
CE 850
Intelligent Transportation Systems

Department of Civil and Environmental Engineering
Michigan State University
Offered Fall of Odd Years

Instructor:

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Recommended Prerequisite:

CE 444 – Principle of Traffic Engineering

Course Objectives:

The purpose of the course is to introduce students to the basic elements of intelligent transportation systems (ITS). ITS concepts that will be reviewed include:

- ITS general concepts
- ITS planning process
- Traffic surveillance and monitoring systems
- Advanced traffic management systems (ATMS).
- Advanced traveler information systems (ATIS).
- Advanced vehicle control and safety systems (AVCSS).
- Advanced public transportation systems (APTS).
- Commercial vehicle operations (CVO).

Lectures on each topic will focus not only on the technological elements that support ITS developments, but also on the system, institutional and societal aspects that are linked to ITS deployments.

Required Textbook:

Since ITS is continuously changing, no specific textbook will be used. Appropriate reading material will be assembled from pertinent journal and periodical papers along from publications from ITS America, the U.S. Department of Transportation, and other agencies involved in the development and deployment of ITS.

Suggested Textbook:

- *Intelligent Transportation Systems Primer*, Institute of Transportation Engineers, 2000, 546 pages. [ISBN No: 0-935403-45-0]

Grading:

The final grade for the class will be determined as follows:

- Class participation10%
- Research paper proposal.....10%
- Final research paper.....35%
- Presentation15%
- Midterm10%
- Final exam20%

Class participation is critical. It should take the form of raising discussion points, search and provision of relevant printed and electronic material, including Web resources.

The midterm will be a 60-minute exam held within class time, while the final exam will be a one and half hour held during the final examination period. Make-up examination will only be scheduled with prior permission or under extreme emergency circumstances. The take-home portion is due at the beginning of the class portion of the examination.

Grading follows the traditional scale (90-100=A, 80-89=B, etc.) Borderline cases will be evaluated individually, and course grades will be raised solely at the instructor's discretion, using class participation, enthusiasm, and other subjective factors in that judgment.

Course Tentative Schedule

Week	Topic	Deliverable
1	Introduction	
2	ITS Planning Process	
3	Traffic Surveillance and Monitoring	Discussion of research paper topics
4	Traffic Surveillance and Monitoring	
5	Advanced Transportation Management Systems	
6	Advanced Transportation Management Systems	
7	Advanced Transportation Management Systems	Submission of research paper proposal
8	Advanced Traveler Information Systems	Midterm
9	Advanced Traveler Information Systems	
10	Advanced Vehicle Control and Safety System	
11	Advanced Vehicle Control and Safety System	
12	Advanced Public Transportation Systems	
13	Advanced Public Transportation Systems	
14	Commercial Vehicle Operations	
15	Paper presentations	Research papers due Research paper presentations
16		Final exam

ITS Research Paper

A professional paper based on a relevant topic in intelligent transportation systems that is of interest to the student is required as an integral part of this course. The topic of the paper will be selected in close consultation with the instructor. If this is your first paper for a graduate class, you are particularly encouraged to seek individual guidance from the instructor.

Specific requirements and expectations for the paper are presented below:

Paper Topics

Select a topic that is of interest to you and that is reasonable in scope, i.e., not too narrow and not too broad. In addition, be sure that there is plenty of information relating to your topic in easily obtainable sources.

When selecting your topic, you may elect depth or breadth in your coverage as follows: you can choose to comprehensively cover an area of ITS (breadth), or you can choose to cover one particular point in depth. The topic chosen for the term project may deal with technical and/or institutional/societal aspects of Intelligent Transportation Systems.

In selecting your topic, you should think beyond presenting simply a history or a literature survey. You should think of what new ideas and innovative solutions you can add to a particular topic. The paper should be written in your own word, with careful attention to proper citation of sources.

Paper Proposal

Your proposal is limited to **two pages** (typed/word processed). The proposal shall include the following:

- Your name
- Paper title
- Specific **objectives** of the paper, in bullet format (*where you are going*)
- Preliminary outline of paper, in table of content format (*how you are going to get there*)
- Evidence of preliminary library and literature research. This should include a list of library references (minimum of ten relevant journal articles or technical reports).

Note that for this course web sites do not count as the required ten minimum references. Web sites can be cited, but only as additional references.

Paper Format

The minimum requirements for the paper are as follows:

- The paper should include the following sections, in the given order: (1) Title page, (2) Abstract, (3) Table of Contents, (4) Main body of paper with including tables and figures (5) Acknowledgement, if any, (5) References, and (6) Appendices, if any.
- The length of the paper should not exceed 25 pages, including everything.
- Text should be written single-spaced, using 11 or 12 point Times New Roman font, on one side of letter-sized paper and in a single column.

- The abstract should not be longer than 250 words.
- All tables and figures should be labeled, with sources cited.
- Use one-inch margins at top, bottom, left, and right.
- Number pages in upper right corner.
- Special binding is not required.
- Avoid jargon, acronyms, and use of personal pronouns in your paper.
- Each student must write an individual paper.

Paper Evaluation

You will be evaluated on your paper as follows:

• Introduction/Background	10 %
• Objectives	10 %
• Body	40 %
• Conclusions/Recommendations/Perspective	20 %
• Language/Style	10 %
• Overall Impression	10 %

What exactly should go into your report will depend on the specific topic/point you have decided to cover. As general guidelines, your report should:

- Be aimed at an audience that is transportation-literate.
- Provide the reader with a complete picture of the current state-of-the-art.
- Describe the relevance of the topic being covered.
- Describe the current issues and problems.
- Discuss issues and problems that still need research.
- Note the likely future directions.

Research Paper Presentation

Attendance

You are required to attend all paper presentations. The presentations should be looked upon as an opportunity to gain experience making a professional presentation in a supportive environment, among your peers.

Delivery

The primary contributors to an effective presentation are (a) technical content, (b) visual aids, and (c) skills of the speaker. Remember that a presentation may (should) differ from the printed paper and that the presentation gives the author an opportunity to discuss and emphasize highlights of the work, which may not be possible to do in the printed version. It is recommended that you think towards structuring your presentation as follows:

- Title
- Objectives
- Outline of Presentation
- Methodology
- Body
- Summary
- Conclusion
- Perspectives

Do not read the paper or presentation. You should practice to become completely familiar with your presentation so that you can speak from memory or notes. Concentrate on your delivery. Speak clearly and at a pace somewhat slower than normal conversation. Avoid a monotone. Can you be heard throughout the room, and are you facing your audience, instead of looking at the visual aids?

Timing

Your presentation will be limited in time to 20 minutes. Most people are surprised when their time is up! It is very helpful if you practice your talk beforehand, keeping track of elapsed time. Recognize that actual presentations usually take longer than rehearsals. Help your audience by not exceeding your allotted speaking time.

Visual Aids

Visual aids are always effective tools for communicating your ideas quickly, and therefore are recommended. An overhead projector will be available. Do not consider using the white/chalk board as a substitute for visual aids. Please do not use all text visuals that convey no additional information to the audience. A maximum of one or two visuals should be used per minute of presentation. The instructor will be happy to assist you in the development of visual aids.