



# *Civil and Environmental Engineering Graduate Program*



## **Program Information Manual for Graduate Students**

**Academic Year  
2015-2016**

## **Preface**

This manual is intended to augment the sections of the Graduate School Bulletin dealing with academic policies and procedures and degree requirements. The student is urged to read the Graduate School Bulletin carefully since all the vital information is not repeated herein. It is the student's responsibility to be aware of the current requirements of the Graduate School.

This Manual also constitutes part of the Program Bylaws.

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## **SECTION I: Master of Science**

### **A) Degree Options**

*The Master of Science degree requires the completion of at least 30 credits under two options:*

**Option A:** Requires a minimum of **24** credits of coursework plus a 6 credit thesis and a public oral defense of thesis.

**Option B:** Requires a minimum of **27** credits of coursework plus a **3** credit special project, and a final oral examination.<sup>1</sup>

Students are free to choose between Options A and B, except graduate assistants, who are required to take Option A. The students choose a program of study outlined in **Section III**.

### **B) General Course Credit Requirements**

*Students must satisfy the following credit requirements toward the M.S. degree:*

1. At least **18** credits must be taken from the Department of Civil and Environmental Engineering.
2. No credit in 300-level courses may be used toward the M.S. degree.
3. No more than **6** credits of 400-level Civil and Environmental engineering courses may be used toward the M.S. degree<sup>2</sup>. *Special Problems in Civil Engineering and Co-Op Courses* cannot be used toward the MS Degree.
4. No more than **3** credits of either *Advanced Topics In Civil Engineering (180:601 or 180:602)* **or** *Advanced Topics in Environmental Engineering (180:611 or 180:612)* may be used toward the M.S. degree.
5. 180:701 and 180:702 can be used only for thesis research. These credits will not count toward coursework requirements.
6. At least **two** semesters (N credit prefix) of *Seminar in Civil and Environmental Engineering (180:691, 180:692)*

<sup>1</sup> As per the Graduate School's requirement, he/she must demonstrate that he/she has the ability to write a creditable report as part of a regular course

<sup>2</sup> Courses approved by graduate director

### **C) Scholastic Standing**

Candidates for the M.S. degree shall have a GPA of 3.0 or better in their coursework. No more than **6** credits bearing the grade of C or C+ may be used to meet the requirements for the M.S. degree. His/her advisor monitors the student's academic performance. The students may be recommended for dismissal from the Graduate School by action of the graduate faculty.

### **D) M.S. Committee**

The student's graduate committee will normally consist of three graduate program faculty members. The student's advisor will serve as chairperson. The graduate director upon the recommendation of the student's advisor will appoint members to the student's committee. The advisor will consult with the student on this matter. The graduate director in consultation with the advisor and the student will make any subsequent changes of committee members.

**Option A:** The committee will be appointed during the term in which the student commences his/her thesis research. Before embarking on the research, the student will submit a short proposal of the thesis work to his/her committee. The committee will be responsible for supervising the thesis research and conducting the public oral defense of thesis.

**Option B:** The committee will be appointed at the start of the semester in which the student will take his/her final oral examination. The student will work on a 3-credit project with his/her advisor and submit a scholarly report. The final oral examination is based on the work done in the project. The committee will be responsible for conducting the final oral examination.

### **E) Final Oral Examination**

The final oral examination will be conducted by the student's committee near the end of the student's final term of work. The examination will consist of an oral presentation of the thesis or project report.

The student must bring with him/her the form *Application for Admission to Candidacy for Degree of M.S.* to the examination. The form must have been previously filed with the Graduate School early in the semester in which the student expects to take the examination. After the examination, the student will return the properly signed form to the Graduate School. One dissenting vote is allowed to pass a candidate for the degree. Students who fail the final examination will be given the opportunity to retake the examination for a second and final time within one year of the first attempt.

**F) Continuing to the Ph.D. Program**

Students who completed the department's M.S. degree requirements and are interested in continuing to the doctoral program should file an application with the graduate director. Normally, the student is expected to have a grade point average of at least 3.5 in the M.S. coursework and must be recommended by the M.S. committee members. It is desirable for the student to have a professor who agrees to supervise the student's doctoral research. The student's M.S. committee will review the application and make a recommendation to the graduate director for approval.

**G) Time Limits**

Students are urged to complete the M.S. requirements as expeditiously as possible. The normal maximum is three years after the first registration in the Graduate School.

