

Rutgers University  
The State University of New Jersey  
School of Engineering

**DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**INFORMATIONAL NOTEBOOK**

**FOR**

**UNDERGRADUATE STUDENTS**

For Academic Year 2011-2012

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## **INTRODUCTION**

The Department offers a four-year undergraduate curriculum leading to the degree of Bachelor of Science. A five-year, dual-degree program is also offered in conjunction with the School of Arts and Sciences in New Brunswick/Piscataway, leading to a B.S. degree in civil engineering and a B.A. degree in any liberal arts and science major. A B.S.-M.B.A. joint degree program is also available with the Rutgers Graduate School of Management in Newark. Co-op program is available for students who are interested in obtaining practical experience before graduation.

This booklet has been prepared in an effort to keep the undergraduate civil and environmental engineering students informed of academic policies, procedures and requirements that are particular to civil and environmental engineering. This booklet is also intended to provide faculty advisors with the necessary information about student advising and counseling.

All faculty advisors and civil engineering students should carefully read the Academic Policies and Procedures and Degree Requirements published in the New Brunswick Undergraduate Catalog 2007-2009 located on the web at [http://catalogs.rutgers.edu/generated/nb-ug\\_current/](http://catalogs.rutgers.edu/generated/nb-ug_current/) It is also important to be cognizant of University Policies and Procedures described in the same catalog.

## **PROGRAM EDUCATIONAL OBJECTIVES**

Consistent with the stated mission of the University, the object of the civil and environmental engineering program is to provide students with a broad and thorough education in civil and environmental engineering fundamentals, applications, and design so as to prepare graduates for the practice of civil and environmental engineering at the professional level with confidence and skills necessary to meet the technical and social challenges of the future and for continuing their studies at the graduate level.

- To provide a broadly based educational experience in which the essential scientific and technical elements of the engineering curriculum are integrated with the humanities and social sciences to prepare students with competencies needed for personal enrichments, career development, and lifelong learning.
- To ensure that the graduates have the highest standards of personal and professional integrity, and ethical responsibility in the practice of civil and environmental engineering.
- To ensure that the graduates are well versed in several areas of civil and environmental engineering, such as structural, geotechnical, transportation, construction, water resources and environmental engineering, and are able to identify, formulate, and solve a wide range of civil and environmental engineering problems using modern engineering tools and techniques.
- To provide students with a comprehensive design experience involving a team approach, alternate solutions, and realistic constraints that include economic, environmental, ethical, social, and political considerations.

- To encourage students to continue post-baccalaureate professional development including, but not limited to, graduate school, professional registration and continuing education.

## **PROGRAM OUTCOMES**

Each graduate of the Civil and Environmental Engineering Program is expected to have demonstrated the following by the time of graduation:

- (1) an ability to apply knowledge of mathematics, science, and engineering for analysis and solution of engineering problems
- (2) proficiency in at least four recognized major civil engineering areas: structures, geotechnics, transportation, construction, and water resources and environmental engineering
- (3) an ability to design and conduct laboratory experiments and to critically analyze and interpret data in the major civil and environmental engineering areas indicated in (2) above
- (4) an ability to identify, formulate, and solve a wide range of civil and environmental engineering problems, using the skills, techniques, and modern engineering tools necessary for engineering practice
- (5) an ability to perform civil and environmental engineering design by means of design experience integrated throughout the professional component of the curriculum, culminating in a comprehensive design experience involving a multidisciplinary team work, alternate solutions, and realistic design constraints that include economic, environmental, ethical, global, social, and political considerations
- (6) an understanding of the importance of personal and professional integrity, and ethical responsibility in the practice of civil and environmental engineering, and other professional practice issues
- (7) an ability to effectively communicate orally and in writing
- (8) a recognition of the need for an ability to engage in lifelong learning and professional development including graduate school, professional registration, and continuing education
- (9) the broad education necessary to understand contemporary issues and the impact of engineering solutions in a global and societal context.

## **PROGRAMS OF STUDY**

The objective of the undergraduate program is to provide broad and thorough education to students in civil and environmental engineering fundamentals, applications, and design in order to prepare graduates for the practice of professional engineering. To enable the graduates to meet challenges posed by an ever-changing society and advancing technology, the program intends to provide a broad background in many of the different areas of civil and environmental engineering, and sound exposure to engineering sciences, humanities and social sciences. The curriculum is ABET accredited.

Student may concentrate in one of the areas of civil and environmental engineering. The first three years the curricula are identical; changes take place in the senior year. A variety of departmental and technical electives and the “capstone” design courses, permit the student to concentrate in areas of personal interest. Total credits required are 128. The curriculum for civil and environmental engineering is shown on page 11.

### A. Electives for Civil and Environmental Engineers

1. Departmental Electives are 300/400 level civil and environmental engineering (180: ) courses listed on page 14. Of the two departmental electives required, the student must take in the spring semester of the senior year at least one “capstone” design course listed below (more than one course may be taken). Before taking a capstone design course, students are required to take at least two courses from the same specialty area. The capstone courses are:

180:407 Construction Projects  
180:426 Structural Design  
180:431 Design of Environmental Facilities  
180:438 Transportation Engineering II  
180:474 Geotechnical Engineering

A student may take Special Problems in Civil and Environmental Engineering (180:491, 492, 493, 494), as departmental electives with approval of a professor supervising the work, to a limit of 3 credits in the senior year. This course is generally limited to seniors with GPA of 2.7 or higher. The student must fill out a form to receive approval (page 21).

