

## PUBP 4140 Foundations of Leadership

This course offers a comprehensive review of contemporary issues and perspectives on leadership, including multi-disciplinary and systems-oriented approaches as well as classic theory, moving to the examination of evolving contemporary beliefs. The emphasis is on application of concepts in actual leadership settings and situations. The students become familiar with different ways of exercising leadership, their own strengths and weaknesses, and how they can best work with others in a leadership context. They learn and apply leadership skills in a hands-on, practical way. Topics include development of leadership theories, personal assessment and development, values and ethics, motivation, power, followership, group dynamics, multiculturalism in leadership, conflict resolution, performance excellence, and the change process.

3 CREDITS

INSTRUCTOR: WES WYNENS

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## CEE 4000 Global Engineering Leadership

This course focuses on the basic principles and practice of leadership in engineering environments. This is a modular course taught by practitioner leaders and managers. The modules focus on the principles and practice of leadership and management in private, public and not-for-profit engineering organizations. Topics include leadership, management, organizational behavior, entrepreneurship, ethics, innovation, communication, collaboration and competition, and conflict resolution. The course includes team-based projects in which the students have an opportunity to reflect upon and apply what they are learning.

3 CREDITS

INSTRUCTORS: RUDY BONAPARTE  
LISA ROSENSTEIN

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## CEE 4350 Environmental Technology in the Developing World

This course develops practical skills to evaluate environmental impacts in developing countries. The global burden of disease is known to be dominated by a variety of environmental risk factors that include poor air quality (both indoors and outdoors), waterborne diseases, and issues related to sanitation. The class focuses on evaluating the state of the environment in developing countries, with emphasis on problem-based, hands-on learning and includes an embedded study abroad component to conduct field studies in a developing country.

3 CREDITS

INSTRUCTOR: JOE BROWN

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## CEE 4150 Construction Management and Megaprojects

Challenges and opportunities related to effective and efficient planning, design, construction, delivery, and operations of megaprojects. Review of unique characteristics that make megaprojects exceptionally difficult to manage – great size, high costs, technical complexity, long timeframe, massive environmental and social impacts, high risk level, diverse stakeholders with often conflicting interests and sometimes varied cultural backgrounds, and possible contractual, legal, and ethical issues. Case study reviews to develop awareness and understanding of leadership skills required in a complex megaproject environment.

3 CREDITS

INSTRUCTOR: BAABAK ASHURI

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## CEE 4460 International Disaster Reconnaissance Studies

Understanding the consequences of major earthquakes in foreign countries; associated studies undertaken to understand contributing factors and efforts aimed at mitigating these factors for similar future events; and leadership in crisis situations. Lectures and group study activities with an international travel experience, including opportunities to visit several sites impacted by the M8 earthquake in Wenchuan, China, and the world's largest "shake table" facility, E-Defense in Tokyo, Japan. Class focuses on evaluating the tectonic setting of the event as well as how manmade infrastructure performed. The manner in which authorities responded to the event from a rescue/recovery perspective is also discussed. Students become familiar with key seismic considerations in the impacted zone as well as the planning and execution of a field reconnaissance study or shake table simulation.

3 CREDITS

INSTRUCTOR: J. DAVID FROST

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## CEE 4660 Sustainable Transportation Abroad

Transportation, with other infrastructure systems, plays a major role in the development of cities, regions and nations worldwide. The purpose of this course is to examine the quality of transportation systems, and the quality of the cities and regions they serve, in selected cities around the world to understand the influence of transportation on sustainable development. It is also to understand the influences of political, institutional and other infrastructures on the quality of transportation systems. The course includes an embedded study abroad component to study a transportation system in a city overseas.

3 CREDITS

INSTRUCTOR: KARI WATKINS

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## CEE 4160 Smart and Sustainable Cities

Over half of the world's nearly 7.5 billion people live in cities, which have experienced unprecedented urban growth over the past several decades. This number is predicted to increase to 70% by 2050, with much of this growth occurring in less developed countries. However, urban population growth is posing numerous challenges, which spurred the United Nations to develop the "New Urban Agenda" as a roadmap for building cities that are engines of prosperity and culturally rich centers of social engagement, while still protecting the environment.

