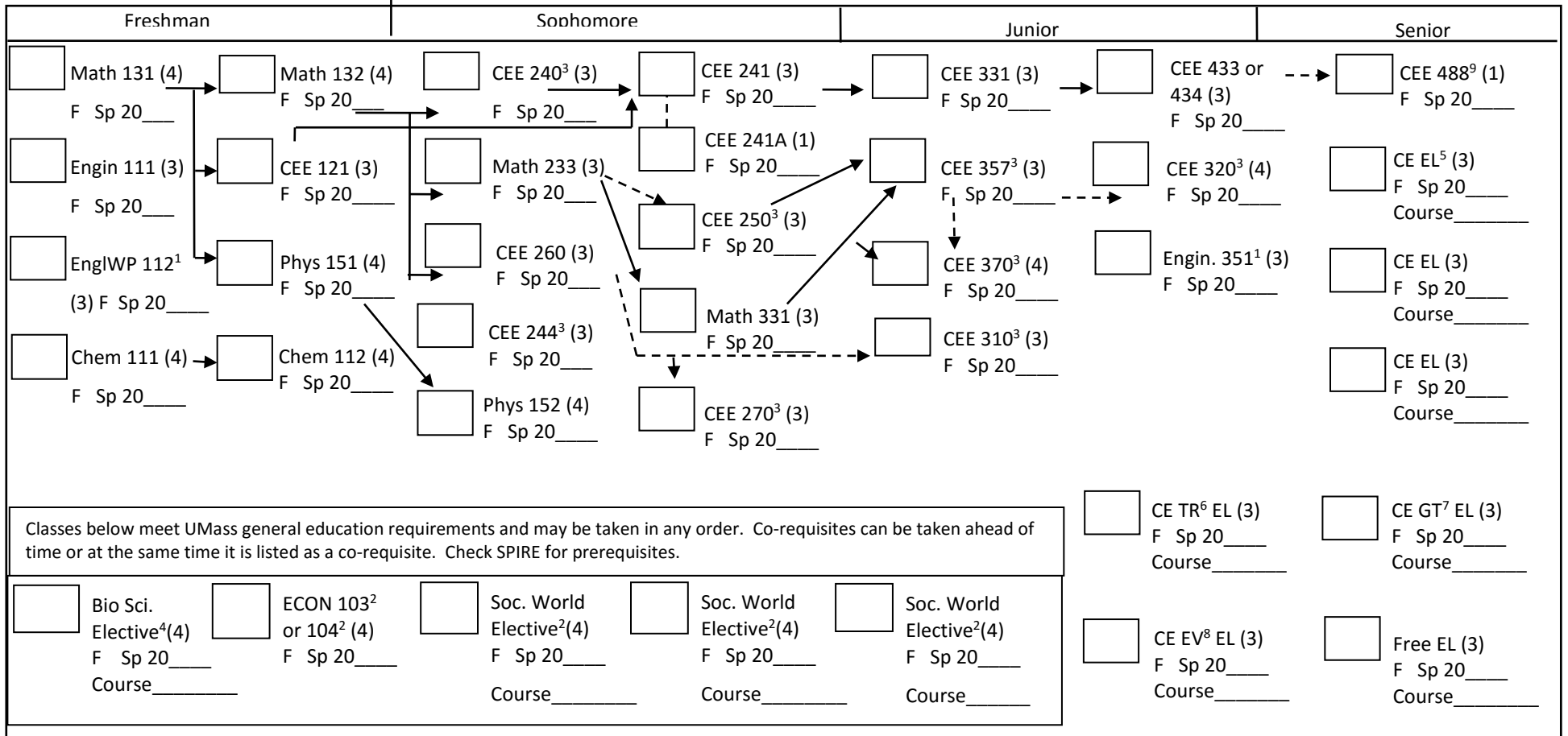
Progress Through the Curriculum – Flow Chart

Figure 2 shows the path through the curriculum taken by the typical student. The flow chart is used by the student, the advisor and the Department to track the student's progress and plan an appropriate course sequence to complete the degree in a timely manner. The flow chart shows many of the prerequisites for each course (indicated by the solid lines). The flow chart also shows the corequisites for courses (indicated by dashed line). Corequisite courses must be taken in the same semester or in an earlier semester as the course for which they are a corequisite. A complete list of prerequisites and corequisites for all Civil and Environmental Engineering courses taken by undergraduate students is provided in Appendix A.

Figure 2: Flow Chart for Progress Through the Civil Engineering Curriculum

CIVIL ENGINEERING

Curriculum for Students Entering the University after June 2016



Notes: Solid arrows indicate prerequisites, broken arrows indicate co-requisites. **Graduation clearance requires a 2.0 University GPA and a 2.0 Major GPA. Total credits needed is 123.**

ECON 103 or 104 _____ AL, AT _____	HS _____ AL, AT, SB, I or SI _____	G course _____ U course _____	5. A Civil Engineering elective is any 300 level or higher CEE course. At least two Design Elective courses must be taken. The following courses are designated as Design Electives: CEE 421, 433, 434, 450, 462 and 469. Indicate here the two courses that meet the Design Elective requirement. Design Elective #1 _____ Design Elective #2 _____
1. EngIWP 112 and Engin 351 meet UMass communication skills requirements.		6. TR elective: any 300 level or higher CEE Transportation area course. CEE 450 satisfies both the TR elective and the Design Elective requirements.	
2. Social world requirement: 4 courses, one with G and one with U designation.		7. GT elective: any 300 level or higher CEE Geotechnical area course. CEE 421 satisfies both the GT elective and the Design Elective requirements.	
3. Additional prerequisites shown in parentheses: 240 (Phys. 151 co-requisite), 244 (Math 131), 250 (Phys 151, Math 132), 270 (Engin 111; Math 132); 310 (Math 233); 320 (241); 357 (240); 370 (Chem 112).		8. EV elective: any 300 level or higher CEE Environmental & Water Resources area course. CEE 469 satisfies both the EV elective and the Design Elective requirements.	
4. Biological sciences requirement - any course with BS designation. Must be 4 credits.		9. CEE 488 has these prerequisites: 310, 320, 331, 370 and requires senior standing. A Design Elective should be taken in the same semester that CEE 488 is taken.	