2. Technical Electives are those upper level technical courses appropriate for civil and environmental engineers. The CEE curriculum requires two (2) technical electives to be chosen from among the list on pages 14-16 of this booklet. Although students are free to choose, courses 330:373 and 650:351 are strongly recommended to help the students prepare for the Fundamentals of Engineering (FE) examination. Any departmental electives course may be used as a technical elective.

3. Humanities/Social Science Electives are intended to serve the objectives of a broad education, and to make engineers fully aware of their social responsibilities and better

able to consider related factors in the decision-making process. The CEE curriculum contains 18 credits of Hum./Soc. Electives which must include 350:101 Expository Writing and 220:200 Economic Principles and Problems. A list of acceptable Hum./Soc. Electives courses is on pages 18-19. At least 6 credits must be at advanced level (300 level or higher), and at least two electives must be in one subject area.

4. General Electives: almost any course taught for credit at Rutgers University qualifies as a general elective. There are, however, a few exceptions in certain subject areas as listed in this booklet on page 20.

5. Graduate Courses may be taken as departmental or technical electives by qualified undergraduate students. In order to qualify, one is expected to have a cumulative G.P.A. of 3.0 and must obtain approval of the course instructor or Graduate Program Director and also the approval of the Associate Dean. (See page 21 for form to be used).

#### B. Five-Year Dual Degree Program

The five-year programs offer dual degrees in conjunction with various other undergraduate colleges at Rutgers University. A B.A./B.S. program is offered in cooperation with the School of Arts and Sciences in New Brunswick/Piscataway. A B.S./B.S. program is offered in cooperation with Cook College. For program details, see Five-Year Engineering Curricula in the New Brunswick Undergraduate Catalog.

#### C. Five-Year B.S./M.B.A. Program

A special joint program between the School of Engineering and Rutgers Graduate School of Management is available for qualified engineering students. This program offers the opportunity for students to obtain the Master of Business Administration degree within one calendar year of completing the baccalaureate degree requirements. In order to be considered for this special joint program, a student must have earned a cumulative grade point average of 3.2 or better through the first term of the junior year and must have received a score in the top 80<sup>th</sup> percentile or better on the Graduate Management Admission Test (GMAT). For details see [http://catalogs.rutgers.edu/generated/nb-ug\\_current/](http://catalogs.rutgers.edu/generated/nb-ug_current/) for the Undergraduate Catalog. For civil and environmental engineering students, up to 15 credits of MBA courses may be used as technical/general electives towards the B.S. degree.

#### D. Co-op Internship

The internship provides the student with the opportunity to practice and/or apply knowledge and skills in various civil and environmental engineering professional environments. This internship is intended to provide a capstone experience to the student's undergraduate experience by integrating prior course work into a working engineering environment. The experience also motivates the student for further learning. The credits earned are for the educational benefits of the experience. Details are presented on page 24.

## GENERAL REGISTRATION RULES FOR ALL CLASSES

1. The average course load is about 15-18 credits per semester. Students should maintain a normal load of *engineering-related* courses as specified on their program sheet. The minimum load per semester is 12 credits and the maximum is 20 credits. Special permission from the Associate Dean is required for course loads outside these limits.
2. Students are not allowed to register for any course without the proper prerequisites, unless a special permission card is signed by the instructor of the course and the approval of the advisor. A chart of prerequisites for the CEE program can be found on page 12.
3. Students who fail any required course must repeat it.
4. All CEE courses, including all Department and Technical Electives, must be taken at Rutgers for the first time. Students who fail a CEE course may repeat it elsewhere. Permission to take the course outside Rutgers must be obtained from the faculty advisor and Associate Dean. Authorization forms are available in room EN B-100.
5. Students may register for at most one Pass/NoCredit course per semester for a total of two elective courses (see form on page 23).
6. 180:243 Mechanics of Solids is a prerequisite course for many courses in the junior year. Make certain to complete this course before the Fall semester of your junior year.
7. Seniors require most careful review. It is important that the student review his/her academic file with the advisor to ensure that the student registers for the appropriate remaining courses required for graduation. The student is urged to obtain a complete transcript from the Registrar (free of charge) and check the curriculum sheet against it to find out what courses are remaining to satisfy the degree requirements. The Associate Dean's Office, B-100 is available for assistance with regard to degree audit.
8. Seniors with GPA of 3.0 or higher may enroll in the graduate level courses with permission of the instructor and approval of the Associate Dean. The student must fill out the form on page 21 for this purpose.

## TAKING A COURSE AT ANOTHER SCHOOL

Students may take certain courses at another institution over the summer or winter sessions (not during the spring or fall terms) and transfer the credit (not the grade) to be applied towards your Engineering degree at Rutgers. A grade of C or better is required for the credits to be eligible for transfer (the grade does not transfer into the transcript/GPA). Courses eligible to be taken outside of RU during the summer/winter include first and second year courses of the engineering curriculum: math, physics, chemistry, humanities/social science electives, non-school 14 tech electives, sophomore level introductory major courses. Junior and Senior level major courses

may NOT be taken outside of RU unless failed first at RU or unless there is some extenuating circumstances and needs the approval of the civil engineering undergraduate director.

To check equivalencies for NJ Community Colleges, go to NJ Transfer/ARTSYS - <https://www.njtransfer.org/artweb/chgri.cgi>. For all other institutions or any other transferring concerns, please request advice from Dean Prendergast (Engineering Bldg Rm. B-100, [lpred@rci.rutgers.edu](mailto:lpred@rci.rutgers.edu)). If you wish to take a civil engineering course at a 4 yr institution or an institution outside of New Jersey, the student must provide a course description for evaluation (printed from the school's website, or copied from their printed course catalog) and must have the approval of the civil engineering undergraduate director.

