NJIT

JOHN A. REIF, JR. DEPARTMENT OF

CIVIL AND ENVIRONMENTAL ENGINEERING

Newark College of Engineering

PROGRAMS AND CAREERS

UNDERGRADUATE MAJOR:

- Civil Engineering B.S.

MINORS:

- Environmental Engineering
- Geosystems

GRADUATE DEGREE PROGRAMS:

- Civil Engineering - M.S.
- Civil Engineering - M.S. (Online)
- Critical Infrastructure Systems - M.S.
- Environmental Engineering - M.S.
- Transportation - M.S.
- Civil Engineering - Ph.D.
- Environmental Engineering - Ph.D.
- Transportation - Ph.D.

RESEARCH AREAS:

- Alternative cementitious materials
- Ductile cement-based composites
- Recycled aggregate concrete
- Seismic resistance of structures
- Transportation infrastructure systems
- Surface chemistry
- Environmental systems modeling
- Water and wastewater treatment
- Site remediation
- Environmental impact analysis
- Context sensitive design
- Traffic analysis
- Safety issues
- Regional transportation planning with a special strength in computer simulation and modeling

CAREERS IN CIVIL AND ENVIRONMENTAL ENGINEERING

Structural civil engineers work with architects and builders to assure that steel and other materials used in construction projects exceeds the needs of a given project.

Geotechnical civil engineers help builders excavate underground projects and work with experts who manage challenging land renewal projects.

Transportation civil engineers help us all move around our communities and our country. They work with local and regional planning boards to identify areas of growth and development.

Environmental engineers work closely with business leaders and government officials to institute new air pollution standards that reduce harmful emissions from factories without negatively impacting industrial output.

Construction civil engineers combine their engineering and leadership skills to ensure that building projects are completed on time and under budget.

Hydraulic/Hydrology/Water Resource civil engineers redirect water to benefit residents and businesses in a community.

STUDENT OPPORTUNITIES

STUDENT PROFESSIONAL SOCIETIES

- ASCE (American Society of Civil Engineers)
- AWWA (American Water Works Association)
- EWB (Engineers Without Borders)
- ITE (Institute of Transportation Engineers)
- ARMA (American Rocks Mechanics Association)

STUDENT DESIGN OPPORTUNITIES

- ASCE/AISC Steel Bridge Competition
- ASCE Concrete Canoe Competition
- NJAWWA Water Filter Competition
- ARMA Student Design Competition
- 3D Printed Bridge Competition
- Timber Bridge

COOPERATIVE EDUCATION

- Five Year Co-op Program, from January-August or May-December
- Gain industry experience while earning a salary
- Apply fundamentals from class to real-world problems and learn about industries that recruit civil and environmental engineers
- Students gain experience with placement opportunities in more than 2,600 companies
- Participants offered jobs before they graduate

FE EXAM AND REVIEW

The Fundamentals of Engineering (FE) exam is provided by the National Council of Examiners for Engineering and Surveying (NCEES) and is your first step towards becoming a professional licensed engineer (P.E.). The exam is intended for students who have recently completed or are near completion of their undergraduate engineering degree at an ABET-accredited program. Our BSCE program is ABET accredited. The department provides an FE Civil Engineering review course code for free; course codes are good for four months. We encourage our students to take full advantage of this resource to be ready to pass the exam on the first attempt.

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

FIRST YEAR

1ST SEMESTER		CREDITS
FED 101	Fundamentals of Engineering Design	2 Credits
CS 101	Computer Programming	3 Credits
CHEM 125	General Chemistry I	3 Credits
CHEM 125A	General Chemistry Lab I	1 Credit
ENGL 101	Introduction to Academic Writing	3 Credits
MATH 111	Calculus I	4 Credits
FRSH SEM	First-Year Seminar	0 Credits
		16 Credits

SECOND YEAR

1ST SEMESTER		
CE 200	Surveying	2 Credits
CE 200A	Surveying Laboratory	1 Credit
MATH 211	Calculus III A	3 Credits
MATH 279	Statistics and Probability for Engineers	2 Credits
MECH 235	Statics	3 Credits
PHYS 121	Physics II	3 Credits
PHYS 121A	Physics II Lab	1 Credit
		15 Credits