Academic Honesty

As noted in the University Undergraduate Catalogue, “The University requires honesty of all of its members in their academic work. Honesty is necessary to the learning process and is integral to the atmosphere of genuine inquiry and intellectual curiosity which the University seeks to foster.”

The University has an Academic Honesty Policy, which along with discipline and appeal procedures may be found at the Dean of Students Office website: <http://www.umass.edu/honesty/>. Students are urged to read and follow this policy. Any act of academic dishonesty is taken seriously by the CEE Department and discipline will follow.

In addition to being part of the University, Civil Engineering students are part of a profession, which further demands honesty and integrity. As noted in the American Society of Civil Engineers (ASCE) Code of Ethics, “engineers uphold, and advance the integrity, honor and dignity of the engineering profession by:

1. using their knowledge and skill for the enhancement of human welfare and the environment;
2. being honest and impartial and serving with fidelity the public, their employers, and clients;
3. striving to increase the competence and prestige of the engineering profession; and
4. supporting the professional and technical societies of their disciplines.”

In addition, Fundamental Canon number 6 of the Code of Ethics, states that “Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession.”

Requirements for Graduation with Civil Engineering Degree

In order to qualify for a Bachelor of Science degree in Civil Engineering students must meet the following criteria:

- a total of 123 credits must be earned (for transfer students, a minimum of 45 credits must be earned at UMass Amherst),
- all University General Education requirements must be met,
- all degree course requirements in the CE Program must be met,
- the cumulative grade point average (GPA) for all courses taken must be 2.0 or greater,
- the cumulative GPA in all CEE courses must be 2.0 or greater

These requirements are discussed in detail below.

University General Education Requirements

The General Education requirements in Basic Mathematics, Physical World, Analytical Reasoning and Integrative Experience are automatically met by required coursework in Math, Physics and CEE 486 (Senior Design). The remaining general education requirements are met as follows.

Social World Courses. Four courses must be taken (see Diversity Requirement below) consisting of:

- **One** course in Social and Behavioral Science (SB); Economics 103 or 104, which is required in the Civil and Environmental curriculum, counts as this requirement.
- **One** course in the Arts, which can be in Literature (AL); or Visual and Performing Arts (AT).
- **One** course in Historical Studies (HS).
- **One** additional course with a designation of AL, AT, SB, I or SI.

Students must choose Social World Courses from the University catalog that are designated as acceptable to fulfill the requirements of SB, AL, AT, HI, SI or I. These designations are provided via the online course catalog.

Diversity. One of the four Social World courses must have a Global diversity designation (G) **and** one must have a United States diversity designation (U).

Writing. The University requires two writing courses: in the CE Program this is met with a 3-credit course in the freshman year, EnglWP 112 - College Writing, and a 3-credit course in the junior year, ENGIN 351 - Writing in Engineering.

Biological Science. The University General Education policy requires that the student take a 4 credit course in the Biological Sciences. Courses that qualify for this elective are identified by the University with a “BS” designation. Various departments offer courses with the BS designation. Those that are offered each semester are listed in SPIRE. While a variety of worthwhile courses are listed each semester, the following courses are suggested:

Anthropology 103: Human Origins and Variations
BioChem 100: My DNA
Biology 105: Biology of Social Issues
Biology 106: Human Biology
Biology 109: Evolution Explained
Environmental Sciences 101: Introductory Environmental Science
Microbiology 160: Biology of Cancer and AIDS
Nutrition 130: Nutrition for a Healthy Lifestyle
Stocksch 105: Soils
Stocksch 115: Environmental Biology
Stocksch 140: Plagues: The Ecology of Disease
Stocksch 171: Plagues, Food and People: Ecology of Food and Disease

Minimum Grade Point Average

For graduation, students must have an overall cumulative GPA of at least 2.0 overall and a cumulative GPA of 2.0 in the Civil Engineering major. The major includes all CEE courses (along with any cross listed MIE courses, e.g., M&I-ENG 210 and 211 if applicable).

Civil Engineering Electives

Any Civil Engineering course -- 300, 400, or 500 level may be used as an elective. Out of the five Civil Engineering electives, one elective is required in Environmental and Water Resources, one elective is required in Geotechnical Engineering and one elective is required in Transportation Engineering. Only one independent study/special topics course or Honors course may be used as a CEE Elective and this course may not be used to meet the Environmental and Water Resources, Geotechnical and Transportation elective requirements. Courses at the 500 level are only open to students with a GPA of 3.0 or above, or consent of the instructor. Undergraduates may not take 600 level courses.

Engineering Science and Engineering Design

The Engineering Accreditation Commission of ABET requires that the curriculum in Civil Engineering programs provide coursework containing engineering science and design. The Civil Engineering program tracks the science and design content of courses by identifying the breakdown of science and design credits for each course. These are recorded in Appendix B. The Civil Engineering program considers a course to have significant design content if there is at least ½ credit of design in the course.

