

***UNDERGRADUATE  
CURRICULUM  
MANUAL***

*for the*

*Bachelor of Science Degree Civil Engineering*

***UNIVERSITY OF KANSAS***

*(March 2006)*

**THE UNIVERSITY OF KANSAS**  
**DEPARTMENT OF CIVIL, ENVIRONMENTAL AND ARCHITECTURAL**  
**ENGINEERING UNDERGRADUATE CURRICULUM MANUAL FOR**  
**THE B.S. DEGREE IN CIVIL ENGINEERING**

**DEPARTMENTAL MISSION AND OBJECTIVES**

The mission of the CEAE Department is to provide students with an outstanding engineering education and for the Department to be a leader in research and service. The CEAE Department plans to achieve its mission by meeting the following three strategic objectives:

- 1) Prepare students for productive engineering careers
- 2) Maintain and grow strong Research Programs
- 3) Serve the Profession

The Civil Engineering Undergraduate degree Program Objective is:

To prepare students for professional engineering practice in the analysis, design, construction, and management of civil engineering systems and to prepare them for life-long learning.

**Overview**

The Civil, Environmental & Architectural Engineering Department offers two Bachelor's degrees. One in Civil Engineering and the other in Architectural Engineering. This document presents the requirements of the Bachelor's degree in Civil Engineering. The requirements for the Architectural Engineering degree are available on the Department web page [www.ceae.ku.edu](http://www.ceae.ku.edu) and from the Department office (2150 Learned Hall).

The Civil Engineering degree has two areas of emphasis or concentration. The first is the general civil engineering emphasis and the second is the environmental engineering emphasis. The requirements for each emphasis are presented in this document.

Civil Engineering is a diverse field. This necessitates a flexible curriculum that can be adjusted to individual student interests. Students who have a special interest in certain areas of civil engineering, can pursue that interest by taking the appropriate electives. Other students, especially those who are not yet sure what their career interests can elect to be can elect to be exposed, are exposed to a broader spectrum of civil & environmental engineering topics. The curriculum at the University of Kansas is designed to meet these dual needs.

In planning individual class schedules, there is need for careful analysis of individual interests. The curriculum schedules in this manual are to be considered as guides only. Periodic consultation with an advisor is recommended. Here are several guidelines that should be followed in formulating class schedules:

- a) Pay attention to prerequisite sequencing to assure maximum freedom of choice, in subsequent semesters, in the design and elective areas.
- b) Try to limit course selection to no more than five per semester.

- c) Avoid more than four quantitative (problem-solving, laboratory and report writing) courses in any semester.

Typical semester-by-semester schedules are shown on pages 8 through 11. The first schedule is for the general civil engineering emphasis and the second schedule shown is for the environmental engineering emphasis. These two schedules are for those students who complete all eight semesters in the Civil Engineering Program at the University of Kansas. The third and fourth semester-by-semester schedules are for students who take the first four semesters at another college or university before transferring to KU. These schedules merely show one way in which the required and elective courses in the curriculum may be completed. Only a few students will exactly follow one of these schedules.

Civil Engineering degree requirements are presented under the headings of mathematics & basic sciences, general education, engineering sciences and introduction to design, and engineering analysis and design. These areas are established in accordance with national accreditation requirements, namely the Accreditation Board for Engineering and Technology (ABET). The Civil Engineering curriculum is fully accredited so that graduates will meet one of the requirements for their licenses as Professional Engineers. The following paragraphs illustrate how these requirements are met. Each student is also responsible for conforming with more detailed regulations described in the current undergraduate catalog. Additional information can be found in the School of Engineering's Undergraduate catalog which is accessible through the school's web site([www.engr.ku.edu](http://www.engr.ku.edu)).

## ***CURRICULUM REQUIREMENTS***

### ***1) MATHEMATICS AND BASIC SCIENCES***

A minimum of 39 hours of mathematics and basic sciences is required. These must include 19 hours of mathematics, starting with the first course in calculus, 8 hours of physics, 10 hours of chemistry and a 3-hour basic science elective.