Part-time students will be allowed, without petitioning, a normal maximum of five years.

Students requiring an extension beyond the normal time limits must petition, through the graduate director, to the Executive Council of the Graduate School on an appropriate form available from the Graduate School. The extension will be granted provided that the petition is supported by the student's satisfactory progress in his/her work and other valid reasons.

## SECTION II: Doctor of Philosophy

The graduate program in civil and environmental engineering offers the degree Doctor of Philosophy that requires at least **48** credits of coursework and at least **24** credits of thesis research. The doctoral program is arranged in the following two phases.

**Phase 1:** The student pursues courses of study and successfully completes a qualifying examination.

**Phase 2:** The student primarily pursues courses of research and presents results in an acceptable dissertation.

### **A) General Course Credit Requirements**

*Students must satisfy the following credit requirements toward the Ph.D. degree.*

1. At least **48** credits of coursework, which may include M.S. degree coursework, plus at least **24** credits of thesis research.
2. At least **30** credits of coursework must be taken from the Department of Civil and Environmental Engineering or **15** credits if entering with 24 transfer credits.
3. No more than **6** credits of either *Advanced Topics in Civil Engineering (180:601 or 180:602)* or *Advanced Topics in Environmental Engineering (180:611 or 180:612)*.
4. No credit in 300-level courses and no more than **9** credits in 400-level courses may be used toward the **48** credits of required coursework.
5. At least **18** credits must be in courses within his/her major area of discipline.
6. At least **four** semesters (N credit prefix) of *Seminar in Civil and Environmental Engineering (180:691, 180:692)*.
7. At least **6** credits in the area of mathematics, numerical methods and statistics are required. Suggested courses in Applied Mathematics and Statistics are as follows:

#### Applied Mathematics

198:510	Numerical Analysis
642:516	Applied Partial Differential Equations
642:527,528	Methods of Applied Mathematics
642:550	Linear Algebra and Applications
642:573	Numerical Analysis
642:574	Numerical Analysis
642:575	Numerical Solutions of Partial Differential Equations
642:577,578	Selected Mathematical Topics in System Theory
642:581	Applied Graph Theory

### **Statistics**

960:401	Basic Statistics for Research	(G3)
960:463	Regression Methods	(G3)
960:467	Applied Multivariate Analysis	(G3)
960:476	Introduction to Sampling	(G3)
960:484	Basic Applied Statistics	(G3)
960:486	Interpretation of Data	(G3)
960:490	Introduction to Experimental Design	(G3)
960:501	Statistical Theory for Research Workers I	
960:502	Statistical Theory for Research Workers II	
960:555	Nonparametric Statistics	
960:563	Regression Analysis	
960:590	Design of Experiments	
960:654	Stochastic Processes	

### **B) Scholastic Standing**

Students enrolled in the Ph.D. program are expected to have a GPA of 3.5 or better in their coursework. No more than **9** credits bearing the grade of C or C+ may be used to meet the requirements for the Ph.D. degree. His/her advisor monitors the student's academic performance. The students may be recommended for dismissal from the Graduate School by action of the faculty of the graduate program.

### **C) Admission To Ph.D. Candidacy**

The student becomes a Ph.D. candidate upon passing a qualifying examination. He/she is strongly urged to take the qualifying examination as soon possible, but no later than two academic semesters after completion of his/her M.S. course requirements. The qualifying examination is composed of a written examination followed by an *oral* examination. The *oral* examination must be taken within one semester of passing the *written* examination.

- 1. Written Examination:** This examination must be taken by the student no later than **two** academic semesters after completion of his/her M.S. course requirements and will normally be offered twice during the academic year (last Monday of October and March). The student who intends to take the examination must inform the Graduate Director at least one month before the examination date.

The *written* examination consists of a 3-hour closed book written examination. The examination is given by a committee made up of at



least two faculty members from the student's area of major study and at least one from an area other than the student's major area. The graduate director in consultation with the student's advisor appoints the committee. Students are encouraged to consult with the committee members on the subject area of their examinations. Test results will be announced to the student within one week of the examination date. Students are permitted one re-examination within the time period of no later than three months after the first examination.