Design Electives

Students must complete at least two courses which have been designated as Design Electives. At least one Design Elective should be taken in the same semester as CEE 488 (Professional Practice Seminar). The CEE Faculty designates a course as a Design Elective when it meets three criteria: the course has at least two credits of design, students in the course work on teams, and the course includes a major design experience which is based on the knowledge and skills acquired in earlier course work and incorporates appropriate engineering standards and multiple realistic constraints. The following courses are currently designated as Design Electives: CEE 421, 433, 434, 450, 462, and 469. A course may meet both the Design Elective and the area elective requirements simultaneously. For example, CEE 421 can meet the requirement for a Geotechnical Engineering elective and the requirement for a Design Elective.

Free Elective

The Free Elective may be any 3 credit course taken while the student is enrolled at the university. The student, in consultation with his/her advisor, selects the course. The only courses not allowed for the Free Elective are Health and Fitness courses and 100 and 200 level Military Leadership courses.

Requirements When Graduation Date Changes

It is University policy that a student who has been in continuous attendance and then changes their graduation date to include one or two more semesters, must complete the Departmental, College, and University curriculum requirement in place for their entering class. As policy, the Department will recommend that a Bachelor of Science Degree be awarded to a student whose education has been interrupted by absence from the campus for one or more semesters upon completion of the curriculum in effect when the student enrolled, or any curriculum subsequently adopted during their enrollment as a full-time undergraduate student.

Alternate Paths to Meet Requirements

Transfer Credit

For students transferring to the University of Massachusetts from other institutions, transfer credits for courses satisfying University core requirements are acted upon by the Office of Transfer Affairs. Transfer credits for College core courses are approved in the Transfer Programs Office in the College of Engineering. Transfer credits for courses that satisfy the Civil Engineering curriculum are reviewed in the Department by the Department's Transfer Credit Evaluator. Students are advised to get approval for transfer credit as soon as possible after entering the Department. Transfer credit procedures are given in Appendix C.

UMass students requesting transfer credit for a course to be taken at another institution should first have the particular course evaluated by the appropriate office – University, College, Department - to be sure that transfer credit will be granted upon successful completion of the course. (Use Prior Approval Form for this action; these forms are in Office of Student Affairs).

Students Seeking a Second Bachelors Degree

The process for evaluating the courses submitted by second degree students is designed to ensure that University, College of Engineering, and Civil Engineering Program requirements are met. It is important to note that second degree students do not receive “credit” for previous course work in the sense that there is a formal transfer of courses recorded on the UMass transcript as is the case for transfer students. However, the courses must meet the same criteria as if they were being transferred and be equivalent to courses taught at the University of Massachusetts so as to satisfy College and Program requirements. Decisions about University and College of Engineering courses are made by the Office of Transfer Affairs. Decisions on Civil Engineering Program course requirements are referred to the Department’s Transfer Credit Evaluator for final approval. The end-product of the evaluation will show which of the requirements have been satisfied by previous college work and be recorded on the student’s flow chart.

The University assumes that the General Education requirements have been satisfied previously by second-degree students. If students have not met the minimum ABET criteria for Social Sciences/Humanities (16 credit hours), they will be required to satisfy this requirement. The Office of Transfer Affairs is responsible for decisions regarding the General Educational requirements for second degree students. The University requires 30 credits above and beyond those earned for the first B.S. degree from the University of Massachusetts, and 45 additional credits for students with degrees from another institution. In addition, all College and Department requirements must be met. Since the College and Department requirements generally exceed 45 credits, the University requirement is often not an issue.

Substitution For Civil Engineering Elective Courses

Under special circumstances, and with approval, students may substitute a course outside the Department for a CEE Elective Course. Substitutions are not allowed for required CEE electives in the Environmental and Water Resources, Transportation or Geotechnical areas. Only one course may be substituted as part of the curriculum for a student. It is to be understood that substitutions are to be approved only in cases in which the CEE Department is unable to present a comparable course that will contribute to the intellectual growth of the student. Substitute

courses shall be in an engineering technical area related to the practice of Civil and Environmental Engineering.

Approval requires completion of the Substitution Form for Civil Engineering courses (see Appendix D) which is added to the student's file when a substitution is approved. The Form shall include a summary of the course content and its relation to an existing course within the Department if any and a statement of the reason for the substitution. Approval for the CEE course substitution must be granted by the student's advisor, the instructor and/or group in the CEE subject area in which the substitution is requested and the Undergraduate Program Director. Approval of the instructor and/or group for the substitute course shall be based on the course syllabus and its relation to an existing course within the Department, and/or be based on the clear and definite career goals of the student.

Additional Educational Opportunities

Civil Engineering and The Commonwealth Honors College

The Department offers the opportunity for students to participate in the Commonwealth Honors College. Details are shown in Appendix E. The Civil Engineering Honors program advisor is Dr. Daiheng Ni who is located in Marston 219, ni@ecs.umass.edu, 545-5408.

Study Abroad And National Exchange

Students occasionally wish to enrich and diversify their education by studying abroad. Guideline and information are provided in Appendix F. The following faculty may be contacted for further information:

- Sergio Brena, Structures & Mechanics, Marston Hall 233, brena@ecs.umass.edu, 545-0349

Internships And Co-Ops

The College of Engineering has an Engineering Career and Student Development Center located in 114 Marston Hall. The office provides career advising and helps students obtain pre-professional experience such as co-operative education and summer internships before they graduate.