The Mathematics & Basic Sciences requirement is met as follows:

MATH 121, 122, 220 and 290	15 hours
CHEM 184 & 188	10 hours
PHSX 211 & 212	8 hours
CE 625 - Applied Probability and Statistics	3 hours
Basic Science Elective	3 hours

If a probability and statistics course, other than CE 625, is taken it must require calculus as a prerequisite and the course must be approved by a petition. The basic science elective must be selected from the following lists. Any exception must also be approved by a petition.

Basic Science Elective – General Civil Engineering Emphasis

GEOL 101 Introduction to Geology	5 hours
GEOL 105 History of the Earth	3 hours
GEOL 351 Environmental Geology	3 hours
GEOL 551 Engineering Geology	3 hours
Math elective	3 hours
Physics elective	3 hours
Chemistry elective	3 hours

The Math elective must require calculus as a prerequisite. MATH 409, topics in mathematics for secondary school teachers, although requiring calculus, is not an acceptable math elective.

Basic Science Elective – Environmental Engineering Emphasis

ATMO 105 Introduction to Meteorology	3 hours
ATMO 521 Microclimatology	3 hours
BIOL 104 Principles of Biology	4 hours

BIOL 400	Fundamentals of Microbiology	3 hours
BIOL 414	Principles of Ecology	3 hours
BIOL 660	Limnology and Aquatic Ecology	3 hours
CHEM 622	Fundamentals Organic Chemistry	3 hours
CHEM 646	Physical Chemistry I	3 hours
GEOG 358	Principles of Geographic Information Systems	3 hours
GEOG 521	Microclimatology	3 hours
GEOL 101	Introduction to Geology	3 hours
GEOL 302	Oceanography	3 hours
GEOL 351	Environmental Geology	3 hours
GEOL 551	Engineering Geology	3 hours

## **II) GENERAL EDUCATION**

Civil engineers, more than the professionals in any other engineering specialty, often work on projects that have wide public interest. Their designs are often large-scale and one-of-a-kind. They are used by the public, are often subjected to public review and/or protest, and are frequently constructed with public funds. The projects usually undergo close public scrutiny from original concept through the design and construction stages for adverse impact on people or their environment. Examples of such projects are transportation systems, large bridges and buildings, dams, water treatment plants and reservoirs. Thus, the civil engineer needs an education that will not only provide technical proficiency, but also one that will improve his or her ability to explain complex technical concepts to the public, that will enhance his or her appreciation for conflicting societal values, and that will broaden his or her understanding of people both individually and collectively. The inclusion into the curriculum of electives in the humanities and social sciences gives the student an opportunity to tailor that education to meet specific needs or interests.

A minimum of 21 hours is required in this area. The requirement is met as follows:

ENGL 101	Composition	3 hours
ENGL 102	Composition & Literature	3 hours
COMS 130	Fundamentals of Speech: Speaker-Audience Comm.	3 hours
ECON Elective – Econ 140,142, or 144		3 hours
Social Science Elective		3 hours
Humanities Elective		3 hours
An additional Social Science, Humanities or Elective		3 hours

Credits for English composition at a foreign institution of higher education are not acceptable for the required English courses.

The humanities and social sciences courses are identified in the online timetable and in the undergraduate catalog. The courses are identified by the letters H for humanities and S for social science courses. Western Civilization courses count as humanities electives.

Foreign Language. Up to six hours of foreign language course work listed as U will count toward the humanities requirement if the student is not a native speaker of that language. U courses include beginning German, Hebrew, Slavic (Russian, Polish, Serbo-Croatian, Slavic and Czech), Romance (French, Italian and Spanish) and eastern languages (Chinese, Japanese and Korean). Foreign language courses listed as H or X and S or Y will count toward the humanities and social sciences requirements, respectively.