THIRD YEAR

1ST SEMESTER		
CE 320	Fluid Mechanics	3 Credits
CE 320A	Hydraulics Laboratory	1 Credit
CE 321	Water Resources Engineering	3 Credits
CE 332	Structural Analysis	3 Credits
MECH 236	Dynamics	2 Credits
GER 2XX	History/Humanities	3 Credits
		15 Credits

FOURTH YEAR

1ST SEMESTER		
CE 431	Construction Materials Lab	1 Credit
CE 432	Steel Design	2 Credits
CE 443	Foundation Design	3 Credits
CE 494	Civil Engineering Design I	3 Credits
Elective	CE Elective	3 Credits
GER 3XX	Communications Course	3 Credits
		15 Credits

FIRST YEAR

2ND SEMESTER		CREDITS
CE 101	CE Computer-Aided Design	1 Credit
CHEM 126	General Chemistry II	3 Credits
ENGL 102	Introduction to Writing for Research	3 Credits
MATH 112	Calculus II	4 Credits
PHYS 111	Physics I	3 Credits
PHYS 111A	Physics I Lab	1 Credit
		15 Credits

SECOND YEAR

2ND SEMESTER		
CE 210	Construction Materials and Procedures	3 Credits
CE 260	Civil Engineering Methods	2 Credits
MATH 322	Differential Equations	3 Credits
MECH 237	Strength of Materials	3 Credits
ENE 262	Introduction to Environmental Engineering	3 Credits
		14 Credits

THIRD YEAR

2ND SEMESTER		
CE 333	Reinforced Concrete Design	2 Credits
CE 341	Soil Mechanics	3 Credits
CE 341A	Soil Mechanics Laboratory	1 Credit
CE 350	Transportation Engineering	3 Credits
CE 360	Sustainable Civil Engineering Materials	3 Credits
GER 3XX	History/Humanities	3 Credits
		15 Credits

FOURTH YEAR

2ND SEMESTER		
CE 495	Civil Engineering Design II	3 Credits
Elective	CE Designated Elective	3 Credits
Elective	Science Elective	3 Credits
IE 492	Engineering Management	3 Credits
GER 4XX	HSS Senior Seminar	3 Credits
		15 Credits

FACULTY RESEARCH INTERESTS

ENVIRONMENTAL/WATER RESOURCES GROUP

Michel Boufadel, Ph.D., P.E., F.ASCE
(michel.boufadel@njit.edu)
Mechanics of spills and the effectiveness of remedial methods.

Yuan Ding, Ph.D.
(ding@njit.edu)
Pneumatic fracturing process, stochastic modeling in groundwater, dynamic fracturing of soils, rad waste, brownfields, waste recycling, water and wastewater treatment, microhydrodynamics, combined sewer overflow and soil erosion.

Taha Marhaba, Ph.D., P.E., F.ASCE
(marhaba@njit.edu)
Impact of raw water quality on drinking water treatment, development of analytical techniques for rapid pollution detection and delineation in raw water and treatment processes and nanotechnology for water treatment.

Thomas Olenik, Ph.D., P.E.
(olenik@njit.edu)
Environmental regulations and storm water management.

William H. Pennock, Ph.D.
(william.h.pennock@njit.edu)
Coagulation, sedimentation, media filtration, fluid mechanics of water treatment, lead sensing and water treatment for the majority world.

Wen Zhang, Ph.D., P.E., AAEES, BCEE
(wen.zhang@njit.edu)
Environmental nanotechnology, photocatalysis, reactive membrane filtration, and sustainable nanomaterials for water treatment, disinfection and renewable energy production.

TRANSPORTATION GROUP

Steven Chien, Ph.D.
(chien@njit.edu)
Public transportation systems, intelligent transportation systems, transportation systems analysis, dynamic control and prediction systems and traffic simulation.

Janice Daniel, Ph.D.
(daniel@njit.edu)
Transportation safety, traffic operations and control, congestion strategies, adaptive traffic control, urban freight movement and work zone analysis.

Branislav Dimitrijevic, Ph.D.
(dimitrijevic@njit.edu)
Performance-based transportation planning and programming, integrated travel demand and land use modeling, decision support systems for traffic operations, incident and congestion management, connected vehicle applications for personalized mobility management and the effect of technology on regional mobility and shared use mobility.