Independent Study And Special Topics

CE-ENGIN 396, 496 and 596 Independent Study/Special Problems and CE-ENGIN 397, 497 and 597 Special Topics can be taken to satisfy up to three credits of Civil Engineering elective requirements within the curriculum. None of these courses can be used to satisfy the Environmental and Water Resources, Geotechnical or Transportation elective requirements. These courses typically involve a close interaction between the student and an instructor. A student with an interest in pursuing an independent study should directly contact the faculty member whose interests best match the topic of the study. Instructors may agree to take on an independent study student if they find it conforms with their needs and availability.

An instructor who wishes to offer one of these courses is required to make an outline of the course conforming to the required format (see Appendix G) and determine the objectives and outcomes of the course. This outline will then be submitted no later than the first week of the semester to the Undergraduate Program Director so that the information can be included in the student's file. No grades will be forwarded to the Registrar's Office until the outline is completed and a copy of the final report (or appropriate deliverable) is submitted. It is the student's obligation to ensure that the form is completed by the instructor and passed to the Undergraduate Program Director.

Engineering Management Minor

The Engineering Management Minor is an interdisciplinary minor which provides engineering students with background in the areas of finance, accounting, marketing, and management. It is offered through the College of Engineering and the Isenberg School of Management. All full-time undergraduate engineering students with a GPA of 3.0 or higher in their second semester freshman year or later and who have declared an engineering major qualify for the Engineering Management Minor. Applications are available in the Office of Student Affairs in 126 Marston Hall or at http://engineering.umass.edu/sites/default/files/Engineering_Management_Minor_Application_s2015.pdf.

The Minor requires 15 credits with the courses indicated below:

1. Required Foundation Courses (12 credits)
 - Principles of Management (MGT 301)
 - Introduction to Accounting (ACCTG 221)
 - Corporate Finance (FIN 301)
 - Fundamentals of Marketing (MKTG 301)
2. Capstone Experience (3 Credits, Required)
 - Technology Management - Innovation and Entrepreneurship (SOM/ENGR 797 or 597)

For additional information, contact Prof. Sergio Brena brena@ecs.umass.edu

Scholarship Opportunities

The Department is fortunate in having a large number of scholarships that are available to our undergraduates. The generous support of our alumni over the years has made this possible. Many of the scholarships are endowed by alumni to honor former faculty members in the Department. In addition, the College of Engineering grants a large number of scholarship awards each year and students in the Department are often recipients of these awards.

The award of scholarships are coordinated by a faculty scholarship committee that solicits and reviews nominations. Students may apply for scholarships during the Spring semester of each academic year. Applications are available on line at the College of Engineering web site at <http://engineering.umass.edu/scholarships>.

Academic Regulations

A complete set of academic regulations is published annually by the Office of the Provost and can be found at <http://www.umass.edu/registrar/sites/default/files/academicregs.pdf>. Selected regulations are listed in this section.

Grading

The official grading system of the University is: A (4.000), A- (3.700), B+ (3.300), B (3.000), B- (2.700), C+ (2.300), C (2.000), C- (1.700), D+ (1.300), D (1.000), F (0.0), Inc (Incomplete: 0), P (Pass: no effect on cumulative average), W (Withdrawn: no effect on cumulative average), Y (year-long course in progress: no effect on cumulative average), Aud (Audit: no effect on cumulative average or on credit toward graduation), and NR (no grade record was submitted by the instructor for the entire class).

Grades may be changed only when requested by the instructor of the course and approved by the Head of the Department and the Academic Dean of the College in which the course is offered.

No course marked F, Inc, W, Y, Aud, or NR earns graduation credit.

No course for which a grade of C or higher was earned may be repeated. A course for which a grade of C-, D+, D or F (or CD before 2004) was earned may be repeated one time without permission. A course may be repeated a second time, for a total of three times, only with prior permission of the undergraduate dean of the school or college in which the student is enrolled. Under no circumstances may a student take a course more than three times. Successful registration for a course does not constitute permission.

All enrollments and all grades will appear on the transcript, but the last grade will be calculated in the GPA unless the dean files an appeal with the Registrar. Repeating a UMass Amherst course at another of the Five Colleges, at another campus of the University of Massachusetts, or at any other institution will not result in grade substitution. If an academic honesty sanction has been imposed, the grade specified in the sanction will always be calculated in the GPA.

NOTE: Repeating a course can have negative consequences. For example, if a passing grade of C-, D+ or D (or CD before 2004) was received in the first enrollment, but a failing grade is received when the course is repeated, no credit would be earned for either attempt. Repeating a previously passed course may also have an effect on financial aid eligibility. Students considering repeating previously passed courses should consult their academic advisors and Financial Aid staff.

Incomplete Grades

At the discretion of the instructor, incomplete grades may be given to undergraduate students who are passing a course at the time of the request for an incomplete grade and who are not able to complete the coursework because of medical or personal problems. Students normally have until the end of the following semester to complete the work. The instructor may request an extension of this deadline if it is appropriate to do so. When the work is completed, the instructor will complete a change of grade card to indicate the course is completed, inform the Academic Assistant, and notations will be made in the appropriate files.

Grades of Incomplete that are not resolved by the end of the following semester, are automatically converted to an F. Please note that bona fide reasons for a request for an incomplete grade are for severe medical or personal problems.

Pass/Fail Option

No College or Department requirements for a degree can be taken pass/fail. This means that no Civil Engineering class required for graduation, including electives, can be taken pass/fail.

Academic Status

A student is in good academic standing when their cumulative average is 2.0 or above and the total number of credits earned averages 12 or more per semester.