## **III) ENGINEERING SCIENCE AND INTRODUCTION TO DESIGN**

The Engineering Sciences area is divided into two sub-areas: Basic Engineering Sciences (III-A) and Civil Engineering Sciences and Introduction to Design (III-B):

### **A) Basic Engineering Science**

A total of 28 hours is required in the Basic Engineering Sciences sub-area. The required courses are:

CE 201	Statics	2 hours*
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and	CE 300	Dynamics	3 hours*
or	CE 301	Statics and Dynamics	5 hours*
	CE 310	Strength of Materials	4 hours*
	CE 330	Fluid Mechanics	4 hours*
	CMGT 357	Engineering Economics	3 hours
	CE 390	Engineering Graphics	3 hours*
	EECS 138	Computer Programming(C++)	3 hours*
	EECS 319	Basic Circuits	3 hours <sup>X</sup>
	C&PE 221	Basic Engineering Thermodynamics	3 hours <sup>X</sup>
or	ME 312	Basic Engineering Thermodynamics	3 hours <sup>X</sup>
	ME 306	Science of Materials	3 hours <sup>X</sup>

\* Required course <sup>X</sup> At least one of these two courses is required

### **B) Civil Engineering Sciences and Introduction to Design**

Twenty hours in this sub-area are required. Many of these courses are prerequisite to the Engineering Analysis and Design courses. The required courses are listed below:

CE 240	Surveying	3 hours*
CE 412	Structural Engineering Materials	3 hours <sup>X</sup>
CE 455	Hydrology	3 hours*
CE 461	Structural Analysis	4 hours*
CE 477	Introduction to Environmental Engineering & Science	3 hours*
CE 484	Transportation Materials	3 hours <sup>X</sup>
CE 487	Soil Mechanics	4 hours*

\* Required course <sup>X</sup> At least one of these two courses is required.

## **IV) ENGINEERING ANALYSIS AND DESIGN**

The requirements for the general civil emphasis and environmental emphasis are the same in areas I, II, and III except for the selection of the basic science elective. The engineering analysis and design requirements for the general civil emphasis and the environmental emphasis are different. The requirements for each emphasis are defined below.

### **General Civil Engineering Emphasis – Engineering Analysis and Design Requirements**

In the General Civil Emphasis, each student must take a minimum of 16 hours from the following senior design courses. These courses include the following required courses:

Structural – 6 hours		
CE 562	Structural Design I (steel)	3 hours
CE 563	Structural Design II (concrete)	3 hours
Water Resources and Environmental – 4 hours		
CE 576	Water Supply & Sewerage	4 hours
or CE 552	Water Resources Design	4 hours

In addition to the above three required design courses, at least two more courses (6 hours) must be taken in at least two of the following four areas.

	Construction CMGT 400	Construction Administration	3 hours
	Transportation CE 580	Transportation Systems Analysis	3 hours
or	CE 582	Highway Engineering	3 hours
	Geotechnical CE 588	Foundation Engineering	3 hours
	Water Resources and Environmental CE 576	Water Supply & Sewerage	4 hours
or	CE 552	Water Resources Design (the one not taken in the above list)	4 hours

### Environmental Engineering Emphasis – Engineering Analysis and Design Requirements

In the Environmental Emphasis, each student must take a minimum of 20 hours from the following list of senior design courses. These courses include the following required courses:

	Water Resources and Environmental – 8 hours		
	CE 576	Water Supply & Sewerage Design	4 hours
	CE 552	Water Resources Design	4 hours
	Structural Design Elective – 3 hours		
	CE 562	Structural Design I (steel)	3 hours
or	CE 563	Structural Design II (concrete)	3 hours
	Civil Engineering Design Elective – 3 hours		
	CMGT 400	Construction Administration	3 hours
or	CE 580	Transportation Systems Analysis	3 hours
or	CE 582	Highway Engineering	3 hours
or	CE 588	Foundation Engineering	3 hours
	Environmental Principles Elective – 3 hours		
	CE 570 and CE 571		3 hours
or	CE 573		3 hours
	Environmental Design Elective – 3 hours		
	CE 574		3 hours
or	CE 755		3 hours
or	CE 757		3 hours
or	CE 791		3 hours