**Before registering for any course outside of Rutgers**, fill out an Authorization for Transfer Credit Form (from can be downloaded from [http://coewww.rutgers.edu/oaa/transfer\\_courses.php](http://coewww.rutgers.edu/oaa/transfer_courses.php) or picked from SOE Room B-100. The form must be signed by Dean Bernath, Dean Prendergast, or Dean Rankin. Once the grade has been received at the school external to Rutgers, the student must request (from the external school) to have an Official transcript sent from the external school directly to our office.

## **TRANSFER FROM AN EXTERNAL COLLEGE**

For those students who are interested in transferring into the School of Engineering from an institution external to Rutgers, there are several steps to take.

### **1. Complete appropriate coursework.**

Ensure that you will have completed the appropriate courses by the time you intend to begin your studies at Rutgers. Generally we look for the equivalent of our first year - 2 semesters of calculus, 1 semester of calc based physics, Matlab computer programming, 1-2 semesters of chemistry. Some other relevant courses to take are: engineering mechanics-statics, macro/micro economics, English Composition.

### **2. Apply.**

Apply to the School of Engineering through the Office of Admissions  
<http://ruweb.rutgers.edu/admissions.shtml>

### **3. Return Acknowledgement Card. Send in deposit.**

Once you are admitted, after you return the Admissions Acknowledgement card (indicating you'll be attending the School of Engineering) and after you send in your deposit, the Office of Admissions will send your file and transcripts to our office (Office of Academic Affairs) for evaluation.

### **4. Attend Transfer Orientation Session.**

After evaluation of your transcript, you will get a copy of what transfer credit you will receive. At that time, you will also be invited to Transfer Orientation Session, where you will pick your classes for the following semester with an advisor from your major. All incoming transfer

students to the School of Engineering must attend Orientation. At Orientation you will receive:  
1) Transfer credit evaluation, 2) Curriculum Check-off sheet, 3) meet with an academic advisor,  
and 4) choose your classes.

For more information on transfer, visit this link:

[http://coewww.rutgers.edu/oaa/transfer\\_external.php](http://coewww.rutgers.edu/oaa/transfer_external.php)

or contact SOE Office of Academic Affairs (732)-445-2212

For course description of CEE courses, see Undergraduate Catalogue

[http://catalogs.rutgers.edu/generated/nb-ug\\_current/](http://catalogs.rutgers.edu/generated/nb-ug_current/)

For specific questions on transfer of civil engineering courses, contact the CEE Undergraduate Director at 732-445-0579, ext. 128 or e-mail: [mmazurek@rci.rutgers.edu](mailto:mmazurek@rci.rutgers.edu)

**RUTGERS UNIVERSITY  
THE STATE UNIVERSITY OF NEW JERSEY  
SCHOOL OF ENGINEERING  
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**UNDERGRADUATE PROGRAM**

Dr. Nenad Gucunski	Chairman	445-2232/2569	CEB 124
Dr. Monica Mazurek	Undergraduate Director	445-0579, ext. 128	CAIT 118

**Advisors: Class of 2012**

Dr. Ali Maher		445-0579, x 105	CAIT 211E
Dr. Yook-Kong Yong		445-3219	CEB 131

**Advisors: Class of 2013**

Dr. Monica Mazurek		445-0579, x 128	CAIT 118
Dr. Hani Nassif		445-4414	SOE A131

**Advisors: Class of 2014**

Dr. Maria Boile		445-0579, x 129	CAIT 120
Dr. Trefor Williams		445-0579, x 120	CAIT 112

**Advisors: Class of 2015**

Dr. Qizhong Guo		445-4444	CEB 109
Dr. Kaan Ozbay		445-0579, x 127	CAIT 116

The students are encouraged to see their advisors as often as necessary, but are required to see them at least once a year. The Chairman and the Undergraduate Director are also available for discussion on individual or departmental concern.

## CIVIL AND ENVIRONMENTAL ENGINEERING CURRICULUM

Effective with the Class of 2012

### FRESHMAN YEAR

01:160:159	Genl. Chem for Engr.	3		01:160:160	Genl. Chem for Engr.	3
01:160:171	Intro to Experimentation	1		01:355:101	Expos Writing	
01:355:101	Expos Writing			or		
				14:440:127	Intro to Comptrs for Engr	3
14:440:127	Intr to Comptrs for Engr	3		14:440:221	Engineering Mechanics	3
14:440:100	Intr to Engineering	1		01:640:152	Calculus II	4
01:640:151	Calculus	4		01:750:124	Analytical Physics I	2
01:750:123	Analytical Physics I	2		_____:____	Hum/Soc Elective	<u>3</u>
_____:____	Hum/Soc Elective	<u>3</u>				18
		17				

### SOPHOMORE YEAR

01:640:251	Mul Multiv Calculus	4		14:180:243	Mech of Solids	M3
14:440:222	Engg Mech: Dynamics	3		14:180:216	Intro CADD	M3
01:750:227	Analy Physics IIA	3		01:640:244	Diff Eqs/Lin Alg	4
01:750:229	Analy Physics lab	1		01:220:200	Econ Princ & Prog	3
01:355:302	Scien. & Tech. Writing	3		_____:____	Hum/Soc Elective	<u>3</u>
_____:____	Hum/Soc Elective	<u>3</u>				16
		17				

### JUNIOR YEAR

01:960:379	Basic Prob & Statistics	M3		14:180:320	Elem of Struc Design	M3
14:180:305	Construction Engg	M3		14:180:345	Prop Materials Lab	M1
14:180:318	Elem of Structures	M3		14:180:364	Transp Engg	M3
14:180:387	Fluid Mechanics	M3		14:180:372	Soil Mechanics	M3
14:180:389	Fluid Mech Lab	M1		14:180:374	Soil Mech Lab	M1
14:635:407	Mech Prop Materials	<u>M3</u>		14:540:343	Engg Economics	<u>M3</u>
		16				14