2. **Oral Examination:** This examination must be taken within one semester of passing the *written* examination. The student will submit a short thesis proposal to his/her Ph.D. committee one week prior to the *oral* examination. The student must bring with him/her the form "Application for Admission to Candidacy for the Degree of Doctor of Philosophy" obtainable from the Graduate School. The examination will cover the proposed research. One dissenting vote is allowed to pass the student in his/her *oral* examination. After the examination, the student will return the candidacy form, properly signed by the committee, to the Graduate School. Approval of this form represents admission to Ph.D. candidacy. Students are permitted one re-examination within one month after the initial oral examination.

#### **D) Ph.D. Committee**

The graduate director, in consultation with the student's advisor, during the time interval between the written and oral qualifying examinations, will appoint the student's Ph.D. committee. The committee will be responsible for conducting the oral qualifying examination, for supervising the thesis research, and conducting the public thesis defense.

The committee will consist of at least four faculty members, with the student's advisor as chairperson. At least one of the committee members will be from outside of the program of civil and environmental engineering. A majority of the committee members must be chosen from within the program.

**E) Public Defense Ph.D. Thesis Defense**

This public examination covers the student's Ph.D. research work and thesis. His/her Ph.D. committee will conduct it. One dissenting vote is allowed to pass the student for the degree. At the time of the examination, it is the responsibility of the candidate to retrieve from the Office of the Graduate School his/her candidacy application (on which the results of the qualifying examination appear) and submit it to the chairperson of his/her committee. The student must return this form properly signed by the committee to the Graduate School along with the required original copy of his/her thesis and other materials (see the Graduate School catalog).

In order to prepare and distribute appropriate announcements, the graduate director must be informed of the thesis title, the date, and time of the thesis defense at least ten days in advance by the chairperson of the committee.

**F) Time Limits**

Students are urged to complete the Ph.D. requirements as expeditiously as possible. The normal maximum for a student entering the program with a B.S. degree is seven years after the first registration in the Graduate School. The normal maximum for a student entering the program with a M.S. degree is six years after the first registration in the Graduate School. Part-time students will be allowed, by petitioning the Graduate School, a time extension of one to three years beyond the normal limits given above.

Students requiring an extension beyond the normal time limits must petition the graduate director and the Executive Council of the Graduate School on an appropriate form available from the Graduate School. The extension will be granted provided that the petition is supported by the student's satisfactory progress in his/her work and other valid reasons.

## **SECTION III: Programs of Study**

The Department of Civil and Environmental Engineering offers the following specialties: (a) Construction Engineering, (b) Geotechnical Engineering, (c) Structures, (d) Transportation, (e) Water Resources and Environmental Engineering. In addition, The Department is offering in collaboration with other graduate programs two graduate certificate programs in (a) Engineering Geophysics and (b) Transportation Studies.

### **A) Specialty Requirements**

Students in the M.S. and Ph.D. programs are required to choose a specialty. For each specialty in the graduate program the student is required to take:

- M.S.** •At least four departmental courses in their area of specialty
- At least two departmental electives outside of their specialty

- Ph.D.** •At least 18 credits must be in courses within major area of discipline

Students interested in taking course outside of the department are strongly encouraged to consult the list of suggested courses listed in **Section III-C** of this manual.

### **B) Departmental Courses Listed by Specialties**

#### **Construction Engineering**

- 180:516 Advanced Structural Design (3)*
- 180:541 Advanced Reinforced Concrete (3)*
- 180:545 Advanced Construction Engineering Management (3)*
- 180:546 Advanced Construction Engineering Management II (3)*
- 180:561 Advanced Water Supply and Sewerage (3)*
- 180:562 Design of Water and Wastewater Treatment (3)*
- 180:572 Soils Engineering (3)*
- 180:577 Advanced Foundation Engineering (3)*

### **Geotechnical Engineering**

- 180:548 *Pavement Mgt, Preservation, Rehabilitation (3)*
- 180:549 *Adv. Pavement Mgt Material and Modeling (3)*
- 180:535 *Mechanistic Pavement Design (3)*
- 180:571 *Advanced Soil Mechanics (3)*
- 180:572 *Soils Engineering (3)*
- 180:574 *Groundwater Engineering I (3)*
- 180:575 *Theoretical Soils Mechanics (3)*
- 180:576 *Groundwater Engineering II (3)*
- 180:577 *Advanced Foundation Engineering (3)*
- 180:578 *Soil Dynamics (3)*
- 180:579 *Environmental Management of Maritime Infrastructure (3)*
- 180:580 *Engineering Rock Mechanics (3)*
- 180:581 *Physiochemical Properties and Stabilization of Soils (3)*
- 180:582 *Dynamic Soil Structure Interaction and Earthquake Eng (3)*