Sequence of Courses. Each of the senior design courses is the last course in a sequence of courses, each one prerequisite to the next. These sequences culminate with the senior design courses. Of particular importance is the fact that each series requires a five to six-semester sequence for the design courses. Therefore, in planning each semester's schedule of classes, a student should be sure that the schedule includes the proper courses in the sequence of prerequisites. As mathematics, physics, English, statics and dynamics are listed in the prerequisites for the design courses, every student should complete the curriculum requirements for those subjects as early as possible in their undergraduate careers.

## V) Electives in Selected Areas of Emphasis

A student who completes the minimum requirements in each of the four areas of the curriculum will have earned 122 hours in the General Civil Emphasis and 126 hours in the Environmental Emphasis. A total of 132 hours is required in both emphases for graduation. The remaining 6 or 10 hours (to total 132) may be courses that qualify for inclusion in one or more of the four curricular areas that are above the stated minimum.

Area V is included in the curriculum to allow students to use credits in technical subjects which would not apply in the other curricular areas of study, but which would contribute to his or her educational and/or professional goals.

The following paragraphs indicate courses which may be applied to Area V, along with several courses or areas of study that may not be used in that area.

Architectural Engineering. Any course number above 300 is acceptable.

Architecture. Up to five credit hours of building technology and site planning courses numbered 250 or above may be used in Area V.

Business. Any course offered by the University of Kansas School of Business is acceptable. Business courses offered at other colleges or universities will be accepted only if the courses presented are equivalent to courses at KU.

Civil & Environmental Engineering. A student who wishes to study a particular civil engineering area in greater depth can use courses at the 600 or 700 level. However, any student who takes advantage of that opportunity to specialize should be aware that some of the 700-level courses are primarily for graduate students, but are open to seniors who have the prerequisites. The 700-level courses that are primarily for graduate students are not recommended for students who have a low grade point average. A student not wishing to specialize can attain a broader background by taking additional courses beyond the minimum requirements in Area IV, engineering analysis and design. Students who enter the Civil & Environmental Engineering program as freshmen normally will complete CE 191, Introduction to Civil Engineering, in their first semester, and most students will complete CE 499, Senior Seminar, during their senior year. These credits will be used in Area V. Students who transfer to Civil & Environmental Engineering after the freshman year may have completed a different introduction to the profession type course in another engineering discipline. In that case, the credits will be used in Area V. However, the credit hours from only one introduction to the profession type course may be applied toward graduation.

Engineering. Any course offered by the various departments of the School of Engineering is acceptable except:

AE 241	Private Flight Course
AE 242	Private Flight Aeronautics

### ***ROTC CREDITS***

Students competing the ROTC program may substitute three hours of ROTC courses for COMS 130 and may count up to three additional hours of ROTC courses in the general education area (if related to the social sciences or humanities and in excess of the minimum 21 hours required) or as electives (if related to the physical sciences or engineering).

### ***COMMUNITY COLLEGE TRANSFERS***

Many KU civil engineers attend a community college during their freshman and sophomore years followed by two years at KU to complete the BSCE degree. This document presents recommended courses to be taken

during the first two years to be taken at a community college Not more than 64 hours can be transferred from a community college.

### ***DUAL ENROLLMENT***

Some students may desire to pursue two degrees at the same time. The University of Kansas makes dual enrollment possible by having the student enroll in two separate academic divisions simultaneously. For example: students who wish to study for bachelor degrees in business and in civil engineering may enroll in both the School of Business and the School of Engineering; or students who desire to attain degrees in civil engineering and in geology may enroll in both the School of Engineering and the College of Liberal Arts and Sciences. Other possible dual majors could include degrees in foreign language, literature or any other degree offered by the university.