### SENIOR YEAR

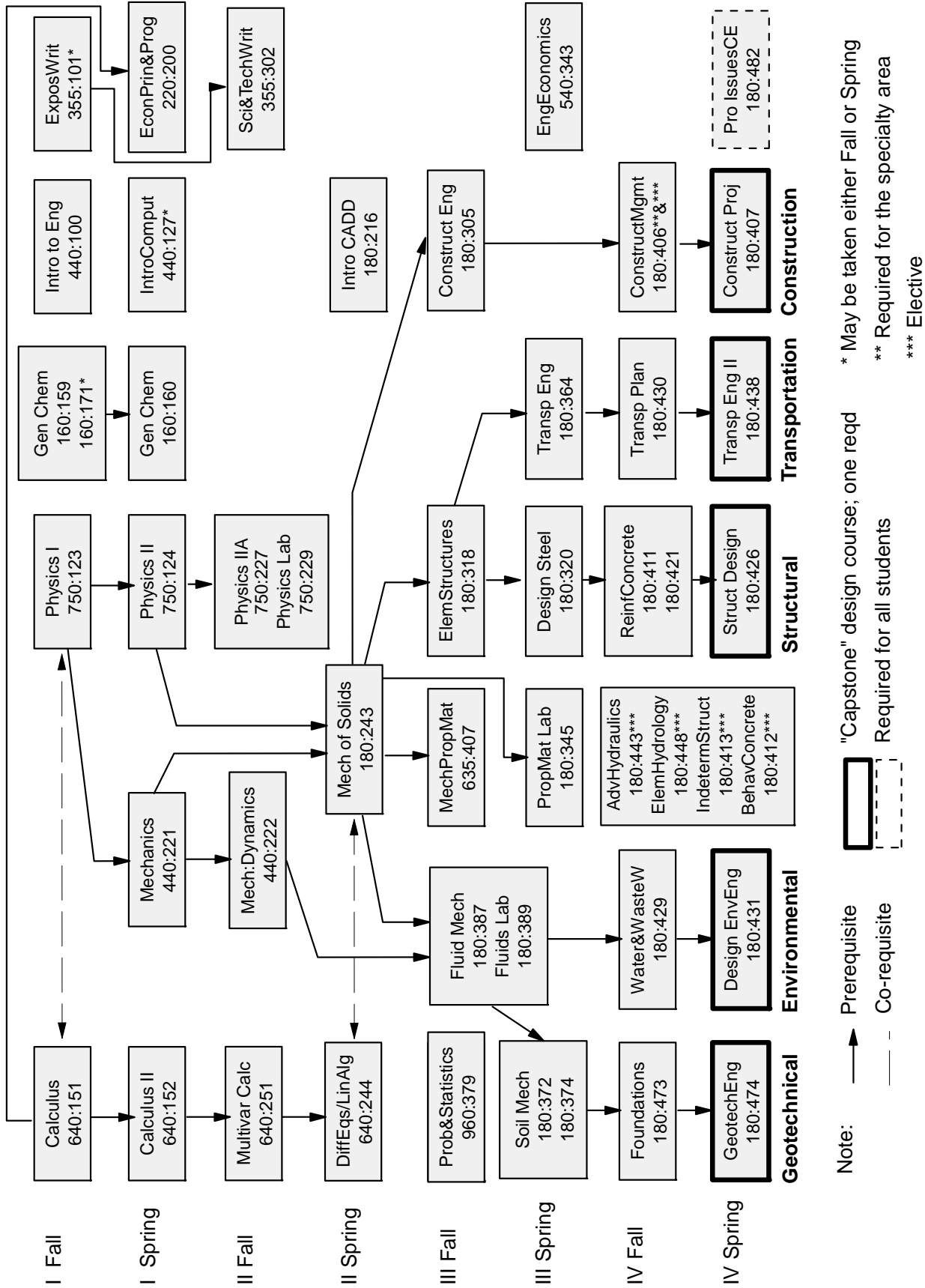
14:180:411	Reinforced Concrete	M3		14:180:482	Prof Issues in CE	M1
14:180:421	Reinf Concrete Lab	M1		14:180:____	*Design Project	M4
14:180:429	Water & Waste Wtr Eng	M3		14:180:____	Dept Elective	M3
14:180:473	Foundation Engg	M3		_____:____	Tech Elective	M3
14:180:430	Transportation Plann	M3		_____:____	General Elective	<u>3</u>
_____:____	Technical Elective	<u>M3</u>				14
		16				

**Total credit hours 128**

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\*One or two of the departmental electives 407, 426, 431, 438 and 474 will be offered each year to satisfy the design requirement.

# Civil and Environmental Engineering Prerequisite Chart of Required & Elective Courses



**COURSES TO BE INCLUDED IN THE MAJOR AVERAGE**

**APPLIED SCIENCE (072/073)**

All Engineering Electives  
All technical electives  
All math/science electives

**BIOMEDICAL ENG. (125)**

All 125 courses

**BIOENVIRONMENTAL (116/117)**

All 117, 155, 180, 220, 332, 375, 440, and 650 courses, 200 level and above.

