Spring 2020

TRAN 755-102: Intelligent Transportation Systems

Joyoung Lee

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TRAN 755 Intelligent Transportation Systems

Section: 102 Spring 2020

Prerequisite: TRAN 752. Techniques used to improve the safety, efficiency and control of surface systems. Emphasis on technological and operational issues of these systems and using them for incident detection and for traffic management through route and mode diversion.

**Brief Course Description**

This course will discuss the fundamental concepts and practices of Intelligent Transportation Systems (ITS). The primary topics of this course cover 1) National ITS Architecture; 2) Active Transportation and Demand Management (ATDM) and Active Traffic Management (ATM); 3) Integrated Corridor Management (ICM); 4) Connected and Automated Vehicles; and 5) Data Collection and Communications Technologies for ITS. Students will be assigned to a group project to hone their hands-on experiences of designing and evaluating real-world ITS applications. Every individual of this class will be asked to perform a term project.

**Course Objectives**
1. Understand the fundamental concepts of Intelligent Transportation Systems
2. Gain working knowledge of emerging ITS applications
3. Obtain the best practices of ITS
4. Examine the gaps and challenges of current ITS applications
5. Have capabilities to identify and solve transportation problems within the context of ITS applications

**Instructors**
Professor Joyoung Lee, Ph.D.
Office: 274 Tiernan Hall
E-mail: jo.y.lee@njit.edu
Office Phone: 973-596-2475
Office Hour: TBD.
Teaching Assistant/Grader
TBD

Lecture Hours and Location
Wednesday 6:00 PM - 9:05 PM @ CKB 315

Textbook & References:
The primary reading material of this class is ITS-ePrimer (http://www.pcb.its.dot.gov/ePrimer.aspx).
Additional reading materials will be provided by the instructor based on topics during lecture which will
be accessible through Moodle. The reading material for the class comes primarily from the instructor's
handouts and online references provided during lectures. The following references are optional reading:

Grading
Term Paper: 30%
Final Exam: 30%
Group Project: 35%
Homework (Weekly progress report for term paper and group project) : 5 %

Group Project
The class will be divided into multiple groups (i.e., up to 3 members per group) to conduct a
hypothetical ITS design project. Given scenarios reflecting real-world practices, each group will propose
the most desirable ITS application to deal with the given problem and prove the effectiveness of their
proposal visually and numerically. The tentative time line of the group project is as follows.
- 7th Week: Complete grouping
- 11th Week : Submit project Scope of Work
- 14th Week : Final Presentation & Draft Report (Concept of Operations Document)
- 15th Week: Final Report (Concept of Operations Document)

Term Paper
Each student will conduct a term paper for a selected topic. The primary purpose of the term paper is to
let students 1) scan previous research efforts related to the topic; 2) examine the gaps and challenges of
the previous efforts; and 3) come up with new idea(s) to fill out the gaps and overcome the challenges.
Choosing a topic for the term paper is up to student. Each student will be presenting the progress of the
term project on a weekly basis; the presentation schedule will be announced during lecture. The time
line of the term paper is as follows.
- 3rd Week: Submit the list of term paper topics
- 6th Week: Submit the draft abstract of term paper
- 7th Week: Submit the final abstract of term paper
- 9th Week: Presentation
- 10th Week: Final Draft Paper Due

Exam/Homework Policies

- Exam: All exams will be in-class. Students are allowed to bring their own one-page formulation sheet which must be submitted to the instructor along with the question and answer sheet at the end of each exam.
- Homework: Problems will be assigned to reinforce course learning objectives. The assignments will be targeted to provide practice for methods that may be included in course exams. Homework should be turned in at the start of the class period identified by the instructor. No late homework will be accepted.
- Collaborating, sharing, and/or copying for exam/homework is NOT allowed. Credit will not be given to individuals who either asked or allowed such behaviors. The NJIT honor code will be upheld and any violation will be brought to the immediate attention to the Dean of Students. See http://studentsenate.njit.edu/wp-content/uploads/2010/03/University_Code_on_Academic_Integrity.pdf

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Class Policies

- Cell Phones and mobile devices (e.g., Laptop, IPad/Tablet PC, IPod, etc.): Cell Phone should be turned off prior to coming to class. Texting and the use of mobile devices during the class shall not be allowed.
- Each student will be excused to miss up to two classes with prior permission/VALID reason. Each subsequent class missed will cost the student up to 5% of the overall grade. Five (5) or more missed classes will result in an F grade.
<table>
<thead>
<tr>
<th>Lecture</th>
<th>Class Agenda</th>
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| 1       | - Course Overview  
          | - Introduction to ITS |
| 2       | - National/Regional ITS Architecture  
          | - Data Collection Technologies |
| 3       | - Data Collection Technologies  
          | - Performance Measures |
| 4       | - Lab: Traffic Data Collection (WiFi-based travel time collection; Remote Traffic Microwave Sensor; Video Analytics) |
| 5       | - Active Transportation and Demand Management (ATDM)  
          | - Active Traffic Management (ATM) |
| 6       | - Integrated Corridor Management (ICM) |
| 7       |   |
| 8       |   |
| 9       | Spring Recess: No Class |
| 10      | - ITS Evaluation Techniques |
| 11      | - Adaptive Traffic Signal Control |
| 12      | - Connected and Automated Vehicles |
| 13      | - Connected and Automated Vehicles: Field Test |
| 14      | - Group Project Final Presentation and Final Report (ConOps) |
| 15      | - Final Exam |