Dual enrollments require careful planning of the semester class schedules and the preparation of the enrollment card for both academic divisions each semester. This program also requires that the student work carefully with special advisors in each area of study. The minimum time required to attain the two degrees is at least one year longer than the minimum for one of the degrees.

The academically well-qualified student who is seriously considering dual enrollment in two separate degree programs at the undergraduate level might explore the possibility of studying for the second degree at the graduate level. If the undergraduate program is properly planned, it may be possible to attain one B.S. degree and one Master of Science degree in about the same time that would be required for two undergraduate degrees.

### ***STUDENT CURRICULUM POLICY***

**A student in Civil Engineering is required to meet the curriculum requirements in effect at the time he or she is admitted to program. If the requirements are subsequently revised, the official policy is the university undergraduate catalog plus and changes adopted by the department since the last printing of the catalog. This manual is only advisory and is rarely revised.**

**A student may petition to meet the requirements a curriculum adopted after he or she has been admitted to the program, but must satisfy all the requirements of the new program.**

**TYPICAL SCHEDULE OF COURSES FOR THE  
CIVIL ENGINEERING DEGREE  
GENERAL CIVIL ENGINEERING EMPHASIS**

For Fall 2003 and Subsequent Admissions

The following typical schedule of courses may be used as a guide for enrollment by students who complete all four years at the University of Kansas.

**FRESHMAN YEAR**

CE 191	Introduction to CE	2	CE 240	Surveying	3
ENGL 101	Composition I	3	ENGL 102	Composition & Literature	3
MATH 121	Calculus I	5	MATH 122	Calculus II	5
CHEM 184	Foundations of Chemistry I	<u>5</u>	CHEM 188	Foundations of Chemistry II	<u>5</u>
		15			16

**SOPHOMORE YEAR**

PHSX 211	General Physics I	4	CE 301	Statics and Dynamics	5
Math 220	Differential Equations	3	CE 390	CE graphics/GIS	3
EECS 138	Intro. to Computing(C++)	3	Econ 140/142/144	Economics	3
COMS 130	Speaker-Aud. Communication	3	PHSX 212	General Physics II	4
Humanities/Social Science Elective <sup>1</sup>		3	Basic Science Elective <sup>1</sup>		<u>3</u>
Math 290	Elem. Linear Alegbra	<u>2</u>			18
		18			

**JUNIOR YEAR**

CE 310	Strength of Materials	4	CE 461	Structural Analysis	4
CE 330	Fluid Mechanics	4	CE 487	Soil Mechanics	4
CE 477	Intro. to Env. Engineering & Sci.	3	CE 412/484	Materials	3
Engineering Science Elective <sup>1</sup>		3	CE 455	Hydrology	3
Humanities/Social Science Elective <sup>1</sup>		<u>3</u>	CMGT 357	Engineering Economics	<u>3</u>
		17			17

**SENIOR YEAR**

CE 499	Senior Seminar	1	CE 563	Structural Design II	3
CE 562	Structural Design I	3	Civil Engineering Design Elective		3
Civil Engineering Design Elective (Water)		4	General Electives		5
Civil Engineering Design Elective		3	Humanities or Social Science elective <sup>1</sup>		<u>3</u>
CE 625	Applied Probability and Statistics	3			14
Engineering Science Elective <sup>1</sup>		<u>3</u>			
		17			

**TOTAL HOURS REQUIRED FOR DEGREE<sup>2</sup> = 132**

<sup>1</sup> See the list of recommended electives and required courses for further information.

<sup>2</sup> The Fundamentals of Engineering (F.E.) Exam is also a requirement of this degree program.

***TYPICAL SCHEDULE OF COURSES FOR THE  
CIVIL ENGINEERING DEGREE  
ENVIRONMENTAL ENGINEERING EMPHASIS***

For Fall 2003 and Subsequent Admissions

Students who complete all four years at the University of Kansas may use the following typical schedule of courses as a guide for enrollment.

