

Course Description

The course is Traffic Engineering, CEE 6603. A graduate level required course for M.S. / Ph.D. in Transportation Engineering in School of Civil and Environmental Engineering. Size of course is typically ~22 students. The course is taught in Georgia Tech currently. The purpose of this course is to introduce students with primary traffic engineering concepts and methodologies that are practiced in real-world and are used commonly in traffic research. The course further aims to develop an investigative and critical thinking approach in students to solve real-world traffic problems. To this end, the course includes an individual term project for which students are encouraged to select a topic from a list of choices given. A topic not in list, but relevant, can be chosen too. Further, the topic can be in the student's area of research considering this is graduate level course.

Learning Outcomes

Outcome # 1: The students will recite and interpret key terminologies and definitions such as traffic demand, traffic flow, fundamental traffic flow equation, traffic density, travel time, peak hour factor, queue length and delay etc.

Outcome # 2: The students will solve beginner-level problems by applying theoretical concepts and formulas learnt in the course and by referring the guidelines in the Highway Capacity Manual, Highway Safety Manual, and AASHTO Guidebook, etc. For example determining level of service of an intersection, performing capacity analysis of an intersection or a roundabout, estimate stopping sight distance etc.

Outcome # 3: The students will differentiate between different types of traffic signals used in the US such as protected only, permissive only, protected-permissive, etc.

Outcome # 4: The students will interpret performance of a signalized intersection by analyzing the system components such as traffic demand, green clearance times, signal phase timings, cycle length, volume-to-capacity ratio etc.

Outcome # 5: The students will turn in evaluation reports by conducting lab activities directed to measure/estimate traffic measures on road such as travel time, spot speed, recommended pedestrian walk time at a signalized intersection etc. The students will also turn in discussion reports by analyzing and investigating theoretical aspects such as discussion on suitable yellow time length, driver expectancy issues observed, and estimating traffic flow equation for real-world traffic data.

Outcome # 6: The students will build one real-world intersection traffic simulation model in Vissim, a microscopic traffic simulation software to conduct a level of service analysis of the two intersections and to provide suitable recommendation such as a revised signal timing plan, a different roadway design etc. The students will report a discussion based on quantitative analysis derived using the simulation software.

Strategy Used to Create the Objectives

The course objective is chosen with an intention to allow students to gain knowledge of the current traffic evaluation processes mostly in practice and a few in theory. Towards this goal, it is noted that the course is offered as required course for students at graduate level, which can most likely include students from international background. Although the

Learning Outcome F4.1

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fundamentals of traffic sciences might be same globally, transportation engineering taught in this class aims to provide hands on experience with solving and evaluating real world traffic engineering issues. It is crucial to provide a summary chart that briefs key functions and basic traffic rules of different traffic control components such as signal timing, road traffic rules, sign conventions used in the US to all the students. Learning outcomes 1, 2, 3, and 4 are towards this course goal. Second goal of the course is to develop a critical thinking approach towards evaluating a traffic problem, this can mean that in some cases there might be no one definite solution, the very reason for research to become narrow and specific. Such practices and experiences is intended to provide students an understanding of the critical thinking required in research. Thus, also allowing the graduate students a glimpse of research in traffic engineering. Learning outcome 5 and 6 are towards this goal.

I think the objectives are right level based on my personal experience of taking this course as a new international graduate student and based on the required research skills of critical thinking in traffic engineering at Georgia Tech which I understand by working as a Graduate Research Assistant and by interacting with other Ph.D. students and faculty. However, I definitely think I would like to get feedback from the current instructor and other faculty members on the course goals and learning outcome goals to get a reflective feedback of the expected level of the objectives. I also think it would be beneficial to get feedback from other current graduate students and a few alumni students who are in industry. To create course goals and objectives I referred the course syllabus and lab assignments offered in the course. I referred to the section "Course Topics", "Term paper"

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in the syllabus and I referred to “Lab Assignment Objectives” to understand the level of depth on critical thinking expected to be imparted to the learners through this course. I added Outcome# 6 to the current course. That is, the current course content does not include content towards outcome #6.