Department of Civil and Environmental Engineering
Norfolk, Virginia 23529

Phone: 757-683-3753
Web site: http://www.odu.edu/cee

Graduate Programs

Opportunities
In this rapidly changing technological world, Master’s degrees are highly desirable and sometimes required to hold truly professional civil and environmental engineering positions in the industry, and in federal, state and municipal government agencies. Doctoral degrees are required for college-level teaching and for employment in research institutions. Many leading industries and agencies seek well trained doctoral graduates for performing highly sophisticated engineering tasks. Our graduate programs are designed to train the technological leaders of the future in civil and environmental engineering.

Degree Requirements
Master’s degree programs offer three options: Master of Science degree Thesis option (24 hours course work and 6 hours thesis work), Project option (27 hours course work and 3 hours project), and Course option (30 hours course work). The Ph.D. degree requires 24 hours of graduate course work and 24 hours of dissertation research.

Tuition and Financial Aid
2019-2020 Tuition for graduate study is $547 per semester credit hour for Virginia residents and $1383 for non-Virginia residents. Teaching and research assistantships are available and are awarded on the basis of merit. TA/RA assistantships stipends range from $12,800 for masters and $15,000 for doctoral students and above. TA/RA recipients are expected to engage in 20 hours of teaching and/or research activity per week. Master’s degree students holding TA/RA assistantships are eligible for in-state tuition rates. Doctoral students holding these positions are eligible for a complete tuition waiver.

Potential Prerequisites for non-Civil/Env BS Holders
Applicants who have completed an undergraduate degree in a field other than civil or environmental engineering may be admitted to the program provisionally, but generally are required to complete prerequisite courses as listed below.

Potential Prerequisite Courses for M.S. in Environmental Engineering:
MATH211 Calculus I
PHYS232N Univ. Phys. I
PHYS232N Univ. Phys. II
CHEM204 Statics
PHYS232N Univ. Phys. I
PHYS232N Univ. Phys. II
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics

MATH212 Calculus II
PHYS232N Univ. Phys. I
PHYS232N Univ. Phys. II
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics

MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.

MATH312 Calculus II
PHYS232N Univ. Phys. I
PHYS232N Univ. Phys. II
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics

MATH312 Calculus III
PHYS232N Univ. Phys. I
PHYS232N Univ. Phys. II
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics

For Master's degree Programs, the applicant must hold an undergraduate degree (preferably in civil or environmental engineering). Applicants with bachelor’s degrees in other field of engineering/sciences may have to complete undergraduate prerequisite courses (see Potential Prerequisites section below). For Doctoral programs, an applicant must normally have a master’s degree or its equivalent in engineering or a related field. For both Master’s and Doctoral programs, two letters of recommendation and an essay about the applicant’s interest in the particular area, and goals and plans for the future are required. All applicants whose native language is not English must take TOEFL and have 550 point or above (or IELTS ≥ 6.5) for regular admission. Submission of GRE are required, except for applicants who hold a BS degree (for Master program applicants) or a Master degree (for Ph.D. program applicants) in engineering disciplines from ABET accredited institutions in U.S.A. Application deadlines for domestic applicants, are June 1, Nov.1 and April 1, for Fall, Spring, summer semester admission, respectively. Those for international applicants are April 15 for Fall, October 1 for Spring, and February 1 for Summer. Visit http://www.odu.edu/admission/graduate.

Potential Prerequisites for M.S. in Civil Engineering:
MATH211 Calculus I
PHYS232N Univ. Phys. I
PHYS232N Univ. Phys. II
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics

MATH212 Calculus II
PHYS232N Univ. Phys. I
PHYS232N Univ. Phys. II
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics

MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.
MATH307 Ord. Diff. Eq.

MATH312 Calculus III
PHYS232N Univ. Phys. I
PHYS232N Univ. Phys. II
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics
CHEM204 Statics

For Master's degree Programs, the applicant must hold an undergraduate degree (preferably in civil or environmental engineering). Applicants with bachelor’s degrees in other field of engineering/sciences may have to complete undergraduate prerequisite courses (see Potential Prerequisites section below). For Doctoral programs, an applicant must normally have a master’s degree or its equivalent in engineering or a related field. For both Master’s and Doctoral programs, two letters of recommendation and an essay about the applicant’s interest in the particular area, and goals and plans for the future are required. All applicants whose native language is not English must take TOEFL and have 550 point or above (or IELTS ≥ 6.5) for regular admission. Submission of GRE are required, except for applicants who hold a BS degree (for Master program applicants) or a Master degree (for Ph.D. program applicants) in engineering disciplines from ABET accredited institutions in U.S.A. Application deadlines for domestic applicants, are June 1, Nov.1 and April 1, for Fall, Spring, summer semester admission, respectively. Those for international applicants are April 15 for Fall, October 1 for Spring, and February 1 for Summer. Visit http://www.odu.edu/admission/graduate.