This course will be taught in three parts. In Part I, "City Infrastructure Systems," the course will focus on providing a broad overview of how cities function by examining the various city infrastructure systems (e.g., transportation infrastructure, power supply, water distribution, buildings, etc.) and their interdependencies in relation to one another and to human and natural systems. This will be explored in the context of the role city infrastructure systems play in understanding and achieving urban sustainability. Part II, "Sustainability Challenges," will examine the key challenges urban environments face and emerging solutions in place or under development to address these challenges. Finally, in Part III of the course, "Smart Solutions," students will form teams to conceptualize solutions to a key challenge that will be explored in a team semester project. Final project teams will identify and explore interdisciplinary solutions, which may be analytical (data-driven) or theoretical (focused on modeling and design).

3 CREDITS

INSTRUCTOR: JOHN E. TAYLOR

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## CEE 3052 Introduction to Structural Engineering for GELM

This course introduces key concepts in structural engineering: the science, art and skill of designing various types of structures such that their behavior is as intended in a safe and resilient manner throughout their lifetime. Through case studies of structures and failures, demonstrations, and lectures, students will understand how structures of all types (i.e. buildings, bridges, domes, dams, etc.) take and transfer loads, to compute the effects of the loads on the structural members, and to determine the material and size of these members such that they are resilient and sustainable.

3 CREDITS

INSTRUCTOR: LAUREN STEWART

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## CEE 4252 Historic Structures

This study abroad course is aimed at developing students' knowledge and technical skills of historic buildings within a global framework, allowing students the opportunity to develop their engineering skills in a culturally immersive experience. London, with its rich architectural and structural design history, provides the backdrop for students to create and grow their knowledge of structural and construction techniques used throughout history and the methods to preserve, restore and reuse them.

3 CREDITS

INSTRUCTOR: LAUREN STEWART

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## CEE 4560 Origami Engineering

This class acquaints the student with state-of-the-art algorithms to design and analyze origami structures. Students will learn how to create and transform geometries by folding and unfolding, and thus apply origami to solve engineering and societal problems. In addition, using origami as a tool, we will outreach to some fundamental concepts in differential geometry.

Selected Topics to be covered:

- Application of origami engineering to societal problems
- Team-building and communication, development of individual awareness •  
Origami design principles: How to draw a valid crease pattern
- Origami kinematics: How to fold origami
- Origami mechanics: The Shopping Bag Theorem
- Origami in engineering: Miura-ori and the Eggbox
- Making silhouettes with one cut
- Polyhedra folding and unfolding
- Triangles on Earth: Spherical trigonometry
- Basics of (discrete) differential geometry

3 CREDITS

INSTRUCTOR: GLAUCIO PAULINO

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## CEE 4801 GEP I Global Engineering Practicum I

In GEP I, students will work with their faculty mentor and the course instructor to develop a plan for proposed research or work for a field-based, research-based or service learning international project. The proposed plan will consist of clearly stated objectives, hypotheses, and experimental and other approaches. The plan will also clearly articulate how the student will engage with local communities through the work. Students will work with counterparts based in the country of interest to refine problem definitions, approaches, and to give feedback on potential solutions. The research or work plan developed in the course will serve as the scope of work for the student's project. Students will also work with staff from the Office of International Education and the Leadership Education and Development (LEAD) office to conduct safety and leadership training, described below. Specific tasks will be: 1) Define the civil or environmental problem of interest; 2) Develop specific hypotheses or research objectives related to the problem; 3) Develop methodologies and protocols to evaluate the hypotheses or conduct research; and 4) Pilot test field experiments and methods or conduct initial data collection. *This course will be offered in the spring. It is expected that in the summer following their completion of this course, students will travel and work abroad to complete the proposed research.*

1 CREDIT

INSTRUCTOR: VARIOUS

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## CEE 4801 GEP II Global Engineering Practicum II

In GEP II, under the oversight of the course instructor, students will work with their faculty mentor to analyze and interpret the data collected during their international field-research, or analyze and synthesize the information collected during their international research experience. The goal of the synthesis will be to draw conclusions in regards to the objectives and hypotheses developed or objectives set in GEP I. Specific deliverables will be: 1) A research paper presenting the work completed, results, and discussion of the findings; and 2) A public presentation on the research or work project. *This course will be offered in the fall.*

1 CREDIT

INSTRUCTOR: VARIOUS

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## INTN 3011 Global Engineering Leadership Experience

Each student in the leadership minor program must complete a work-abroad, research-abroad, or study-abroad experience. The purpose is to give the student an opportunity to exercise leadership of self and others in a foreign engineering or technology environment on a real-world problem. The experience will offer students the opportunity to develop and apply cross-cultural skills required in the successful completion of projects.

VARIABLE CREDIT

INSTRUCTORS: ADJO AMEKUDZI-KENNEDY

JOHN KOON

LISA ROSENSTEIN

ROBERT SIMON

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