### **Structures**

*Students in the structures program are required to take 180:516 and 180:541*

- 180:514 *Composite Materials in Civil Engineering (3)*
- 180:515 *Structural Analysis (3)*
- 180:516 *Advanced Structural Design (3)*
- 180:517 *Structural Dynamics (3)*
- 180:518 *Design for Lateral Loads (3)*
- 180:519 *Advanced Structural Analysis (3)*
- 180:522 *Finite Element Methods in Civil Engineering (3)*
- 180:523 *Structural Optimization (3)*
- 180:524 *Bridge Design I (3)*
- 180:525 *Structural Reliability (3)*
- 180:526 *Structural Stability (3)*
- 180:527 *Bridge Design II (3)*
- 180:541 *Advanced Reinforced Concrete (3)*
- 180:542 *Advanced Reinforced Concrete II (3)*
- 180:544 *Prestressed Concrete (3)*
- 180:553 *Bending and Buckling of Plates and Shells (3)*

### **Transportation**

- 180:530 *Maritime Transportation (3)*
- 180:531 *Traffic Engineering (3)*
- 180:532 *Transportation Planning (3)*
- 180:533 *Traffic Operations (3)*
- 180:534 *Design of Transportation Facilities (3)*
- 180:536 *Transportation Systems Analysis (3)*
- 180:537 *Intelligent Transportation Systems (3)*
- 180:538 *Freight Transportation Systems (3)*
- 180:579 *Environmental Management of Maritime Infrastructure (3)*

### **Water Resources and Environmental Engineering**

- 180:561 *Advanced Water Supply and Sewerage* (3)
- 180:562 *Design of Water and Wastewater Treatment* (3)
- 180:563 *Advanced Hydrology* (3)
- 180:564 *Unit Processes in Environmental Engineering* (3)
- 180:565 *Biogeochemical Engineering* (3)
- 180:566 *Sediment Transport* (3)
- 180:567 *Analysis of Receiving Water Quality* (3)
- 180:568 *Thermal Effects of Receiving Waters* (3)
- 180:569 *Environmental Informatics* (3)
- 180:574 *Groundwater Engineering I* (3)
- 180:576 *Groundwater Engineering II* (3)
- 180:579 *Environmental Management of Maritime Infrastructure* (3)
- 180:586 *Advanced Fluid Mechanics* (3)
- 180:588 *Theory of Hydraulic Models* (3)
- 180:590 *Coastal Engineering* (3)
- 180:592 *Green Infrastructure for Water Management* (3)

### **C) Suggested Courses Outside of the Department**

#### **Computer Sciences**

- 198:510 *Numerical Analysis* (3)
- 198:521 *Linear Programming* (3)
- 198:527 *Computer Methods for Partial Differential Equations* (3)

#### **Ecology and Evolution**

- 215:506 *Estuarine Ecology* (4)

#### **Environmental Sciences**

- 375:509 *Groundwater Pollution* (3)
- 375:525 *Principles of Solid Waste Management & Treatment* (3)
- 375:530 *Hazardous Waste Management* (3)
- 375:531 *Biological Waste Treatment* (3)
- 375:533 *Water Law* (3)
- 375:541 *Environmental Models* (3)

#### **Geological Sciences**

- 460:408 *Geomorphology* (3)
- 460:516 *Advanced Structural Geology* (3)
- 460:555 *Geophysics I* (3)
- 460:556 *Geophysics II* (3)

#### **Industrial Relations and Human Resources**

- 545:610 *Selected Problems in Industrial Relations* (3)

### **Industrial and Systems Engineering**

- 540:510 *Deterministic Models in Industrial Engineering* (3)
- 540:515 *Stochastic Models in Industrial Engineering* (3)
- 540:522 *Operations Research* (3)
- 540:530 *Forecasting and Time Series Analysis* (3)
- 540:535 *Graph Theory & Networks in Industrial Engineering and Operations Research* (3)
- 540:575 *Advanced Engineering Economics* (3)