Faculty and Research Activities
Shahin N. Amirii, Ph.D. (Kansas State University), P.E., Lecturer, Computational mechanics (solid and fluid mechanics); geotechnical engineering; health monitoring of structures; aircraft cabin air quality.

MeiCet Cetin, Ph.D. (Rensselaer P. I.), Professor, transportation engr.; intelligent transp. systems; modeling and simulation; traffic signal control; freight transport.; big data & machine learning; dynamic tolling.

Yanheong Chae, Ph.D. (Lehigh University), Associate Professor, structural engr.; structural dynamics; earthquake engr.; real-time hybrid simulation; performance-based design of structures; control of structures...

Mujde Ertlen-Unal, Ph.D. (Missouri U. of S. & T.), Associate Professor, environmental engr.; wastewater treatment; env. microbiology; haz. waste treatment; sustainable develop. (Director, Sust. Develop. Inst.).

Sherif Isbakh, Ph.D. (University of Central Florida), P.E., Professor & Department Chair; transportation engr.; intelligent transportation systems; traffic simulation & modeling; traffic safety & driving behavior.

Isao Ishibashi, Ph.D. (U. of Washington), P.E., Professor & Graduate Program Director, geotechnical engineering; earthquake engineering; soil dynamics; soil-structure interaction; experimental methods.

Sandeep Kumar, Ph.D. (Auburn University), Professor, sustainable chemical conversion processes, biofuels; thermochemical conversion of biomass; sub- and supercritical water/CO2 technology.

Gangfeng Ma, Ph.D. (U. of Delaware), Associate Professor, Coastal engineering; coastal hazards; sea level rise and climate change; computational fluid mechanics.

Duc T. Nguyen, Ph.D. (U. of Iowa), Professor (also in MSVE department), structural engineering; parallel computational mechanics; numerical algorithms for transportation networks; optimization.

Zia Razaqz, D.Sc. (Washington University), P.E., University Professor, retrofitting buildings and bridges; flood/wind/fire/earthquake/impact resistant structures; stability; passive damping; FRP structures.

Gary C. Schafron, Ph.D. (Syracuse Univ.). Professor, environmental engr.; fate and transport of contaminants in natural systems; lake oxygenation; aquatic chemistry; physicochemical treatment processes.

Ben J. Stuart, Ph.D. (Rutgers Univ.), P.E., Professor, & Interim Dean, environmental engr.; sustainable systems; algal biofuels & bioproducts; waste management; nutrient cycling; wastewater treatment.

Navid Tahvildari, Ph.D. (Texas A&M University), Assistant Professor, coastal engineering; environmental fluid mechanics; nonlinear wave dynamics; ocean mixing; internal waves; inverse modeling.

Xizi Wang, Ph.D. (Iowa State U.), P.E., Associate Professor, water resources, hydrological processes, ecohydrology, watershed analysis/modeling, climate change, stormwater, flooding and drought.

Kun Xie, Ph.D. (New York University), Assistant Professor, transportation engr.; traffic safety; statistics & econometrics; big data analytics; emergency management; transport geography.

Jaewon Yoon, Ph.D. (North Dakota State U.), Associate Professor, University Professor, environmental engineering; water quality modeling and management; stochastic and geospatial methods.

Visit http://www.odu.edu/cee for detailed individual research activities.
**Master's Degree Programs**

The graduate courses applicable towards Master's degrees are grouped into following categories.