**CHEMICAL ENGINEERING (155/156)**

All 155 courses  
All required Chemistry, Biochemistry, and Microbiology courses  
All technical electives

**CIVIL ENGINEERING (180/181)**

All 180 courses

960:379

540:343

440:407

All technical electives

**ELECTRICAL ENGINEERING (332/333)**

All 332 courses

All technical

All computer electives

**INDUSTRIAL ENGINEERING (540/541)**

All 540 courses

180:243

332:373

440:407

33:010:310

All technical electives

**MATERIALS SCIENCE (635/636)**

All 635 courses except: 635:201&202

960:XXX

**MECHANICAL ENGINEERING (650/651)**

All 650 courses

332:373, 375

540:343

640:421

440:407

**Note: All departmental and technical electives must conform to guidelines published in Departmental Advising Handbooks or be approved by the student's departmental academic advisor.**

School of Engineering

Department of Civil and Environmental Engineering

**Departmental Electives**

180:331	Fundamentals of Environmental Engineering	3 cr
180:382	Hydraulic and Environmental Engineering	3 cr
180:402	Finite Element Methods Methods in Civil Engineering	3 cr
180:406	Construction Engineering Management	3 cr
180:407	Construction Projects	4 cr
180:412	Behavior of Concrete Materials and Systems	3 cr
180:413	Theory of Indeterminate Structures	3 cr
180:426	Structural Design	4 cr
180:431	Design of Environmental Engineering Facilities	4 cr
180:438	Transportation Engineering II	4 cr
180:443	Advanced Hydraulics	3 cr
180:448	Elements of Hydrology	3 cr
180:471	Elements of Environmental Geotechnology	3 cr
180:474	Geotechnical Engineering	4 cr
180:491, 492	Special Problems in Civil Engineering	By Arrangement
180:493, 494	Special Problems in Environmental Engineering	By Arrangement
180:496, 497	Co-op in Civil and Environmental Engineering	By Arrangement

Notes:

- 1) Student is required to take at least one of “capstone” design courses (407, 426, 431, 438, 474).
- 2) Co-op Internship (496 and 497) can be taken as departmental electives only with a special approval from the Undergraduate Director. In all other cases those will be counted as technical electives.
- 3) For course description of these course, see Undergraduate Catalogue [http://catalogs.rutgers.edu/generated/nb-ug\\_current/pg21485.html](http://catalogs.rutgers.edu/generated/nb-ug_current/pg21485.html)

**School of Engineering**  
**Department of Civil and Environmental Engineering**

**Recommended and Acceptable Technical Electives**

(Refer to Undergraduate Catalog)

- Course must carry at least 3 credits
- Excluded are individual study, recitation special topic and seminar courses

**Strongly Recommended**

14:332:373 Elements of Electrical Engineering  
14:650:351 Thermodynamics

**Acceptable**

01:115: (Bio-Chemistry) All except 202, 392

01:119: (Biology) 101, 102; any course higher than 302

01:160: (Chemistry) Any 200 or higher-level course

01:198: (Comp. Science) All except 105, 107, 110, 111, 113, and 170

01:450:321 (Geography) Geographic Information Systems  
01:450:417 (Geography) Coastal Geomorphology

01:460:(Geology) 101; any course higher than 300

01:640: (Math) Any course 300 or higher  
01:640:250 (Math) Introduction to Linear Algebra

01:750:(Physics) Any course higher than 300 except 301, 323, 324, 370, 397

01:960:(Statistics) All except 201, 211, 212, 285, 379, 381

(Planning and Public Policy)

10:762:306 Principles of Urban Planning  
10:762:316 Physical Design and Site Planning  
10:762:413 Urban Revitalization  
10:762:420 GIS for Health and Planning  
10:762:451 Environmental Policy and Regulations  
10:762:473 Transportation Policy  
10:762:440 Principles of Real Estate

(Bioenvironmental Engineering)

- 11:117:494 Land and Water Resources Engineering
- 11:117:495 Environmental Systems Analysis for Engineers
- 11:117:496 Planning and Design of Land Treatment Systems

(Environmental Resources)

- 11:372:371 Air photo Interpretation
- 11:372:444 Watershed Management: An Interdisciplinary Perspective
- 11:372:442 Applied Principles of Hydrology

(Environmental Sciences)

- 11:375:302 Elements of Water and Wastewater Treatment
- 11:375:307 Elements of Solid Waste Management
- 11:375:333 Environmental Law I
- 11:375:334 Environmental Law II
- 11:375:405 Fund. of Water and Wastewater Analysis
- 11:375:409 Environmental Statement and Impact
- 11:375:421 Principles of Air Pollution Control
- 11:375:430 Hazardous Wastes (Pre-requisite 375:307)
- 11:375:444 Water Resources – Water Quality

(Marine and Coastal Sciences)

- 11:628:401 Applied Shoreline Management

(Natural Resource Management)

- 11:704:421 Wetland Ecology

(Electrical and Computer Engineering)

- 14:332:231 Digital Logic Design
- 14:332:252 Programming Methodology

(Industrial and Systems Engineering)

- 14:540:210 Engineering Probability
- 14:540:311 Deterministic Models in Oper. Res.
- 14:540:410 Linear Programming
- 14:540:421 Industrial Organization and Management
- 14:540:433 Quality Engineering and Statistics
- 14:540:461 Engineering Law

(Mechanical and Aerospace Engineering)

- 14:650:443 Vibrations and Controls
- 14:650:449 Introduction to Mechanics of Composites
- 14:650:458 Aerospace Structures
- 14:650:460 Aerodynamics
- 14:650:462 Power Plants
- 14:650:474 Solar Thermal Energy Collection and Storage
- 14:650:477 Environmental Control of Buildings

**In Addition:**

Any of the Civil and Environmental Engineering Elective Courses (14:180 :   ), including 491, 492, 493 and 494 are acceptable as technical electives.

