

## **NR 5884 Infrastructure for Resilience**

Offered: Fall Semester

**INSTRUCTOR:** Courtney E. Kimmel, PhD ([cekimmel@vt.edu](mailto:cekimmel@vt.edu))

**REQUIRED TEXT:** There is no required text for this course.

### **COURSE DESCRIPTION:**

Infrastructure describes the basic systems and structures that support markets, governance, communication, lifestyle, and every other aspect of society. Infrastructure includes physical or “hard” infrastructure systems such as transportation, energy, water/ sanitation, and one that is often left out of the planning mix, ecological systems; as well as “soft” infrastructure systems – the less tangible systems such as laws, regulations, markets, research and education, etc. that ultimately affect the design, construction, management, and governance of these systems. In an era experiencing profound change including rapid urbanization, changing climatic conditions, as well as shifting poles of power, the vulnerabilities of existing infrastructure systems are becoming more apparent. Cities, often in partnership with private interests, are at the vanguard of an infrastructure revolution. Through rethinking systems, and their management and impacts, cities are leading the way towards a more resilient and sustainable future through infrastructure development that advances ecosystem services, energy efficiency and renewable resource use, enhanced and efficient water and sanitation systems, novel waste management strategies, as well as 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.

### **COURSE OUTLINE:**

#### **Section I: Introduction**

- Week 1: Course logistics, Biosketch
- Week 2: Systems
- Week 3: Infrastructure Systems & Cities
- Week 4: Rethinking Infrastructure

#### **Section II: working to make infrastructure systems**

- Week 5: Resilient, Sustainable
- Week 6: Smart, Green
- Week 7: Livable, Accessable

### **COURSE OUTLINE (continued):**

**Section III: Infrastructure Systems in Transition**

Week 8: Water & Sanitation

Week 9: Transportation

Week 10: Energy

Week 11: Waste

Week 12: Social & Civic

**Section IV: Deep Dive Project**

Week 12: Proposal Due

Week 13: Review & Respond to colleagues' Proposals

Week 15: Rough Draft, Peer-review

Week 16: Final Draft Due

**COURSE REQUIREMENTS AND GRADING:**

**100 total possible points**

Participation in Weekly Discussion	25 points
Professional Development Activities	25 points
Part II Mini-Project	10 points
Part III Mini-Project	10 points
Part IV Deep Dive Project	30 points