NEW YORK UNIVERSITY – TANDON SCHOOL OF ENGINEERING
DEPARTMENT OF CIVIL AND URBAN ENGINEERING

SPRING 2018

CE-GY 77531-I (20636) – Environmental Systems Management – 3.0 Units
Division: Graduate – Subject: Civil Engineering – Section: I
Day(s): Monday – Time: 18:00-20:30 – Building/Room: Rogers Hall, Room 304
Prerequisite(s): Graduate Standing

Instructor: Prof. Haralambos V. Vasiiliadis, Ph.D., P.E., DEE, D.WRE, CIH
Office: --
Telephone: 917.488.0507 (preferably Monday thru Friday from 11:00 a.m. to 1:00 p.m. and from 3:00 p.m. to 4:00 p.m.)
Office hours: --
Email: HVasiliadis@NYU.edu or HvV@ATT.Net
Email Specs: Your subject title AND all attached filenames of your emails should have the following format
“CEGY77531-SP18-<LastName><FirstName><MiddleInitial>-<subject>”, e.g., “CEGY77531-SP18-VasiliadisHaralambosV-NotesheetA

Class hours: After class and by appointment
Classroom: RH-304


H. V. Vasiiliadis Notes: 1. Water Resources Engineering
2. Environmental Engineering
3. Hazardous Waste Management
4. Noise Pollution and Control
5. Data – Probabilities – Statistics

Catalog Descr.: This course includes an in-depth analysis of the environmental systems (both natural and man-made) and provides integrated management methods and practices to assist in making complex decisions in the rapidly evolving multidisciplinary subject of environmental systems management.

Course: This course provides an overview of issues and challenges in the rapidly a) evolving multidisciplinary subject, and b) developing field of interdisciplinary pedagogy of environmental (systems) management encompassing natural science (e.g., geology, biology, and chemistry), engineering (e.g., materials and energy balances, air resources systems, water resources systems, municipal and hazardous wastes), and business and social science elements (e.g., sustainability, marketing, financial investments, public relations, economics, law and policy, and environmental ethics) along with all required methods and tools (e.g., participatory approaches, statistics, remote sensing, geographic information system, life cycle analysis, environmental audits, and risk analysis and assessment). All major environmental problems, such as global warming, climate change, ozone depletion, air, water and noise pollution, soil contamination and waste and toxic substances management, etc., are discussed and analyzed. All new challenges, such as water governance, environmental sustainability, infrastructure vulnerability/resiliency against extreme natural events as well as strategic approaches for a holistic design and management of complex environmental and technological systems within a framework of engineering systems and towards environmental planning are presented. The interactions among the atmosphere (including biosphere), hydrosphere and lithosphere with the ecosphere and the urban (including urban water cycle), freshwater and coastal environments are described. The integration of urban systems design for water, soil, air and noise pollution treatment/control.
as well as for solid and hazardous waste management for a sustainable community development are discussed. Different tools and techniques of systems analysis, decision and policy making, and planning of environmental systems are introduced. Analysis of uncertainty and risk involved in planning and management of environmental systems is discussed. Monitoring and the best management practices (BMPs) to prevent water and soil pollution are also discussed along with conflict resolution in resources allocation, water security and principles of preparedness planning. Real life case studies will be presented including a paradigm shift from supply to demand management. Furthermore, in an attempt to maximize the benefits of this class various topics of water resources and environmental engineering will be reviewed on as-needed basis. More specifically, these short review sessions will include but not limited to: engineering hydrology, surface water and groundwater management, gravitational flow and drainage, flow under pressure and water distribution networks, air and noise pollution and control, and toxic substances and solid (including hazardous) waste management.

**Learning Goals:** Upon completion of this course, students will be able to:
- Understand the fundamental environmental concepts, principals, issues, and challenges involved in environmental systems management
- Identify and formulate all fundamental parameters and factors to be considered in a holistic approach to environmental systems management
- Apply all major definitions and theorems as well as all pertaining fundamental equations and models both for analysis and design purposes
- Analyze uncertainty and risk involved in planning and management of environmental systems
- Design/prepare a real-scale management plan to an environmental system
- Present such plan in a professional and scientifically acceptable manner