For the 5-year BS/MBA program only, the following courses are acceptable as technical electives:

22:223:581 (Economics Applied)	Managerial Economic Analysis
22:010:577 (Accounting)	Accounting for Managers
22:620:585 (Management)	Organization Behavior
22:960:575	Data Models
22:711:580	Supply Chain Logistics

LIST OF **ACCEPTABLE** HUMANITIES/SOCIAL SCIENCE ELECTIVES  
EFFECTIVE FALL TERM 2005 (Revised 10-2005)

**NOTE: This list is based on the New Brunswick Undergraduate Catalog, 2003-2005, and supersedes all previous lists. Any new courses added after publication of the 2005-2007 Catalog are subject to review. Questions or appeals regarding course acceptability should be directed to the Associate Dean.**

**Rationale for H/SS Electives in the Curriculum:** A good undergraduate education should provide more than the development of technical skills. Properly chosen, H/SS electives can complement your technical courses by helping you to develop an understanding of the problems facing our society, a historical consciousness, a sense of values, knowledge of other cultures, an appreciation of the fine arts, and an ability to think logically and communicate effectively. Think seriously about your choices, and use them to enhance your educational experience. Engineering students may also complete a **minor** or **second major** in these disciplines. See <http://coewww.rutgers.edu/oa/declaration.php> for details.

**School Requirements:** All candidates for the B.S. degree must complete a minimum of 18 credits of humanities/social science courses including the following:

- 01:355:101;
- 01:220:200 or 01:220:102 **AND** 103. (Note: credit not granted for 220:200 and 220:102 or 220:103)
- Four free electives chosen from courses listed below;
- Free electives must be selected in a manner such that at least **two courses are at the 300/400 (upper) level**, at least two courses, including one upper level, are from the same subject area; and at least two different subjects are represented. All courses may be from the same subject **ONLY IF** a minor or 2<sup>nd</sup> major in a H/SS subject is earned. Even with a minor/major, 2 upper level courses from this list must be chosen.
- Elementary language courses are normally NOT accepted for H/SS credit. However, four semesters of a language (2 elementary and 2 intermediate) that were not taken in high school and is not the student's native language will count as 1 general, 2 H/SS lower, and 1 H/SS upper elective. The second upper level H/SS elective must come from another subject unless a minor is earned.

Department	Courses
01:013 African Lang & Lit	205,209,210,227,228,231,232,235,236,237,238,301,309,310,311,327,328,335-338,437, 438
01:014 Africana Studies	All Courses EXCEPT: 140,223,224,341,342,460, 490-498
01:050 American Studies	All Courses EXCEPT: 281-284
01:070 Anthropology	All Courses EXCEPT: 291-294,334,335,349,354,355,358,359,390-395,495-498
01:082 Art History	All Courses EXCEPT: 111,112,291-94,345,462,473,491-498
01:098 Asian Studies	241,242,321,322,444
01:145 Catalan	301,302,305
01:165 Chinese	All Courses EXCEPT: 101,102,111,112,121,490-498
01:190 Classics	All Courses EXCEPT: 101,102,431,432,491-496
01:195 Comparative Lit	All Courses EXCEPT: 136,151,160,399,493-496
01:202 Criminal Justice	201,206,301,310,311,312,322,327,405
01:214 East Asian Studies	241, 242, 310, 338

<b>01:220 Economics</b>	<b>All Courses EXCEPT: 322,326,386,,397-399,401-410,421,490-496</b>
<b>01:350-354 English</b>	<b>All Courses</b>
<b>01:355 English (Writing)</b>	<b>Either 322 Or 302</b>
<b>01:360 European Studies</b>	<b>301, 401</b>
<b>11:372 Environ Planning</b>	<b>202</b>
<b>11:373 Environ &amp; Business Econ</b>	<b>323,331,361,363,371</b>
<b>Department</b>	<b>Courses</b>
<b>11:374 Environ Policy, Instit &amp; Behavior</b>	<b>101,102,175,211,220,223,269,279,301,308,312,313,314, 315,322,331,335,336,341</b>
<b>01:420 French</b>	All Courses EXCEPT: 101-121,171,210,275,276,299,393,394,399,493-498
<b>01:450 Geography</b>	100,102,103,205,211,222,240,262,309,311, 320, 322, 323, 330-338, 341, 342, 361, 363, 370, 380, 405, 406, 411, 419, 470
<b>01:470 German</b>	All Courses EXCEPT: 101-122,281,282,299, 387-390, 393-396,495,496
<b>01:489 Modern Greek</b>	201,202,205,207,241,305,306,312,316,347,351,358,380-383,493,494
<b>01:490 Greek</b>	207,208,304-306,308-312,315,335,352, 353, 391,392,400,402
<b>01:506-512 History</b>	All Courses
<b>01:535 Hungarian</b>	201, 202, 259, 260, 321,355,401,490
<b>11:554 Interdisc Studies - Cook</b>	196,296,301,305
<b>01:556 Interdisc Studies</b>	220,499
<b>01:560 Italian</b>	All Courses EXCEPT: 101-124,283,284,299,317,318
<b>01:563 Jewish Studies</b>	All Courses EXCEPT: 101-104,381,382,482,483
<b>01:565 Japanese</b>	201,202, 213, 214, 241, 242, 250, 301-304, 313, 314, 315, 317, 325, 350, 360, 362, 370, 401, 402, 411, 451, 452, 460, 470, 483
<b>01:574 Korean</b>	201,202,210,220,221,250,301,302,303,304,401,402,410,411,450,471
<b>37:575 Labor Studies</b>	All Courses EXCEPT: 401,450-499
<b>01:580 Latin</b>	203,204,302-304,310,321,323-325,327-329,335,401-404, 407
<b>01:590 Latin Amer Studies</b>	201, 367, 393,401,402,410,460,499
<b>01:615 Linguistics</b>	All Courses
<b>01:667 Medieval Studies</b>	281,282,388,481
<b>01:685 Middle East Studies</b>	203,204,303,304,329,350,355,437,438,451,455,490,495,496
<b>07:700 Music</b>	101-122,125,211-222,226-238,301-322 (For Music Only, 200+ counts as Upper Level)
<b>01:730 Philosophy</b>	All Courses EXCEPT: 493-496
<b>10:762 Planning &amp; Public Policy (formerly 975-Urban Studies)</b>	101, 233,303-306,310,324, 331, 350, 352,413, 421, 444,451, 460,462, 471, 473, 474, 476,478,485
<b>01:787 Polish</b>	201,202,259,370,401,402,470,475
<b>01:790 Political Science</b>	All Courses EXCEPT: 250-253,300,392-400,481-498
<b>01:810 Portuguese</b>	All Courses EXCEPT: 101,102,135,141,142,201,493-498
<b>01:830 Psychology</b>	All Courses EXCEPT: 200,300,323,396-398,493-498
<b>01:836 Puerto Rican &amp; Hisp Caribb Studies</b>	All Courses EXCEPT: 354,356,494-497
<b>01:840 Religion</b>	All Courses
<b>01:860 Russian</b>	All Courses EXCEPT: 101,102,105-108,215,338,339,351,352,375-380,487-497
<b>01:861 Russian, Central &amp; East European Studies</b>	259,264,317,318,360,370,391,455,460,470,475
<b>01:920 Sociology</b>	All Courses EXCEPT: 311,312,393,398,399,493-498
<b>01:940 Spanish</b>	All Courses EXCEPT: 100-105,121,139,201,287,288,299,317,318, 326, 327, 399, 416, 470-498
<b>07:965 Theatre Arts</b>	211, 212, 311, 312, 398, 401
<b>01:967 Ukranian</b>	259
<b>01:988 Women's Studies</b>	All Courses EXCEPT: 370,399,425,426,430,493-498