### **Labor and Industrial Relations**

- 578:521 *New Directions In Collective Bargaining*

### **Applied Mathematics**

- 642:516 *Applied Partial Differential Equations* (1)
- 642:527,528 *Methods of Applied Mathematics* (3)
- 642:550 *Linear Algebra and Applications* (3)
- 642:573,574 *Numerical Analysis* (3)
- 642:575 *Numerical Solutions of Partial Differential Equations* (3)
- 642:588 *Introduction to Mathematical Techniques in Operations Research* (3)

### **Mechanical and Aerospace Engineering**

- 650:529 *Random Vibration* (3)
- 650:531 *Advanced Mechanics of Materials* (3)
- 650:540 *Fluid Mechanics* (3)
- 650:571 *Introduction to Mechanics of Continua* (3)
- 650:572 *Theory of Elasticity* (3)
- 650:573 *Theory of Plasticity and Applications* (3)
- 650:575 *Finite Element Methods in Solid Mechanics* (3)
- 650:577 *Mechanics of Composite Materials* (3)
- 650:585 *Fracture Mechanics* (3)
- 650:588 *Stress Waves in Solids* (3)

### **Mechanics**

- 654:583 *Advanced Theory of Elasticity* (3)

### **Oceanography**

- 712:501 *Physical Oceanography*
- 712:615 *Geophysical Data Analysis*

### **Statistics**

*960:401 Basic Statistics for Research (G3)*

*960:463 Regression Analysis (G3)*

*960:563 Regression Analysis (3)*

*960:580 Basic Probability (3)*

*960:582 Introduction to Methods and Theory of Probability (3)*

*960:590 Design of Experiments (3)*

*960:654 Stochastic Processes (3)*

### **Management (for Construction Majors Only)**

*010:577 Accounting for Managers (3)*

*390:587 Financial Management (3)*

*835:578 Management of Operations (3)*

## **SECTION IV: Academic Advisors**

At the beginning of the first term of study, each newly admitted graduate student would be assigned a provisional academic advisor who is chosen with respect to the student's area of specialization.

The student is expected to contact the faculty members in his/her area of specialization and discuss possible topics for either a thesis or special project. This should be done for the M.S. student during the second semester and for the Ph.D. student prior to taking the qualifying examinations. The student should seek a faculty member who agrees to guide his/her thesis or special project. He/she then informs the graduate director, who will then appoint the faculty member as the student's advisor.

Subsequent changes of advisor may be made when special conditions arise. In such cases, the student must discuss the problem with his/her current advisor and the graduate director for a solution. However, students should be aware that such changes might create practical problems, such as loss of time and efforts and possible loss of support for graduate assistants. The student must file a "change of advisor" form with the graduate director.

## **SECTION V: Thesis**

The following provisions apply to both M.S. and Ph.D. theses. The deadlines for submission of the **first** draft should be:

- 1) February 15<sup>th</sup> for May graduation
- 2) April 15<sup>th</sup> for October graduation
- 3) November 1<sup>st</sup> for January graduation

Prior to the deadlines, the **candidate** should submit copies of the **first** draft to his/her advisor for distribution to the committee members. Three copies (four copies for the Ph.D. candidate) of the **final** draft that conform to the instructions given in the pamphlet "Style Guide for Thesis and Dissertation Preparation", available from the Office of the Graduate School, should be submitted to the advisor prior to setting a date for the public thesis defense.

After the thesis defense the student may be required to make modification to his/her **final** draft. The student then submits the thesis to the graduate school, the Department, and advisor. The Graduate School requires that photocopies be made on bonded paper. A biographical sketch, a thesis abstract not exceeding 350 words, and approval by the advisor is required by the Graduate School.

The announcement for the final examination is the responsibility of the graduate director and will be made at the request of the advisor and in consultation with all members of the committee.

Expenses for thesis preparation, including the cost of drawings, photographs, reproductions, and printing, are the sole responsibility of the student.

The advisor in consultation with the student will decide the manner or format of publication of the thesis or research results.

## **SECTION VI: Seminars**

Since the departmental seminars are the vehicles by which the faculty and graduate students are exposed to the research activities, within and outside of the departments, M.S. students are required to complete at least two semesters and Ph.D. students at least four semesters of seminars. (180:691 or 780:692, N credit prefix).

## **SECTION VII: Transfer of Credits**

Students will be allowed to transfer no more than **12** credits toward the M.S. degree and no more than **24** credits toward the Ph.D. degree. The transferred credits must satisfy the requirements set forth in Sections I & II.