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<td>Environmental, social, and governance (ESG) factors and the role of public relations and organizational communication in environmental management</td>
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<td>Mon., May 07, 2018</td>
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<td>Remote sensing and geographic information system</td>
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<td>Mon., May 14, 2018</td>
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<td>Final Exam [05/09/2018-05/15/2018] – Chapters 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21 and notes</td>
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**Grading Policy:**
- Midterm: 25%
- Class review: 5%
- Class participation: 5%
- Final Exam: 25%
- Assignments: 20%
- Projects: 20%
- Bonuses: 5% for each set of exam notes (hence 2x5%=10%)
Exams: There will be two (2) exams (one midterm and one final exam). Exams will be based on lecture material, homework assignments and projects. Specific topics for each exam will be announced in class in advance. The examinations may consist of short-answer questions, true/false questions, numerical problems and essay questions. All exams will be closed book and notes. You may bring with you 2 sheets (8.5”x11”) of notes (i.e., 4 pages) for the midterm exam and 4 sheets (i.e., 8 pages) for the final exam but you are not allowed to include any numerical examples. In addition you may bring copies of tables and conversions (maximum 2 pages for each exam). Your exam notes will be reviewed in the beginning of each exam. Each set of exam sheets may receive up to 3 bonus points for its completeness, integrity and presentation. Typed exam notes will receive one (1) extra bonus point. During the exams, you are allowed to use calculators, rulers, pens/pencils and erasers. However, you are not allowed to use cell phones, computers (including notebooks, netbooks, ipads, etc.) or other electronic devices.

Reports: Use only 8½ “x11” paper. No cover pages. Staple all pages at the top left corner. On the top right corner of the first page of your assignments include your full name, homework assignment, problems solved partially and problems solved completely along with the date of submission. Underline your answers. Use proper graph paper for all graphs, sketches, designs, etc. which meet engineering standards. The overall appearance of your submittals is very important. All technical papers/reports should adhere to the ASCE guidelines for publication [http://ascelibrary.org/doi/pdf/10.1061/9780784479018]. You may use either international (SI) or English (EU) units.

Class review: During the first 5 minutes of each class, 2 pre-selected students will present a synopsis of the material covered in the previous class. Students may use PowerPoint or other means of electronic presentations. Along with the presentation students should submit a copy of their class notes for the material covered in the presentation. Students may receive up to 4 bonus points for their class review presentation.

Assignments: Each team (consisting of 4+/- students) will work on one of the assignments listed in the syllabus. Assignments are an important part of the learning process: they reinforce both concepts and computational skills. Be sure to allocate sufficient time. Although you are welcome and encouraged to discuss assignments with other students or with the instructor or graduate assistant, you must first make an effort to complete each assignment by yourself. After any discussions about specific problems, you should prepare your assignment submittal independently – copied solutions violate the spirit of the learning process and the NYU-Poly Code of Conduct and appropriate academic dishonesty reporting will be implemented.

Assignments should be submitted on 8½ x 11 inch paper - either engineering computation paper (preferred) or lightly-ruled graph paper (see sample below). Cover pages are not required. All pages should be consecutively numbered and the entire assignment must be stapled at the top left corner. On the top right corner of the first page of your homework include your full name, homework assignment number, problems solved partially and problems solved completely along with the date of submission. Underline your answers. Use proper graph paper for all graphs, sketches, designs, etc. which meet engineering standards. The overall appearance of your submittals is very important. Loose-leaf or other horizontally-ruled paper is not recommended as they are not standard in professional use. Computations can be done by hand as long as handwriting is legible.

If a spreadsheet is used for calculations, a printout must be fully annotated so someone familiar with the course material can follow your computations. At a minimum, all rows and columns should be labeled with both variable names and units, and relevant equations should be provided either on the tabular printout or on a separate sheet of paper. Hand-written sample calculations must also be provided for all numerical values in a typical row (not the first row) of the table – write the equation using variables, show all relevant numerical values plugged in, then calculate the answer using your calculator to make sure it agrees with the number calculated by the spreadsheet.
Assuming you (as a team of 4+-/- students) are in charge of compiling Request For Proposals (RFPs) on behalf of the Procurement Office of the Department of Public Works of a small (incorporated) island with a population of 10,000 people in the United States. During the summer (June-August), there is an average increase of approximately 5,000 people due to tourism. The RFPs should cover the following topics (one RFP per topic):

1. Water supply. A remote section of the island experiences low pressure and a light color in their water supply system primarily during the summer. No gastrointestinal-related diseases have been reported.
2. Wastewater collection system. A new development of 100 one-family houses and one 40,000 ft² strip mall (commercial development) is under planning. The existing combined wastewater supply system needs to be expanded. In addition the existing wastewater treatment system needs to be expanded.
3. Drainage – resiliency plan. Due to climate change, a new comprehensive drainage study is required to make the infrastructure of the island more resilient to extreme natural events.
4. Solid waste management. A new solid waste incinerator is under consideration.
5. Air pollution monitoring and control. An advanced air pollution monitoring and control system for the solid waste incinerator is also under consideration.
6. Site cleanup. A site has been used in the past for the disposal of municipal, toxic and hazardous (non-radioactive) waste and proper cleanup is due.

7. Port – waterfront – bulkhead rehabilitation. The island needs to rehabilitate the existing port along with the waterfront – bulkhead.

Draft an outline for each RFP including all technical, engineering, environmental, safety, hygiene, and legal aspects for each task. Include all required data sources, governing equations, models/software to used, technical specifications, environmental compliance requirements and a list of expected results.