Jo Young Lee, Ph.D.
(jo.y.lee@njit.edu)
Vehicular wireless communications technology, traffic operations (stochastic traffic signal) optimization, highway automation (cooperative adaptive cruise control, autonomous vehicle control, cooperative vehicle infrastructure system) and traffic simulation modeling (microscopic traffic simulation, wireless communications network simulation).

Lazar N. Spasovic, Ph.D.
(spasovic@njit.edu)
Intermodal freight transportation, brownfields redevelopment for freight-related uses and the cost of congestion.

#1 NATIONALLY
in Student Economic Upward Mobility
- Forbes

$160+ MILLION
Total Research Expenditures
research.njit.edu

TOP 100
National University
- U.S. News & World Report

STRUCTURAL/GEOTECHNICAL GROUP

Matthew P. Adams, Ph.D., FACI
(matthew.p.adams@njit.edu),
Advanced cement-based materials, corrosion, concrete durability, sustainable construction materials, construction methods and cement hydration.

Matthew J. Bandelt, Ph.D., P.E.
(matthew.j.bandelt@njit.edu)
Performance, applications, design and modeling of sustainable and durable construction materials for enhanced lifecycle performance and reduced environmental footprint, behavior and design of ductile cementitious composites (e.g., UHPC, HPFRCC, FRC) for mechanical and environmental loading conditions, and development and application of nonlinear finite element modeling tools to predict the structural performance and deterioration of novel materials and structural systems.

Eduardo Castro, P.E.
(ecastro@njit.edu)
Reinforced concrete design, strength of materials and structural analysis.

Andrew Ciancia, P.E.
(ciancia@njit.edu)
Permeability, seepage, consolidation and shear strength.

Oladoyin Kolawole, Ph.D.
(oladoyin.kolawole@njit.edu)
Experimental & Computational Geomechanics, Biogeomechanics, CO^2 Sequestration, energy geo-storage and utilization, geo-hazard mitigation, subsurface geotechnics and geothermal energy systems.

Jay N. Meegoda, Ph.D., P.E., F.ASCE
(meegoda@njit.edu)
Remediation of contaminated soils, sediments and ground water, mineralization of per-and polyfluoroalkyl substances (PFAS), shale gas extraction and shale softening, reuse of food waste, engineering properties of contaminated soils, centrifugal modeling of contaminant transport, micro-mechanics, reuse of contaminated soils, ultrasound research and underground infrastructure.

Geraldine Milano, P.E.
(milano@njit.edu)
Equilibrium of particles and rigid bodies subject to concentrated and distributed forces.

M. Ala Saadeghvaziri, Ph.D., P.E.
(ala@njit.edu)
Structural engineering with emphasis on non-linear response of structures and fsi, finite element and computational methods, earthquake engineering, extreme events engineering and structural qualifications, structural applications of composite materials.

Sunil Saigal, Ph.D., P.E., F.ASCE, F.ASME, F.AAA
(saigal@njit.edu)
Computational mechanics, nanotechnology-composite structures, computational cardio-mechanics and orthopedic biomechanics.

Methi Wecharatana, Ph.D., P.E.
(wecharatan@njit.edu)
Structural Mechanics and Materials Engineering.

CONSTRUCTION GROUP

Rayan H. Assaad, Ph.D.
(rayan.h.assaad@njit.edu)
Sustainable infrastructure systems, construction engineering, project management and technologies.

Walter Konon, M.S.C.E.
(konon@njit.edu)
Development and testing of the cleaner wick system for in-situ removal of contaminants from soil and groundwater,iInfrastructure remediation and development.

Fadi A. Karaa, P.E., F.ASCE
(fadi.a.karaa@njit.edu)
Critical infrastructure systems, water and wastewater infrastructure planning.

Stephanie Santos, Ph.D., P.E.
(stephanie.ribeiro@njit.edu)
Autocad software and computer application programs for generating engineering drawings.

The mission of the John A. Reif, Jr. Department of Civil and Environmental Engineering is to:

- **Educate** a diverse student body to be employed in the engineering profession
- **Encourage research** and scholarship among our faculty
- **Promote service** to the engineering profession and society

The Department of Civil and Environmental Engineering also shares the four-pronged mission of New Jersey Institute of Technology: **education, research, economic development and engagement**.

Student Outcomes

By graduation, our students are expected to have:

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

APPLY TODAY!

njit.edu/admissions

NJIT

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