## **SECTION VIII: Non-Civil Engineering Graduates**

Normally, students with a bachelor degree in civil engineering or another engineering field from an ABET accredited program or equivalent are admitted into the graduate program. The application for admission should include the following:



1. Online application
  2. Nonrefundable application fee
  3. One official transcript from each postsecondary institution attended
  4. Three letters of recommendation
  5. A personal statement
  6. GRE test results (not more than 4 years old)
  7. TOEFL test results for International applicants
- The minimum GPA for admissions into the master's program is 3.0.
  - There are no minimum GRE scores required for admission, however, applicants are expected to have competitive scores. GRE scores should not be more than 4 years old.
  - The minimum TOEFL score is a 90/120 on the IBT. TOEFL is not required if you have a bachelor or advanced degree from an accredited US program or if you have a bachelor or advanced degree from a recognized program in a country where the official language of instruction is English.

Online applications and the application process guidelines can be found at the following link: <http://gradstudy.rutgers.edu/apply/overview> .

All graduate courses are evening classes. Most undergraduate courses are day time classes.

**A) Applicants with a bachelor degree in engineering other than civil engineering** may be admitted if they fulfill the admission requirements. In addition, they have to take the following required basic civil engineering courses:

1. Engineering mechanics (statics and dynamics)
2. Mechanics of solids (180:243)
3. Fluid mechanics (180:387)
4. Soil mechanics(180:372)

In addition to the courses listed above, students may be required to take additional undergraduate courses in their area of specialization. The following additional courses are listed for each area of specialization:

#### Structural engineering

1. Structural Analysis I (180:318)
2. Steel Design (180:320)
3. Reinforced Concrete (180:411)

#### Environmental engineering

1. Water and Wastewater Design (180:429)

#### Transportation engineering

1. Transportation Engineering (180:364)
2. Transportation Planning (180:430)

Construction engineering and management

1. Construction Engineering (180:305)
2. Construction Engineering Management (180:406)

Required courses for applicants to MS in geotechnical engineering

1. Foundation Engineering (180:473)

The 300 level courses are considered E graduate credits and will not count towards the MS degree course credits. The 400 level courses can be used towards the MS degree course credits. No more than 6 credits of 400 level course credits can be used towards the MS degree.

These requirements must be met early in the students' program because many are pre-requisites for graduate courses. The student is expected to earn grades of B or better in the listed courses.

**B)** Applicants with bachelor degree in non-engineering majors should have the following courses before they apply to the graduate program in civil engineering:

- 12 credits of calculus
- 6 credits of chemistry
- 6 credits of calculus-based physics
- 3 credits of computer programming
- 3 credits of engineering graphics or CAD

Applicants with bachelor degree in non-engineering majors who have the required math, physics, chemistry, computer programming, and CAD can apply to the graduate program. If granted admission, they have to take the required basic civil engineering courses and any additional courses needed in their area of specialization. These course are listed in Section A on pages 16 and 17.

In some cases applicants with non-engineering degrees are advised to consider a bachelor degree option in civil engineering given the amount of pre-requisite credits required and professional licensing which may require a bachelor degree in civil engineering in some state jurisdictions.

## **SECTION IX: Appeal and Grievance**

A student should first discuss his/her grievance with their advisor. If the matter cannot be resolved the student may appeal to the graduate director. The graduate director shall consult with all parties involved and propose a resolution. If this is not successful, the matter shall be referred to the program faculty. Although the program faculty's decision shall normally be final, the student may further appeal to the Dean of the Graduate School.

## **Contact Information**

### *Graduate Program Director:*

Dr. Husam Najm----hnajm@rci.rutgers.edu

### *Graduate Program Administrative Assistant*

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### *Construction Engineering and Management*

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### *Water Resources and Environmental Engineering*

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Dr. Qizhong Guo----qguo@rci.rutgers.edu

Dr. Monica Mazurek----mmazurek@rci.rutgers.edu

Prof. Steve Medlar----medlarsj@aol.com

### *Geotechnical Engineering*

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### *Transportation*

Dr. Jing (Peter) Jin----peter.j.jin@rutgers.edu

Dr. Xiang Liu---xiang.liu@rutgers.edu

### *Structural Engineering*

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Dr. Husam Najm----hnajm@rci.rutgers.edu

