

NR 5884 TS: Infrastructure for Resilience

Offered: Fall Semester

INSTRUCTOR: Courtney E. Kimmel, Ph.D., <mailto:cekimmel@vt.edu>

REQUIRED TEXT: All reading materials will be provided by the instructor.

COURSE DESCRIPTION:

Infrastructure describes basic systems and structures that support markets, governance, communication, lifestyle, and society. Infrastructure includes physical or “hard” systems (e.g., transportation, energy, water/sanitation, ecological services) and “soft” systems (e.g., laws, regulations, markets, research, education) that affect the design, construction, management, and governance of these systems. Profound changes such as rapid urbanization, climatic conditions, and shifting centers of power, have made the vulnerabilities of existing infrastructure systems more apparent. Cities, often in partnership with private interests, are at the vanguard of an infrastructure revolution. By rethinking management and impacts of systems, cities are leading the way to a more resilient and sustainable future that advances ecosystem services, energy efficiency and renewable resource use, enhanced and efficient water/sanitation systems, novel waste management strategies, and the governance, market, and management systems to support them. In this course, we will explore these infrastructure innovations and how professions are shifting to design, support, implement, and manage a new landscape.

Learning Objectives:

Having successfully completed this course, the students will be able to:

- Demonstrate a broad understanding of the various infrastructure systems that support urban areas, as well as their interconnections
- Display critical and creative thinking skills regarding interventions and innovations for development of sustainable and resilient outcomes
- Develop personal competencies to engage with and contribute to professional communities of knowledge and practice

COURSE REQUIREMENTS AND GRADING:

Students have the opportunity to direct their own learning by choosing from a menu of assignments (e.g., blog posts, case studies, literature reviews, analysis, forum discussions) associated with each section of the course. Each assignment is given a point value and students earn a letter grade based on the total number of points earned over the semester (a running total is provided in the virtual course gradebook).

SCHEDULE:

- Week 1 – Introduction

Unit I - Introduction

- Week 2 – Systems
- Week 3 – Cities
- Week 4 – Rethinking Infrastructure

Unit II – Infrastructure Systems

- Week 5 – Resilience
- Week 6– Smart, Green
- Week 7 – Livable, Accessible

Unit III – Infrastructure Systems in Transition

- Week 8 – Transportation
- Week 9 – Water & Sanitation
- Week 10 – Ecological Infrastructure
- Week 11 – Elective
- Week 12 – Wrap-up

Unit IV – Deep Dive

- Week 13-15

SAMPLE