

Master of Project Management
Course 485
Intelligent Transportation Systems

Course Objective:

Intelligent Transportation Systems (ITS) represent the application of technology to help address our ongoing challenge of providing safe and efficient transportation. In the face of constrained budgets and limited space for building wider roadways, ITS offers a collection of technology tools to optimize the capacity of existing infrastructure, enhance safety and mobility, limit environmental impacts, and support data-sharing for a connected environment.

The course will provide a practical perspective of ITS and will complement other courses that focus on the theory behind ITS solutions. A brief overview of the history of ITS will be provided to highlight the challenges we have faced in the transportation industry and the factors that led to the development of this new strategy. The life cycle of ITS will be covered from the planning stages to design to operations and maintenance. A variety of technologies will be discussed, including vehicle sensors, video systems, hardwire and wireless network communications, and central management software. The class will explore Connected Vehicle initiatives and their transformative implications to transportation.

Students who complete the course will gain an understanding of the goals and benefits of ITS, and how it merges advanced technologies with our transportation systems to help address our challenges. The course will include samples of real-world tasks associated with delivering ITS projects as well as opportunities to study and share perspectives on various ITS applications in the transportation industry.

Week 1: The Road to ITS

History of traffic congestion. Traditional approach to addressing demand vs. capacity.
Development of a modern ITS approach. Costs and benefits. Making the case for ITS.
Overview of curriculum. Homework Assignment 1.

Week 2: Systems Engineering and ITS Architecture

Defining systems engineering and its application to ITS. Benefits of systems engineering. Requirements of Code of Federal Regulations, 23 CFR on ITS. The “V” model process. National ITS framework. Benefits of developing ITS architecture. ITS service categories. Regional ITS architecture. Project ITS architecture. Integrating ITS planning with the transportation planning process. Students turn in Homework Assignment 1.

Week 3: Elements of ITS Design

Interdisciplinary engineering coordination with ITS. Powering ITS equipment. Detection technologies and data collection and distribution. Field device site design considerations. Communications infrastructure. Constructability. Plans, specs, and cost estimate deliverable package. Homework Assignment 2.

Week 4: The Backbone of ITS

Communications network topologies and configuration. Bandwidth requirements. Attributes of hardwired and wireless networks. Fiber-optic networks. Computer IT and ITS synergies. OSI seven-layer model. Students turn in Homework Assignment 2.

Week 5: Project 1 Assignment. Review. Midterm Exam.

Project 1: A partial design contract bid package will be provided. The project will involve applying class knowledge to complete the plans, specifications, and cost estimate (PS&E). A brief review of course topics will be offered, followed by the midterm exam.

Week 6: System Operations and Maintenance

Maintenance considerations during design. Operational challenges. Ongoing system maintenance. Budgeting support after initial deployment. Valuable input into design phase of project cycle.

Week 7: Managing ITS Projects

A culmination of topics in the context of project management. Relating elements of the systems engineering process with specific project manager responsibilities, including project planning, risk management, configuration management, and testing plans. Students turn in Project 1. Homework Assignment 3.

Week 8: The Business of ITS. Project 2 Assignment.

Marketing to owner agencies. Client relationships. Ongoing professional development. Writing technical proposals. Estimating service fees and implementation costs. Career planning. Special business participation requirements. Project 2: A Request for Proposal (RFP) will be provided. The project will involve preparing a written proposal meeting all the requirements in the RFP and making a team presentation in a mock interview. Students turn in Homework Assignment 3.

Week 9: Connected Vehicles

Vehicle-to-vehicle and vehicle-to-infrastructure communications. Safety applications and Connected Vehicle Safety Pilot Program. Communications security and legal liability. Interoperability and international initiatives. Students turn in written proposal for Project 2. Homework Assignment 4.

Week 10: Student Presentations. Review for Final Exam.

Students make their presentation for Project 2 in mock interviews to compete for an advertised contract. A review of the course topics will be provided in preparation for the final exam. Students turn in Homework Assignment 4.

Exam Week: Final Exam

Grade Determination:

Homework 1	5%
Homework 2	5%
Homework 3	5%
Homework 4	5%
Project 1	15%
Project 2	15%
Midterm Exam	25%
Final Exam	25%