Dr. Hani Nassif----nassif@rci.rutgers.edu

Dr. Yook-Kong Yong----yyong@rci.rutgers.edu

### *Infrastructure Engineering/Sustainability Systems*

Dr. Hao Wang---hwang.cee@rutgers.edu

**Degree Checklist**  
**Master of Science**

**Field:** \_\_\_\_\_

**Advisor:** \_\_\_\_\_

**Degree Option:** *Thesis\** (24 course credits)      *Special Project* (27 course credits)

**Courses** (at least 18 credits from Civil and Environmental, 4 courses must be from area of specialty)

<u>Course</u>	<u>Credits</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

**Departmental Electives** (at least 2 courses outside of the area of specialty)

<u>Course</u>	<u>Credits</u>
_____	_____
_____	_____
_____	_____
_____	_____

**Graduate Seminar** (Must take 2 semesters)

1<sup>st</sup> Semester: \_\_\_\_\_

2<sup>nd</sup> Semester: \_\_\_\_\_

**Research Credits\*** (must have 6)

\_\_\_\_\_

**Special Project** (3credits)

\_\_\_\_\_

**Degree Checklist**  
**PhD**

**Field:** \_\_\_\_\_

**Advisor:** \_\_\_\_\_

**Pre-Qual:** \_\_\_\_\_

**Proposal:** \_\_\_\_\_

**Courses-48 credits** (at least 30 credits from Civil and Environmental, 18 credits must be within field)

<u>Course</u>	<u>Credits</u>
_____	_____
_____	_____
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**Math/Numerical Methods/Statistics** (at least 6 credits)

<u>Course</u>	<u>Credits</u>
_____	_____
_____	_____
_____	_____
_____	_____

**Research Credits** (Must have 24)

\_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_

**Graduate Seminar** (Must take 4 semesters)    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_    \_\_\_\_ \_

## **Quick Reference Tips**

- All Master students MUST take 2 semesters of seminars
- All PhD students MUST take 4 semesters of seminars
- Special Project credits are NOT the same as Research Credits
- GA/TA/Fellowship credits do NOT count as Research Credits, you must register for research credits separately
- When writing your thesis/dissertation please refer to the Graduate School's style guide. They are particular about formatting.
- When planning your presentations for both MS and PhD, please remember to inform Gina.
- Keep in mind the deadline dates issued by the Graduate School for candidacy forms, thesis/dissertation submissions and diploma applications.
- Most importantly, don't forget we are here to help and make your path toward your degree go as smoothly as possible. Please contact us with any questions or concerns.

## Our Graduate Faculty



Dr. Perumalsamy N. Balaguru received his PhD from The University of Illinois-Chicago. His areas of research include concrete structural systems; composite materials; construction management.

His office is located in the CoRE Building on Busch Campus, Room 618. He can be reached via email at [balaguru@rci.rutgers.edu](mailto:balaguru@rci.rutgers.edu) or via telephone at 848-445-2877



Dr. Nicole Fahrenfeld received her PhD from Virginia Tech. Her areas of research lie at the interface of environmental chemistry and environmental microbiology to promote water quality and sustainability, with applications in natural and engineered systems.

Her office is located in the CoRE Building on Busch Campus, Room 610. She can be reached via email [nfahrenf@rutgers.edu](mailto:nfahrenf@rutgers.edu) or via telephone at 848-445-8416



Dr. Jie Gong received his PhD from the University of Texas at Austin. His areas of research include building information modeling, remote sensing for highway asset management, visual sensing and computing for construction process visualization and analysis.

His office is located in the CoRE building on Busch Campus, Room 604. He can be reached via email at [jg931@rci.rutgers.edu](mailto:jg931@rci.rutgers.edu) or via telephone at 848-445-2881



Dr. Nenad Gucunski received his PhD from The University of Michigan. His areas of research include soil-structure interaction; nondestructive testing; numerical methods; soil and structural dynamics; earthquake engineering.

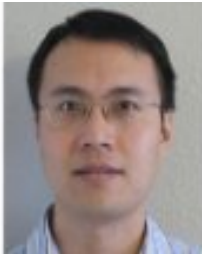
His office is located in the CoRE Building on Busch Campus, Room 611. He can be reached via email at [gucunski@rci.rutgers.edu](mailto:gucunski@rci.rutgers.edu) or via telephone at 848-445-0261





Dr. Qizhong (George) Guo received his PhD from The University of Minnesota. He also holds a Professional Engineer's license. His areas of research include environmental hydraulics; water quality modeling; environmental, coastal, urban and cold regions applications; sediment transport.