Students whose **cumulative** average falls below 2.0 and whose **total** credits average fewer than 12 per semester will be placed on Academic Warning.

A student who incurs two Academic Warnings will be subject to Academic Probation (exception: if the latter semester's work shows substantial improvement, even though the student's cumulative average has not been raised above 2.0, the student can be placed on "Academic Warning Continued" at the discretion of the Assistant Dean for Student Affairs).

Course Enrollments and Withdrawals

Add Period

Students may add a course, with the written permission of the instructor and the Undergraduate Program Director through the **first 14 calendar days** of the semester beginning with the first day of classes.

Drop Period

- a) Students may drop courses with no record **through the first 14 calendar days** of the semester, beginning with the first day of classes.
- b) From the **15th through the 46th calendar day**, courses dropped will be recorded as "W" (withdrawn).
- c) Courses dropped **after the 46th calendar day** of the semester will be recorded as "F" unless a late "W" is approved by the Academic Dean because of extenuating circumstances.

Auditing

A registered undergraduate student may audit a course and have that audit recorded on the official transcript in the credit column as a zero and in the grade column as an "Aud" provided that:

- a) The student officially elects the class as an audit.
- b) The instructor can accommodate the auditor in the class.
- c) The student satisfies the instructor regarding his/her preparation and motivation for auditing the class.
- d) The student satisfies all the criteria for a successful audit as stipulated in advance by the instructor.
- e) The student pays all special fees associated with the course.

APPENDIX A: CEE PREREQUISITE LIST

<u>Course</u>	<u>Prerequisite</u>
CE-ENGIN 121	MATH 131
CE-ENGIN 211	Basic Math Skills (R1) or exemption by sufficient score on Math placement test
CE-ENGIN 240	MATH 132 Co-requisites: Physics 151
CE-ENGIN 241	CE-ENGIN 121, CE-ENGIN 240 (or MIE 210), MATH 132
CE-ENGIN 244	Math 131
CE-ENGIN 250	Physics 151 and Math 132 Co-requisites: Physics 152 and Math 233
CE-ENGIN 260	MATH 132 Co-requisite: Math 233
CE-ENGIN 270	ENGIN 111, MATH 132 Co-requisite: CE-ENGIN 260
CE-ENGIN 275	CE-ENGIN 240
CE-ENGIN 290B	
CE-ENGIN 310	Co-requisites: CE-ENGIN 260 and 270
CE-ENGIN 320	CE-ENGIN 241 (or MIE 211) Co-requisite: CE-ENGIN 357
CE-ENGIN 331	CE-ENGIN 241 (or MIE 211)
CE-ENGIN 357	CE-ENGIN 240 (or MIE 210), MATH 331, CEE 250 (or MIE 230)
CE-ENGIN 370	MATH 331, CHEM 112 Co-requisite: CE-ENGIN 357
CE-ENGIN 410	CE-ENGIN 310
CE-ENGIN 411	CE-ENGIN 310
CE-ENGIN 418	CE-ENGIN 310
CE-ENGIN 421	CE-ENGIN 320
CE-ENGIN 423	CE-ENGIN 320
CE-ENGIN 432	CE-ENGIN 331
CE-ENGIN 433	CE-ENGIN 331
CE-ENGIN 434	CE-ENGIN 331
CE-ENGIN 450	CE-ENGIN 310
CE-ENGIN 455	CE-ENGIN 270
CE-ENGIN 462	CE-ENGIN 270, 357
CE-ENGIN 469	CE-ENGIN 370
CE-ENGIN 470	CE-ENGIN 270
CE-ENGIN 471	CE-ENGIN 357, 370
CE-ENGIN 473	CE-ENGIN 370
CE-ENGIN 476	CE-ENGIN 370
CE-ENGIN 485	CE-ENGIN 320, 331
CE-ENGIN 486	CE-ENGIN 310, 320, 370 and 433 or 434
CE-ENGIN 488	CE-ENGIN 310, 320, 331, 370 & Senior Standing
CE-ENGIN 497M	CEE 270, 310, 320, or 370 or equivalent
CE-ENGIN 509	CE-ENGIN 310

CE-ENGIN 510	CE-ENGIN 310
CE-ENGIN 511	CE-ENGIN 310
CE-ENGIN 515	CE-ENGIN 310, 320
CE-ENGIN 516	CE-ENGIN 310
CE-ENGIN 518	CE-ENGIN 310
CE-ENGIN 520	CE-ENGIN 310 or 411 or 511
CE-ENGIN 521	CE-ENGIN 310 or 411 or 511
CE-ENGIN 523	CE-ENGIN 320
CE-ENGIN 525	CE-ENGIN 320
CE-ENGIN 527	CE-ENGIN 320
CE-ENGIN 535	CE-ENGIN 331
CE-ENGIN 536	CE-ENGIN 433
CE-ENGIN 541	CE-ENGIN 331, MATH 331
CE-ENGIN 542	CE-ENGIN 434
CE-ENGIN 549	CE-ENGIN 331, MATH 331
CE-ENGIN 550	CE-ENGIN 433 and 434 must be taken prior or concurrently with this class
CE-ENGIN 560	CE-ENGIN 357
CE-ENGIN 561	CE-ENGIN 357
CE-ENGIN 570	CE-ENGIN 270
CE-ENGIN 575	CE-ENGIN 370
CE-ENGIN 577	CE-ENGIN 370
CE-ENGIN 590C	CE-ENGIN 433
CE-ENGIN 590I	CE-ENGIN 310 and CE-ENGIN 411 or 511.
CE-ENGIN 597F	CE-ENGIN 357 or equivalent
CE-ENGIN 597M	CEE 270, 310, 320, or 370 or equivalent
CE-ENGIN 597S	CE-ENGIN 310