**COURSES NOT  
ACCEPTABLE FOR USE AS  
GENERAL ELECTIVES**

CHEMISTRY	01:160	110 THROUGH 140
COMPUTER SCIENCE	01:198	110,170
ENGLISH	01:355	096 THROUGH 099
EXERCISE SCIENCE	01:377	171 THROUGH 180
MATHEMATICS	01:640	011 THROUGH 115

**OR any University Course with an “E” Credit Prefix**



**Request for Approval to Enroll In**

Special Problems in Civil or Environmental Engineering (180:491, 492, 493, 494)

- Note:** (1) Student must be in senior standing with a cumulative GPA of 2.70 or better.  
(2) Has never taken the course previously.  
(3) Has a supervising professor's approval.

Name \_\_\_\_\_ Class \_\_\_\_\_

GPA \_\_\_\_\_

Research Topic:

Number of Credits Registered: \_\_\_\_\_ Cr. Term: \_\_\_\_\_

Supervising Professor's Name: \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

\_\_\_\_\_ . \_\_\_\_\_ . \_\_\_\_\_ . \_\_\_\_\_ . \_\_\_\_\_

Official Use:

Special Permission Number: \_\_\_\_\_

**PASS/NOCREDIT FORM**

**Requirements**

- **Eligible courses:** Humanities/Social Science elective, General Elective, non-School 14 Technical elective.
- **Ineligible courses:** Calc 1-4, Physics 1a,1b,2a,2b, Chem 1&2, major courses, school 14 courses (14:xxx:xxx), or any required course for your major.
- May be used for no more than 2 courses.
- May only use 1 P/NC in a single semester.
- Students pursuing a minor or double major should confirm if a P/NC is acceptable with the department offering the minor/double major.

**Timeline**

- The last day to submit an application for P/NC is the last day to drop a course with Dean's Permission (end of the 12th week). This is NOT reversible. For courses taken during Summer Session, the application must be submitted by the end of the first week of classes.
- Starting in the fall semester of senior year, students can apply for P/NC for previous semesters if they have not used their allocation of 2 P/NC courses for their entire undergraduate careers.

**Procedure**

- During the appropriate time frame, fill this form out and return it to B-100.
- Grade of C or better corresponds to a PASS. A grade of D or F corresponds to a NOCR. The grade is not calculated into the gpa, however a NOCR grade is like a failure – meaning: if the course is required, it must be retaken and passed.

Student Name \_\_\_\_\_

Email \_\_\_\_\_

Student ID# \_\_\_\_\_ Date \_\_\_\_\_

Graduation Year \_\_\_\_\_ Eng'g Major Code\* \_\_\_\_\_

*Engineering Major	Code
Non-engineering	001
Applied Science	073
Bioenvironmental	116
Biomedical	125
Chemical	155
Civil	180
ECE	332
Industrial	540
Mat'l Science	635
Mechanical	650

Course #	Course name	Semester&Year	Grade
(Ex. 01:640:250)	(Ex. Linear Algebra)	(Ex. Spring 2003)	
	(Ex. C+)		

**Add Prefix and Change to Pass/Nocr**

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(Ex. P-prefix Grade: PASS)

_____	_____
<b>Dean's Signature</b>	<b>Date</b>
Internal Processing:	
<ul style="list-style-type: none"> <li>▪ During Add/Drop period, enter P prefix into the RUTADMIN system, file this form in student folder.</li> <li>▪ All other times, make a copy for student folder and send to Records and Transcripts for</li> </ul>	

## CO-OP INTERNSHIP

180: 496/497 CO-OP INTERNSHIP IN CIVIL AND ENVIRONMENTAL ENGINEERING  
(3,3 CREDITS, PASS/NO CREDIT BASIS ONLY)

**Catalog Description:** The internship provides the student with the opportunity to practice and/or apply knowledge and skills in various civil and environmental engineering professional environments. This internship is intended to provide a capstone experience to the student's undergraduate studies by integrating prior course work into a working engineering environment. The experience also motivates the student for further learning. The credits earned are the educational benefits of the experience.