**FRESHMAN YEAR**

CE 191	Introduction to CE	2	CE 240	Surveying	3
ENGL 101	Composition I	3	ENGL 102	Composition & Literature	3
MATH 121	Calculus I	5	MATH 122	Calculus II	5
CHEM 184	Foundations of Chemistry I	<u>5</u>	CHEM 188	Foundations of Chemistry II	<u>5</u>
		15			16

**SOPHOMORE YEAR**

PHSX 211	General Physics I	4	CE 301	Statics and Dynamics	5
Math 220	Differential Equations	3	CE 390	CE graphics/GIS	3
EECS 138	Intro. to Computing(C++)	3	Econ 140/142/144	Economics	3
COMS 130	Speaker-Aud. Communication	3	PHSX 212	General Physics II	4
Humanities/Social Science Elective <sup>1</sup>		3	Basic Science Elective <sup>1</sup>		<u>3</u>
Math 290	Elem. Linear Alegbra	<u>2</u>			18
		18			

**JUNIOR YEAR**

CE 310	Strength of Materials	4	CE 461	Structural Analysis	4
CE 330	Fluid Mechanics	4	CE 487	Soil Mechanics	4
CE 477	Intro. to Env. Engineering & Sci.	3	CE 412/484	Materials	3
Engineering Science Elective <sup>1</sup>		3	CE 455	Hydrology	3
Humanities/Social Science Elective <sup>1</sup>		<u>3</u>	CMGT 357	Engineering Economics	<u>3</u>
		17			17

**SENIOR YEAR**

CE 499	Senior Seminar	1			
CE 562/563	Structural Design I or II	3	CE 574/755/757/791	Envir. Design Elective	3
CE 552	Water Res. Eng. Design	4	CE 576	Municipal Water/Wastewater	4
CE 570&571/573	Envir. Principles Electives	3	CE 440/541/580/582/588	CE Design Elective	3
CE 625	Applied Probability and Statistics	3	General Elective		1
Engineering Science Elective <sup>2</sup>		<u>3</u>	Humanities or Social Science Elective		<u>3</u>
		17			14

**TOTAL HOURS REQUIRED FOR DEGREE<sup>2</sup> = 132**

<sup>1</sup> See the list of recommended electives and required courses for further information.

<sup>2</sup> The Fundamentals of Engineering (F.E.) Exam is also a requirement of this degree program.

**TYPICAL SCHEDULE OF COURSES FOR THE  
CIVIL ENGINEERING DEGREE  
GENERAL CIVIL ENGINEERING EMPHASIS**

For Fall 2003 and Subsequent Admissions

The following courses should be completed in the freshman and sophomore years by students who transfer to KU's Civil Engineering program from a community college. (Note: there is a 64-hour limit on transfer credits from a community college.) Also shown is a typical schedule of courses in the junior and senior years for transfer students. These schedules may also be used by students who transfer from a four-year college or university that does not offer an accredited program in civil engineering.

**SUGGESTED FRESHMAN AND SOPHOMORE COURSES**

	<u>Cr.Hr.</u>
Calculus and Analytic Geometry	10
Differential Equations and Elementary Linear Algebra	5
College Physics ( <u>Must</u> be Calculus-based Physics)	8
College Chemistry ( <u>Must</u> be equivalent to KU's CHEM 184 and 188)	10
Basic Science Elective	3
Statics and Dynamics	5
Computer Science (C++)	3
English	6
Economics	3
Speech (Speaker-Audience. Communication)	3
Humanities & Social Sciences	3
Computer Graphics	<u>3</u>
Sub-Total First Two Years	62

**JUNIOR YEAR**

		<u>Cr.Hr.</u>		<u>Cr.Hr.</u>	
CE 625	Applied Prob. and Statistics	3	CE 487	Soil Mechanics	4
CE 240	Surveying	3	CE 455	Hydrology	3
CE 310	Strength of Materials	4	CE 484/412	Transp/structural Materials	3
CE 330	Fluid Mechanics	4	CE 461	Structural Analysis	4
Engineering Science Elective <sup>1</sup>		<u>3</u>	CE 477	Intro Environmental Engr. & sci.	<u>3</u>
		17			17