APPENDIX B: Engineering Science and Design Content

Component Guide for CEE Courses		Updated January 2017 Credit Hours	
Course	Title	Eng. Sci.	Eng. Design
CE-ENGIN 121	Civil and Environmental Engineering Measurements	3	0
CE-ENGIN 211	Perspectives on the Evolution of Structures	0	0
CE-ENGIN 240	Statics	3	0
CE-ENGIN 241	Strength of Materials I	2.5	0.5
CE-ENGIN 241A	Strength of Materials Lab	1	0
CE-ENGIN 244	Programming for Civil Engineers	2	0
CE-ENGIN 250	Thermodynamics, Heat Transfer and Energy Systems	3	0
CE-ENGIN 260	Probability and Statistics in CE-ENGIN	0	0
CE-ENGIN 270	Systems Analysis and Economics for Civil Engineers	2	1
CE-ENGIN 275	Introduction to AutoCAD	0	0
CE-ENGIN 290B	History and Heritage of Civil and Environ. Engineering	0	0
CE-ENGIN 310	Transportation Systems	2	1
CE-ENGIN 320	Soil Mechanics	2.5	1.5
CE-ENGIN 331	Structural Analysis	3	0
CE-ENGIN 357	Elementary Fluid Mechanics	3	0
CE-ENGIN 370	Environmental Engineering Principles	3.5	0.5
CE-ENGIN 410	Public Transportation	2	1
CE-ENGIN 411	Traffic Engineering	1.5	1.5
CE-ENGIN 418	Intelligent Transportation Systems	2	1
CE-ENGIN 421	Foundation Engineering	1	2
CE-ENGIN 423	Engineering Geology	3	0
CE-ENGIN 432	Advanced Structural Analysis	3	0
CE-ENGIN 433	Design of Reinforced Concrete Structures	0	3
CE-ENGIN 434	Design of Steel Structures	0	3
CE-ENGIN 450	Highway Design	1	2
CE-ENGIN 455	Spatial Analysis for Civil Engineers	2	1
CE-ENGIN 462	Water Resources Engineering and Sustainability	1	2
CE-ENGIN 469	Water Supply & Wastewater Collection	0	3
CE-ENGIN 470	GIS for Engineers	2	1
CE-ENGIN 471	Water and Wastewater Systems	1	2
CE-ENGIN 473	Groundwater	2	1
CE-ENGIN 476	Solid and Hazardous Waste Management	2	1
CE-ENGIN 485	Civil Engineering Construction Methods	1	2
CE-ENGIN 486	Civil and Environmental Engineering Design Project	0	3
CE-ENGIN 488	Professional Practice Seminar	0	0
CE-ENGIN 497M	Public Works Engineering and Management	1	2

Component Guide for Elective Courses		Updated January 2017	
		Credit Hours	
Course	Title	Eng. Sci.	Eng. Design
CE-ENGIN 509	Transportation Systems Analysis	2	1
CE-ENGIN 510	Public Transportation Systems	2	1
CE-ENGIN 511	Traffic Engineering	1.5	1.5
CE-ENGIN 515	Pavement Design	0.5	2.5
CE-ENGIN 516	Transportation Design	0.5	2.5
CE-ENGIN 518	Intelligent Transportation Systems	2	1
CE-ENGIN 520	Traffic Flow Theory and Simulation I	2	1
CE-ENGIN 521	Traffic Flow Theory and Simulation II	2	1
CE-ENGIN 523	Ground Improvement & GeoConstruction	1	2
CE-ENGIN 525	Geotechnical Site Investigations	2	1
CE-ENGIN 527	Earthquake Engineering	2	1
CE-ENGIN 535	Matrix Analysis of Structures	3	0
CE-ENGIN 536	Advanced Topics in Reinforced Concrete Design	0.5	2.5
CE-ENGIN 541	Structural Dynamics	2.5	0.5
CE-ENGIN 542	Advanced Topics in Steel Design	1	2
CE-ENGIN 549	Structural Stability	2.5	0.5
CE-ENGIN 550	Introduction to Bridge Engineering	0.5	2.5
CE-ENGIN 560	Hydrology	2	1
CE-ENGIN 561	Open-Channel Flow	2	1
CE-ENGIN 570	GIS for Engineers	2	1
CE-ENGIN 575	Advanced Solid and Hazardous Waste Management	2	1
CE-ENGIN 577	Surface Water Quality Modeling	2	1
CE-ENGIN 590C	Prestressed Concrete	0.5	2.5
CE-ENGIN 590I	Signalized Intersections & Systems	1.5	1.5
CE-ENGIN 597F	ST-Design of Fish Passage Facilities	2	1
CE-ENGIN 597M	Public Works Engineering and Management	1	2
CE-ENGIN 597S	Transportation Sustainability	1.5	1.5

APPENDIX C: TRANSFER CREDIT DOCUMENTATION

The University of Massachusetts has a three-tier system for granting transfer credit for courses taken outside of the University.

- The Office of Transfer Affairs at the Undergraduate Admissions Office (University Admissions Center, 545-0222) evaluates transfer course requests that involve University requirements (e.g., social world courses) including all General Education Requirements.
- Requests involving transfer of course credit for courses required by the College of Engineering (e.g., any first year courses) are the province of the College of Engineering Transfer Affairs Office (Greg Brown, 126 Marston Hall, 545-2035; gwbrown@ecs.umass.edu).
- Requests for transfer of courses that are required by the Civil Engineering Program (e.g., CEE courses) are the responsibility of the Department. This is handled by the Undergraduate Program Director.

