CE 595: Intelligent Transportation Systems

Fall 2015, 3 credits, Tuesday & Thursday 9:40 am - 10:55 am AM, JDT Bldg.

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COURSE DESCRIPTION

This course covers the fundamentals of intelligent transportation systems. Transportation systems worldwide provide economic and social opportunities, but they also create well-known problems of congestion, safety and environmental degradation. This course will examine how Intelligent Transportation Systems (ITS), can enhance mobility, reduce death and injury and protect environmental resources. Such systems apply information and communication technologies in transportation. The issues to be covered in the course will include systems engineering approach applied to ITS, ITS deployment and transportation operations, transportation system management, traveler response to technologies and information, ITS planning, evaluation, and institutional issues. Specific topics to be covered in the course include:

- Identification of transportation problems and costs
- Definition and role of Intelligent Transportation Systems
- Policy-makers' perspective on ITS
- Theory: Diffusion of innovations
- Applications: Transportation system management
- Applications: Traveler Information Systems
- Applications: Public transit, bicycles and pedestrians
- Applications: Eco-friendly and sustainable ITS solutions
- Application: Connected & autonomous vehicles/automated highway systems
- Making plans for intelligent transportation systems
- Evaluation of technologies and large-scale ITS field tests
- Assessing the benefits and costs of ITS
- Learning from ITS deployments in the US
- Challenges and Issues: Technical, institutional, funding, and procurement issues
- ITS evaluation software
- Public and private sector perspectives (institutional and stakeholder issues)

Students: This course provides valuable learning opportunities to those interested in intelligent transportation systems. Students who can take the course include graduate-level Engineering or related fields/disciplines. Interested individuals working with transportation agencies, cities, or transportation consultants are welcome to enroll in the course. Non-degree seeking students can also take this course. Students should be interested in exploring and critically appraising transportation innovations. They will be encouraged to work on ITS technologies which interest them. Through a class project, students need to demonstrate their ability to analyze ITS technologies. Students will be guided to apply their skills by critically reviewing relevant literature, development of a conceptual framework for their selected topic, acquisition of relevant data, and descriptive analysis and modeling. Students will demonstrate their knowledge of ITS as well as ability to apply the knowledge to analyze ITS technologies for solving transportation problems.

Prerequisites: Graduate standing and at least one introductory transportation course.

Credits and format: This is 3-credit course. Most of the course will consist of lectures. In addition, there will be class discussions, and student presentations, and we may have occasional guest lectures.

Requirements: Attendance in all classes is required (unless there is a good reason for your absence). Student assignments will include readings to familiarize them with existing ITS issues and methods. Most of the readings will be from research papers and reports.

There will be a mid-term examination.

A major effort will be devoted to doing a class project. For the class project, every student will conduct a three-phased effort aimed at identifying factors that influence the level of transportation problems and innovative ITS solutions, which can address the problem.

Phase I will involve a review of the literature concerning a specific transportation issue chosen by the student, e.g., connected and autonomous vehicles, evaluating the effect of a freeway service patrol program, understanding traveler response to dynamic information, involving various parties in developing a national plan for intelligent transportation systems.

Phase II will involve critically evaluating a selected research paper in detail.

Phase III will involve conducting analysis. This can be statistical analysis of data, including developing models which predict the impacts of the chosen ITS solution on the transportation problem of interest.

The final project will be a paper of no longer than 7500 words (following guidelines from the Transportation Research Board) and a 15-minute formal presentation to the class, including slides/overheads/visuals.

The requirements for this course include:

- Literature review—20% of grade.
- Critical review of selected paper—15% of grade.
- Mid-term exam—20% of the grade.
- Assigned readings, active participation in class—5% of grade.
- Class project presentation—5%
- Class project—35%

Administrative Issues

Class Meeting Schedule and Changes

The dates of classes as planned will be provided. The class is scheduled to meet generally at the regularly scheduled time. If it is necessary to reschedule a class, every effort will be made to accommodate the needs of as many students as possible.

Office Hours

The schedule of office hours will be announced in class. Dr. Khattak will usually be on campus the day after the class. However, the easiest way to meet is by fixing an appointment.