**SENIOR YEAR**

		<u>Cr.Hr.</u>		<u>Cr.Hr.</u>	
CE 499	Senior Seminar	1	CE Design Elective	3	
CE 562	Structural Design I (steel)	3	General Electives	4	
CE 552/576	CE design course (water)	4	CE 563	Structural Design II (concrete)	3
Design Elective		3	CMGT 357	Engineering Economics	3
General Elective		3	Humanities/Social Science Electives	6	
Engineering Science Elective <sup>1</sup>		<u>3</u>		19	
		17			

**TOTAL HOURS REQUIRED FOR DEGREE<sup>2</sup> = 132**

\* Credit for an engineering computer graphics course will be given only if determined that course content is equivalent to Civil Engineering Computer Graphics (CE 390)

<sup>1</sup> See the list of recommended elective or required courses for further information.

<sup>2</sup> The Fundamentals of Engineering (F.E.) Exam is also a requirement of this degree program.

***TYPICAL SCHEDULE OF COURSES FOR THE  
CIVIL ENGINEERING DEGREE  
ENVIRONMENTAL ENGINEERING EMPHASIS***

For Fall 2003 and Subsequent Admissions

The following courses should be completed in the freshman and sophomore years by students who transfer to KU's Civil Engineering program from a community college. (Note: there is a 64-hour limit on transfer credits from a community college.) Also shown is a typical schedule of courses in the junior and senior years for transfer students. These schedules may also be used by students who transfer from a four-year college or university that does not offer an accredited program in civil engineering.

**SUGGESTED FRESHMAN AND SOPHOMORE COURSES**

	<u>Cr.Hr.</u>
Calculus and Analytic Geometry	10
Differential Equations and Elementary Linear Algebra	5
College Physics ( <u>Must</u> be Calculus-based Physics)	8
College Chemistry ( <u>Must</u> be equivalent to KU's CHEM 184 and 188)	10
Basic Science Elective	3
Statics and Dynamics	5
Computer Science (C++ or Fortran)	3
English	6
Economics	3
Speech (speaker-aud. Communication)	3
Humanities & Social Sciences	3
Computer Graphics	3
Sub-Total First Two Years	62

**JUNIOR YEAR**

	<u>Cr.Hr.</u>		<u>Cr.Hr.</u>
CE 625 Applied Probability and Statistics	3	CE 487 Soil Mechanics	4
CE 240 Surveying	3	CE 455 Hydrology	3
CE 310 Strength of Materials	4	CE 484/412 Transp/structural Materials	3
CE 330 Fluid Mechanics	4	CE 461 Structural Analysis	4
Engineering Science Elective <sup>1</sup>	3	CE 477 Intro Environmental Engr. & Sci.	3
	17		17

**SENIOR YEAR**

	<u>Cr.Hr.</u>		<u>Cr.Hr.</u>
CE 499 Senior Seminar	1	CE 574/755/757/791 Envir. Design Elective	3
CE 562/563 Structural Design Elective	3	CE 576 Municipal Water/Wastewater	4
CE 552 Water Resources Design	4	CE 440/541/580/582/588 CE Design Elective	3
CE 570&571/573 Envir. Principles Electives	3	CMGT 357 Engineering Economics	3
General Elective	3	Humanities/Social Science Elective <sup>1</sup>	6
Engineering Science Elective <sup>1</sup>	3		19
	17		

**TOTAL HOURS REQUIRED FOR DEGREE<sup>2</sup> = 132**

\* Credit for an engineering computer graphics course will only be given if determined that course content is equivalent to Civil Engineering Computer Graphics (CE 390)

<sup>1</sup> See the list of recommended elective or required courses for further information.

<sup>2</sup> The Fundamentals of Engineering (F.E.) Exam is also a requirement of this degree program.

