INFRASTRUCTURE MANAGEMENT AND SECURITY AREA OF STUDY
Zachry Department of Civil Engineering
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INTRODUCTION
Large-scale, distributed infrastructure systems such as communications, power, water supply, flood control, waste management, industrial, commercial, recreational, transportation, other public facilities, commercial facilities, and industrial facilities form the basis for much of modern society. Planning and managing these systems of systems presents a major challenge for Civil Engineers. In addition to understanding the behavior of infrastructure components individually (e.g., understanding a single bridge), we must understand how they interact and behave as a system (e.g., the Texas highway system). This requires an understanding of not only the technical aspects of infrastructure at which Civil Engineers excel, but also an understanding of the social, economic, and political context within which infrastructure problems exist and the management methods that can be useful within this context.

VISION
The vision of the infrastructure management and security area within the Department of Civil Engineering at Texas A&M University is to educate the next generation of engineers and researchers who will plan for and manage the infrastructure systems that civil engineers design, construct, and operate and who will lead the research efforts needed to improve infrastructure planning and management within Texas, the U.S., and the rest of the world.

MISSION STATEMENT:
The mission of the infrastructure management and security area within the Department of Civil Engineering at Texas A&M University is to:

- prepare graduate students so they will be able to plan for, operate, and manage the facilities and public works that civil engineers typically design and construct within the organizations responsible for funding such work;
- prepare graduate students so they will be equipped to lead the international research effort to improve society’s understanding of and capability for planning and managing infrastructure systems;
- educate graduate students so they are capable of completing appropriate information management and decision support activities required to support infrastructure management;
- educate graduate students so they are capable of assessing the vulnerability of infrastructure systems to human-induced and natural hazards, planning preparedness measures for infrastructure systems facing these hazards, and leading the engineering response to restore infrastructure services after these disasters;
- educate graduate students so they are capable of defining the condition of existing facilities through inspection techniques, analyzing citizen contact data, and using appropriate non-destructive testing and remote sensing techniques; and
- develop the knowledge required to address civil engineering infrastructure facilities and public works problems for the State of Texas.

AREA GOALS:
To meet these goals, the faculty will:

- provide courses that integrate scientific and engineering knowledge together with constraints from social, economic, and political factors;
- conduct the highest quality research in non-destructive testing, remote sensing, infrastructure assessment, infrastructure asset management, and infrastructure security;
- provide mentoring and educational opportunities to prepare students in the Ph.D. program to pursue research careers within academia, private corporations, and government agencies;
- promote the highest academic scholarship.
MAIN FOCUS AREAS OF THE PROGRAM:
- Non-destructive testing
- Remote sensing
- Geographic Information Systems
- Infrastructure reliability analysis
- Probabilistic Risk Analysis for complex infrastructure networks
- Decision support systems for complex systems
- Management in government agencies
- Contracting for and managing engineering and design services
- Funding and investment analysis in public agencies

DEGREE PROGRAMS
The following pages outline the degree programs in the Infrastructure Management and Security area. The Master’s of Engineering degree is intended to be a terminal, professionally-oriented degree for those seeking specialization in infrastructure management and security before entering the workforce. The Master’s of Science degree is intended for those who wish to conduct research in infrastructure management and security, either in preparation for entering a Ph.D. program or as preparation for entering the workforce. The Ph.D. degree is intended for those who plan to pursue a research career in the area of infrastructure management and security. This degree requires the completion of a dissertation in which original, rigorous research is completed. The Doctor of Engineering degree is intended for individuals preparing for professional engineering careers in business, industry and the public sector who seek education beyond the master’s degree level. The D.Eng. Program emphasizes engineering practice, public service and the development of leadership potential, not basic research. The Doctor of Engineering degree program is administratively managed by the Academic Dean's office in the Dwight Look College of Engineering.
The Master of Science degree is a research-oriented degree requiring a minimum of 32 credit hours of approved courses and research. At least 25 credit hours must be coursework. The degree also requires the student to complete and submit a thesis to the University. The purpose of the degree is to prepare students to either (a) pursue a PhD program in infrastructure management and security or (b) pursue a career in infrastructure management and security.

**Course Requirements for Infrastructure Assessment & Management MS program**

**Core Courses (must take all three)**
- CVEN 624: Infrastructure Engineering & Management
- CVEN 689: Risk and Decision Analysis for Civil Engineers
- CVEN 689/658: Civil Engineering Applications of GIS

**Infrastructure Systems Courses (Choose at least 2 of the following):**
- CVEN 603: Environmental Management
- CVEN 632: Transportation System Engineering Management
- CVEN 641: Construction Engineering Systems
- CVEN 644: Project Risk Management
- CVEN 664: Water Resource Planning and Management
- CVEN 665: Water Resource Systems Engineering
- CVEN 668: Advanced EPC Project Development

**Economic and Decision Modeling Courses (Choose at least 1 of the following):**
- INEN 627: Engineering Analysis for Decision Making
- INEN 689: Special Topics in Decision Analysis

**Public Policy Courses (Choose at least 1 of the following):**
- BUSH 668: Budgeting in the Public Sector
- BUSH 671: Science, Technology, and Public Policy

The remaining credit hours are to be used for additional courses chosen in consultation with your thesis committee.

Additionally, the “Texas A&M Business Certificate” can be earned by taking the following courses. Only 1 of these may be counted towards the required 25 credit hours of course work.
- ACCT 640: Accounting Concepts and Procedures
- FNC 635: Financial Management for Non-Business
- MGMT 655: Survey of Management
- MKTG 621: Survey of Marketing