When a student transfers into the College of Engineering with credits for courses taken outside the University, he or she must take the following steps:

1. The Admissions office will send the final transfer credit evaluation report (TCE) with courses that are equated to UMass Amherst and then the student should obtain a copy of his or her transcript showing the courses transferred.
2. For courses required by the College of Engineering that were not equated by the TCE, the student should make an appointment with the College's Transfer Affairs Director to receive appropriate transfer course credit. Course Descriptions and Syllabi are needed to grant transfer credit.
3. For Civil Engineering courses, make an appointment with the Undergraduate Program Director. Obtain a "CEE Transfer Evaluation Form" which will show approval of all transfer credits for courses required by the Civil Engineering Program. The student will need at least a catalog description of each course to be transferred, but may need other items, such as a syllabus, course notes, outlines, assignments and/or exams for your meetings with the evaluator.
4. The student should check with the Academic Assistant in the Civil and Environmental Engineering Office about one month after completing the above steps to make sure the "T" entries have been made on their flow chart indicating that the Department has accepted all of their transfer credits.

While many of these steps are done during the admission and initial advising meetings, it is the student's responsibility to complete all of the above steps as soon as possible after entry into the department. Since some of the transfer courses may be prerequisites for required courses, it is important that the "T" entries should be on their flow charts by the next preregistration period following the transfer of a course. Students should always keep a copy of any documentation.

APPENDIX D: Course Substitution Form



University of Massachusetts Amherst
College of Engineering
Department of Civil and Environmental Engineering

Undergraduate Course Substitution Form

Student Name: _____ ID: _____

Required CEE Course: _____

Proposed Substitute Course: _____

Reason for Substitution:

Summary of Course Content and Relation to Existing Course (if any):

Student Signature: _____ Date: _____

Advisor Signature: _____ Date: _____

Instructor/Group Signature: _____ Date: _____

Assoc. Dept. Head Signature: _____ Date: _____

APPENDIX E: COMMONWEALTH HONORS COLLEGE

CIVIL ENGINEERING AND THE COMMONWEALTH HONORS COLLEGE

Commonwealth Honors College is a way for motivated students to enrich their studies through interdisciplinary seminars, enriched honors courses, community service opportunities, and individual research. Creativity, innovation and exploration are the qualities the College encourages.

Entering *first-year students* are admitted to Commonwealth Honors College on the basis of academic achievement in high school, test scores, and an essay by the student.

Entering *transfer students* are admitted by invitation Note: graduates of a Commonwealth Honors Program (CHP) may bring themselves to the attention of a Commonwealth Honors College adviser in the Bloom Honors Advising Center if they were overlooked by Admissions (sometimes graduation from a CHP is not yet properly documented at the point a transfer student is admitted to UMass Amherst).

Others, indeed *any UMass Amherst student*, may apply to the College via its online application when an overall UMass grade point average of 3.400 higher, with a 3.400 or higher in the most recent semester is earned.

THE HONORS COLLEGE CURRICULUM

The full Honors College curriculum is eight honors courses plus a 1-credit honors seminar. All of these courses must be completed with earned grades of B or better.

More specifically, CEE Commonwealth Honors College requirements are as follows:

General Studies Honors Requirements

For the General Studies portion of the Honors College curriculum, honors students complete four honors Gen Ed courses plus one Honors 391A: Special Topics seminar (1 credit). Students choose the one Honors 391A seminar from the wide variety of topics offered by University faculty members via the Honors College each semester. The required four honors Gen Ed courses usually include honors College Writing, unless the student has tested out or is exempt from college writing (in which case the student substitutes a different Gen Ed honors course), and always include Honors 201: Ideas that Changed the World. Honors 201 is a 4-credit, Gen Ed interdisciplinary-honors course (Gen Ed I). Honors Math, Chemistry, and Physics courses that simultaneously fulfill major requirements may be used to meet the remaining honors Gen Ed requirements. Alternatively, the Honors College offers a number of interesting honors courses that may be used to simultaneously fulfill the University's Social World Gen Ed requirements.

Requirements for those pursuing the full Honors College curriculum with Departmental Honors*

CEE Honors Coursework

Two honors courses must be taken from CEE, one must be at the 300 level or higher. For most CEE students, ENGIN 111H and 500 level CEE classes are used to meet these requirements.

CEE Honors Thesis

In addition to the above courses, each student must take CEE 499Y and CEE 499T. During the second semester of the junior year the student identifies a chair and writes a brief 499Y-Semester Plan, which includes deadlines for work that will actually occur within the 499Y semester. During the 499Y semester itself (usually the fall of the

senior year), the student forms an advisory committee, writes a formal proposal, and initiates the research project. The formal research proposal and the 499T registration form must be fully authorized and delivered to the Honors College by the end of the 499Y semester so that the proposal may be reviewed by the Academic Standards Committee of the Commonwealth Honors Council and the student may be enrolled in CEE 499T. In the 499T semester, research is completed, a thesis is written and defended, and the properly documented manuscript is delivered to the Honors College for archiving.

Three credits of honors research can be substituted for a CEE technical elective. Students using honors research as a CEE elective must make an outline of the course (at the beginning of the semester) conforming to the ABET format and determine the ABET components (course objectives, course outcomes, as well as engineering science and design credits for the course). The same form used for independent studies may be used.