**Prerequisite:** Open only to senior Civil and Environmental Students.

**Course Outline:** The students must satisfy the following criteria to be eligible to enter an internship.

- (i) Completed a minimum of 90 credits with a cumulative grade point average of at least 2.5.
- (ii) Completed a minimum of 18 credits in the major, with a major cumulative grade point average of at least 2.5.
- (iii) The Internship can be taken at the end of junior year. The workload should follow a standard credit definition, i.e., 4 hours of work per week per credit for 14 weeks or 56 total hours per credit. The student must spend a minimum of 12 to 15 hours per week to earn these 3 credits.
- (iv) Students electing to participate in the Co-op Internship program for Pass/No credit cannot designate any additional Technical Electives as Pass/No Credit.

The following are the requirements to satisfy the undergraduate internship activities for credit:

1. A suitable project must be formulated as a self-contained individual effort under the supervision of a practicing professional and a faculty member.
2. A written proposal must be submitted to the Department by the student. The proposal must be approved by the Undergraduate Director and the Faculty Advisor. The written proposal should include educational benefits, engineering related responsibilities at work site, project tasks, and the plan for evaluation.
3. The proposal defined above, with the signatures of approval by a faculty member and the practicing professional is required. This must be submitted to the Undergraduate Director before registration. The registration is by special permission only.
4. Students hired on an hourly basis within the Department cannot use this to fulfill the Co-op Internship requirements.
5. All internship work will include a daily/weekly logbook, progress report, and final report. The final report and the semester grade must be signed by the supervising practicing professional and the faculty member.

**Rutgers University-School of Engineering**  
**Department of Civil & Environmental Engineering**  
**-Cooperative Education Internship Proposal-**

**Student:**

**Semester of Enrollment:**

**Length of Internship(s):**

**Employer(s):**

**Total Hours:**

**Academic Credits:**

**Faculty Advisor:**

**Plan for Evaluation:** A written summary of work experiences will be submitted by the student at either the end of the employment period or anytime prior to the end of the semester to which the experience will be credited. The Faculty Advisor will meet with the student, evaluate the summary, and assign a grade (Pass/Fail).

The summary may include particular experiences of the student and general descriptions of the tasks achieved during the period of employment.

\_\_\_\_\_ Date: \_\_\_\_\_  
Student

\_\_\_\_\_ Date: \_\_\_\_\_  
Faculty Advisor

\_\_\_\_\_ Date: \_\_\_\_\_  
Monica Mazurek  
Academic Advisor - Civil/Env. Engg. Dept.

\_\_\_\_\_ Date: \_\_\_\_\_  
Fred R. Bernath  
Associate Dean for Academic Affairs

**RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY**  
**School of Engineering**

**DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING FACULTY**

Balaguru, P.N.	Ph.D.	Illinois	Concrete Structural Systems, Composite Materials, Construction Management.
Gonzales, E.	Ph.D.	UC Berkeley	Operation, Control, and Design of Urban Transportation Networks, Traffic Operations, System and Network Analysis and Modeling.
Gucunski, N. (Chairman)	Ph.D.	Michigan	Soil-Structure Interaction, Exploration by Seismic Methods, Numerical Methods, Soil/Structural Dynamics.
Guo, Q.	Ph.D.	Minnesota	Hydraulics: Environmental, Coastal, Urban and Cold Regions Applications; Water Quality; Sediment Transport.
Hill, D.	Ph.D.	Illinois	Real-Time Modeling of Large-Scale Water Resources Systems; Adaptive Management of Water Resources Systems; Data Mining and Machine Learning.
Maher, A.	Ph.D.	Michigan	Soil/Site Improvement, Soil Composite Materials, Geosynthetics, Environmental Geotechnology.
Mazurek, M.	Ph.D.	UCLA	Air Quality Eng., Environmental Biogeochemistry, Analytical Chemistry for Environmental Systems.
Najm, H.	Ph.D.	Michigan	Structural System Design, Bridge Design, Concrete Material.
Nassif, H. A.	Ph.D.	Michigan	Reliability Analysis; Design, Analysis, and Field Testing of Bridges; Adv. High-Performance Materials.
Nawy, E.G.	D.Eng.	Pisa	Structural Concrete, Materials and Systems, Cold Weather Concrete Construction.
Ozbay, K.	Ph.D.	VA Tech	Transportation Engineering, ITS, Dynamic Traffic Assignment and Control, Traffic Simulation.

**DEPT OF CIVIL/ENV ENGG. FACULTY (cont'd)**

Wang, H.	Ph.D.	Illinois	Advanced Infrastructure Material Characterization, Recycled and Environment-Friendly Material for Pavement Construction and Rehabilitation, Computational Modeling.
Williams, T.P.	Ph.D.	GA Tech.	Construction Management, Traffic Engineering, Computer Aided Analysis, Expert Systems.
Yong, Y.K.	Ph.D.	Princeton	Crystal Plates, Structural Behavior, Finite Element Analysis, Structural Dynamics.

**PART-TIME LECTURERS**

Scott Douglas	M.S.	U. of VT	Environmental Toxicology
Howard Klinger	Ph.D.	U. of DE	Engineering Mechanics
Steven Medlar	M.S.	Tufts	Water Resources/Environmental Engineering