**Category A** (3 credit hours each) - Upper Level Courses in Civil Engr.

- CEE 710 Structural Dynamics
- CEE 711@ Finite Element Analysis
- CEE 712 Advanced Reinforced Concrete
- CEE 713 Prestressed Concrete
- CEE 714 Advanced Structural Analysis
- CEE 715* Engineering Optimization I
- CEE 717 Bridge Structures Design
- CEE 718 Flood Resistant Structural Design
- CEE 719 Inelastic Structures
- CEE 720 Structural Stability
- CEE 721@ Cluster Parallel Computing
- CEE 722 Plates
- CEE 723 Seismic Design of Steel Structures
- CEE 724 Retrofitting Methods for Bridges and Buildings
- CEE 725 Smart Structures
- CEE 730 Advanced Foundation Engineering
- CEE 731 Advanced Soil Mechanics
- CEE 732 Engineering Behavior of Soils
- CEE 733 Soil Dynamics
- CEE 741* Open Channel Flow
- CEE 747* Groundwater Flow
- CEE 761* Water Resources Process and Analysis Methods
- CEE 770 Transportation Safety
- CEE 771 Transportation Operation II
- CEE 772 Intelligent Transportation Systems
- CEE 773 Transportation Planning
- CEE 774 Transportation Network Flow Models
- CEE 775* Transportation Network Algorithms
- CEE 776 Simulation in Transportation Networks
- CEE 782* Design of Coastal Structures
- CEE 787* Dredging & Beach Engineering
- CEE 788* Coastal Hydrodynamics & Sediment Processes
- CEE 789* Computational Environmental Fluid Dynamics

**Category B** (3 credit hours each) - Upper Level Courses in Env. Engr.

- CEE 715* Engineering Optimization I
- CEE 741* Open Channel Flow
- CEE 747* Groundwater Flow
- CEE 751@ Physicochemical Treatment Processes (Env. Core)
- CEE 752@ Biological Wastewater Treatment (Env. Core)
- CEE 753 Advanced Processes for Water & Wastewater Treatment
- CEE 754 Environmental Engineering Microbiology
- CEE 755@ Water Quality Management (Env. Core)
- CEE 756@ Water Quality Modeling (Env. Core)
- CEE 759 Carbon-Free Clean Energy
- CEE 760 Managing Phosphorous in Circular Economy
- CEE 761* Water Resources Process and Analysis Methods
- CEE 762@ Aquatic Chemistry in Env. Engineering (Env. Core)
- CEE 788* Coastal Hydrodynamics & Sediment Processes

**Category C** (3 credit hrs. each) - Lower Level Courses for Civil & Env.

- CEE 514 Masonry Structures Design
- CEE 515 Steel Structural Design
- CEE 516 Wood Structures Design
- CEE 530 Foundation Engineering
- CEE 531 Earth Structures Design with Geosynthetics
- CEE 532 Introduction to Earthquake Engineering
- CEE 533 Geomaterials Stabilization
- CEE 540 Hydraulic Engineering
- CEE 546 Urban Stormwater Hydrology
- CEE 547 Groundwater Hydraulics
- CEE 550 Water Distribution & Wastewater Collection System Design
- CEE 552@ Air Quality
- CEE 554@ Hazardous Waste Treatment
- CEE 555@ Pollution Prevention & Green Engineering
- CEE 558@ Sustainable Development
- CEE 559 Biofuels Engineering
- CEE 570 Transportation Fundamentals
- CEE 571 Transportation Operation I
- CEE 574 Transportation Data Analytics
- CEE 582@ Introduction to Coastal Engineering

**Category D** - Other Graduate Courses

Graduate level courses from other programs. These courses must be related to the program of study and must be approved by the academic advisor.

**MATH or STAT Category**

- CEE 700@ Civil and Environmental Eng. Experimental Design
- CEE 701 Applied Mathematics for Civil and Environmental Engineers

or a graduate MATH or STAT course.

* Double listings in A and B Categories.
@ Available in distance learning mode.

The required minimum course distributions are summarized below for the various Master's degrees. Note that Transportation Engineering program (a field of Civil Engineering) has a different master degree requirement (visit Master Degree Handbook in CEE web site for details).

<table>
<thead>
<tr>
<th>M.S. (Thesis) in Civil Engr. (Env. Engr.)</th>
<th>M.S. (Project) in Civil Engr. (Env. Engr.)</th>
<th>M.S. (Course) in Civil Engr. (Env. Engr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Env. Core)</td>
<td>A (Env. Core)</td>
<td>A (Env. Core)</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A (Env. Core)</th>
<th>A (B)</th>
<th>A (B)</th>
<th>A, B, C or D</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATH or STAT</th>
<th>MATH or STAT</th>
<th>MATH or STAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thesis</th>
<th>Project</th>
<th>Comp. Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total credit hours: 30 * 30 * 30 * 30

* For MS Project options, no more than 9 credit hours can be at 500 level.
(Updated: August 6, 2019)