* Note: Students completing the full Honors College curriculum with Multidisciplinary Honors may need assistance from advisors in Bloom Honors Advising Center, especially if their advanced scholarship honors work will not be related to CEE.

For More Information

The CEE Honors Program Director is Dr. Daiheng Ni. His office is located in 219 Marston Hall or you can contact him at 545-5408 or by email: ni@ecs.umass.edu

CEE COMMONWEALTH COLLEGE CHECKLIST

Name _____ Student ID _____

Advisor _____ Expected Grad. Date _____

Honors Project Title _____

Honors Writing Foundation	Course or Waiver	Sem/Yr	Grade
1. ENGLWRIT 112H, equivalent, or exemption			
Honors Course Requirements			
1. ENGLWRIT 112H or an Alternative Honors Gen Ed Course (1,2,3 preferably from 3 different subject areas)			
2. Honors Gen. Ed. (1,2,3 preferably from 3 different subject areas)			
3. Honors Gen. Ed. (1,2,3 preferably from 3 different subject areas)			
*4a. Honors 201 Ideas that Change the World, 4-credit interdisciplinary course, (Gen Ed I)			
*4b. Honors 391A Topics, 1-credit			
5. CEE Honors Course any level (e.g. ENGIN 111H)			
6. CEE Honors Course \geq 300 (e.g., 500-level CEE course or ENGIN 351H)			
7. CEE 499Y (Honors Research)			
8. CEE 499T (Honors Thesis)			
Thesis or Project Committee	Chair _____ Member _____ Member II (optional) _____		
Forms and other documents:	<input type="checkbox"/> 499Y Semester Plan (SPR of Junior Yr.) <input type="checkbox"/> Research option registration 499Y <input type="checkbox"/> 499T Proposal <input type="checkbox"/> Research option registration 499T <input type="checkbox"/> CEE Dept independent study form <input type="checkbox"/> Research completion form <input type="checkbox"/> Abstract <input type="checkbox"/> Title page with original signatures <input type="checkbox"/> Archive copy of manuscript		

Notes:

- a) 500 level CEE classes, ENGIN 351H, ENGIN 111H, community service learning independent studies, and some five-college courses taken may be used in place of some honors courses.
- b) A grade of B or better is required for all courses used to satisfy honor's requirements.
- c) A cumulative and semester GPA of 3.400 must be maintained to remain in good standing in CC.
- d) Transfer students (both internal UMass transfers and transfers from other institutions) may appeal for a maximum of two accommodations to the standard CC curriculum. The minimum mandatory CC curriculum is always these six requirements: #1,4,5,6,7,8 (see above).

APPENDIX F: STUDY ABROAD AND NATIONAL EXCHANGE

Participation in study abroad or national exchange provides a way for students to enrich and diversify their education, learn about other cultures, people and environments or gain proficiency with a foreign language. For many students, the study abroad or national exchange experience stimulates new ideas about their work after graduation. In the increasingly globalized economy and job-market, international experience may be seen as especially valuable to future employers.

Careful planning of your program of study opens up the possibility to study at schools without engineering programs or in English language programs in non-English speaking countries. Students can accomplish this by taking extra engineering courses at UMass for one or two semesters and saving their general education, biological science, and other courses to take at another college.

If your program of study includes study at a college or university with engineering courses it may be possible to transfer these engineering courses to UMass and to use them towards the degree requirements of the UMass CE Program. Transferring CEE Courses from National Exchange or Study Abroad Program requires several steps as listed below. It is the student's responsibility to see that these steps are taken.

- Students studying abroad or in a national exchange program may use transferred courses to meet the degree requirements of the UMass CE Program. However, all transferred courses must be pre-approved for transfer credit and are subject to review similar to that for other transfer credits (Appendix C).
- Students must obtain prior approval from the Undergraduate Program Director (Prof. Sergio Brena) for coursework taken at another institution. If changes occur during the off-campus term of study, contact him immediately by email (brena@ecs.umass.edu). General education courses taken abroad are evaluated by the international programs office.
- The following information is needed for engineering courses that you plan to take away from UMass: a catalog description, a syllabus and text book used (email the instructor to obtain a copy of the most recent syllabus). Bring that information to the CEE faculty member who teaches the equivalent course at UMass. Obtain his/her written approval that the course fulfills the intent of the equivalent course before you leave.
- Keep all course materials (syllabus, course notes, exams, project reports, etc.). These will be needed by the professor teaching the equivalent course at UMass to determine credit and fulfillment of requirements upon your return.
- Remember that, just as at UMass, you may not get the courses you want while away due to prerequisite requirements, time conflicts or enrollment limitations. Plan for a few different options.

For More Information

The International Programs Office has information on universities abroad that have reciprocal exchange programs with UMass Amherst:

William S. Clark International Center, University of Massachusetts, Amherst 01003. Phone (413) 545-2710, email: abroad@ipo.umass.edu. Or see their web site at: <http://www.umass.edu/ipo/>

National Student Exchange office has information about U.S. colleges and universities that have reciprocal exchange programs with the UMass Amherst. Contact: Sheila Brennan, Coordinator in 614 Goodell, Phone: 545-5351, E-mail: sbrennan@casiac.umass.edu, or see their website at: http://www.umass.edu/ug_programguide/otheracadopp/nsep.html

Appendix G: Independent Study Form

Independent Study/Special Topics (and Honors Research)

"Title"

Student Name

Semester

Objectives:

Outcomes:

Meeting Time:

References:

Faculty:

Goals:

Required Courses:

Prerequisites:

Computer Use:

Laboratory Projects:

Prepared by:

Faculty Name

Date

Student Name

Date