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Fall 2018

# TRAN 755-101: Intelligent Transportation Systems

Joyoung Lee

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JOHN A. REIF, JR. DEPARTMENT OF  
**CIVIL AND ENVIRONMENTAL  
ENGINEERING**



**TRAN 755-Intelligent Transportation Systems**  
**Section: 101**

**Fall 2018**

**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; 3) Integrated Corridor Management (ICM); 4) Connected Vehicles; and 5) Data Collection and Communications Technologies for ITS. Students will be assigned to a group project to hone 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 341

## **Prerequisite**

CE 350 Transportation Engineering

## **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:

- Sussman, Joseph. Perspectives on Intelligent Transportation Systems (ITS). New York, NY: Springer, 2010.
- Mashrur A. Chowdhury, and Adel Sadek, Fundamentals of Intelligent Transportation Systems Planning, Artech House, Inc., 2003.

## **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 3 ~ 5 groups (i.e., up to 3 members per each 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 time line of the group project is as follows.

- 9/26/2018: Complete grouping
- 10/24/2018 : Submit project Scope of Work
- 11/28/2018 : Final Presentation & Draft Report (Concept of Operations Document)
- 12/5/2018 : 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.

- 9/12/2018: Submit the list of term paper topics
- 9/26/2018: Submit the draft abstract of term paper
- 10/3/2018: Submit the final abstract of term paper
- From the 3<sup>rd</sup> week of October: Presentation

### 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](http://studentsenate.njit.edu/wp-content/uploads/2010/03/University_Code_on_Academic_Integrity.pdf)

### Class Polices

- 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.

### Course Schedule (Subject to be changed)

Lecture	Class Agenda
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) - Active Transportation and Demand Management(ATDM)
5	- Active Transportation and Demand Management(ATDM) - Active Traffic Management(ATM)
6	- Integrated Corridor Management
7	
8	- Integrated Corridor Management

9	- Adaptive Traffic Signal Control
10	
11	- Connected and Automated Vehicles
12	- Thanksgiving Recess. No class
13	- Connected and Automated Vehicles
14	- Group Project Final Presentation and Final Report (ConOps)
15	- Final Exam