His office is located in the CoRE Building on Busch Campus, Room 614. He can be reached via email at [gguo@rci.rutgers.edu](mailto:gguo@rci.rutgers.edu) or via telephone at 848-445-2983



Dr. Jing (Peter) Jin received his PhD from The University of Wisconsin-Madison. His areas of research include Transportation Engineering, Intelligent Transportation Systems, Traffic Operations, Traffic Sensing, Traffic Flow theory and Network Modeling, Urban Data Analyticstraffic operations and management

His office is located in the CoRE Building on Busch Campus, Room 613. He can be reached via email at [peter.j.jin@rutgers.edu](mailto:peter.j.jin@rutgers.edu) or via telephone at 848-445-8563



Dr. Xiang Liu received his PhD from The University of Illinois at Urbana-Champaign. His areas of research include Hazardous Materials Transportation Risk Analysis, Statistical Modeling of Train Safety, Economic Analysis of Railway Infrastructure Investment.

His office is located in the CoRE Building on Busch Campus, Room 606. He can be reached via email at \_\_\_\_\_ or via telephone at 848-445-



Dr. Ali Maher received his PhD from The University of Michigan. He also holds a Professional Engineer's license. His areas of research include soil/site improvement; soil composite materials; geosynthetics, environmental geotechnology; soil dynamics

His office is located in the CAIT Building on Busch Campus, Room 211E. He can be reached via email at [mmaher@rci.rutgers.edu](mailto:mmaher@rci.rutgers.edu) or via telephone at 848-445-2951



Dr. Monica Mazurek received her PhD from The University of California-Los Angeles. Her areas of research include air quality engineering; organic geochemistry; analytical chemistry for environmental systems; sustainability systems engineering.

Her office is located in the CoRE Building on Busch Campus, Room 612. She can be reached via email at [mmazurek@rci.rutgers.edu](mailto:mmazurek@rci.rutgers.edu) or via telephone at 848-445-2871



Dr. Husam Najm received his PhD from The University of Michigan. Dr. Najm holds both a Professional Engineer's and Structural Engineer's license. His areas of research include structural system design; bridge design; concrete material.

His office is located in the School of Engineering Building on Busch Campus, Room A139. He can be reached via email at [hnajm@rci.rutgers.edu](mailto:hnajm@rci.rutgers.edu) or via telephone at 848-445-7980



Dr. Hani Nassif received his PhD from The University of Michigan. He also holds a Professional Engineer's license. His areas of research include reliability analysis; design, analysis, and field testing of bridges; advanced high-performance materials; structural modeling and analysis

His office is located in the School of Engineering Building on Busch Campus, Room A131. He can be reached via email at [nassif@rci.rutgers.edu](mailto:nassif@rci.rutgers.edu) or via telephone at 848-445-4414



Dr. Hao Wang received his PhD from The University of Illinois at Urbana-Champaign. His areas of research include innovative and sustainable infrastructure material, computational modeling and mechanics of structure material; pavement design, maintenance, and management

His office is located in the CoRE Building on Busch Campus, Room 608. He can be reached via email at [hwang.cee@rutgers.edu](mailto:hwang.cee@rutgers.edu) or via telephone at 848-445-2874



Dr. Trefor P. Williams received his PhD from The Georgia Institute of Technology. He also holds a Professional Engineer's license. His areas of research include construction management; traffic engineering; decision support systems; neural networks; computer aided analysis; expert systems.

His office is located in the CoRE Building on Busch Campus, Room 605. He can be reached via email at [tpw@rci.rutgers.edu](mailto:tpw@rci.rutgers.edu) or via telephone at 848-445-2880



Dr. Yook-Kong Yong received his PhD from Princeton University. His areas of research include crystal plates; structural behavior and mechanics; finite element analysis; structural dynamics; computational mechanics

His office is located in the CoRE Building on Busch Campus, Room 616. He can be reached via email at [yong@rci.rutgers.edu](mailto:yong@rci.rutgers.edu) or via telephone at 848-445-321

## **Our Adjunct Members of the Graduate Faculty**

**Howard Kliger** received his PhD from The University of Delaware. His area of research includes engineering mechanics.

**Steve Medlar** received his Master's degree from Tufts University. His areas of research include water resources and environmental engineering. He can be reached at [medlarsj@aol.com](mailto:medlarsj@aol.com)