

UPP SPECIAL TOPICS COURSE: TRANSPORTATION RESEARCH METHODS
COURSE: UPP 565
CALL NO: 28980

TIME: To Be Determined

LOCATION: TBD

Instructor: Dr. Piyushimita Thakuriah (Vonu)

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Course Web Site: Login to *http://blackboard.uic.edu*

1. Course Objectives, Learning Goals and Expected Outcomes

The objective of this course is to give students experience with transportation planning methods at an advanced level. At the end of the course, students will have accomplished the following four learning goals:

- 1) Have a chronological and survey-level knowledge of transportation planning models and methods;
- 2) Read seminal papers in transportation planning methods (which you may never need to refer to directly but which you should know);
- 3) Obtain in-depth conceptual knowledge of a selected set of transportation planning methods targeted to urban analysis;
- 4) Have hands-on experience with selected transportation software and research gaps pertaining to these software.

2. Format of Course

Dr. Vonu Thakuriah will teach the course but the participation of students is required to make the course a success. The class will have a limited number of lectures and student participation is expected. Guest lecturers will be invited to enhance the learning experience. Each of the guest speakers has particular expertise on the subject(s) in which they will lecture. Software to be taught should be installed on the student's computer (laptop preferred).

3. Topics Covered and Organization of the Course

Many topics relating to research developments, theories, models and data will be covered in the course:

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| A) Urban transportation demand assessment | F) Network assignment |
| B) Accessibility measurement | G) Traffic flow |
| C) Travel behavior | H) Modeling congestion and tolls |
| D) Air quality and transportation interactions | I) Safety analysis |
| E) Land-use and transportation interactions | J) Program evaluation and impact analysis |

The course will be divided into 2 clusters:

Topic I: Urban Transportation Planning Methods and Simulation; and

Topic II: Network Analysis.

Each cluster will begin with a discussion of the major research questions, chronology/history, data needs and leading modeling approaches. Since there are many ways of doing both, topics (readings, data, software) in both clusters will be organized under two planning questions, which students will have to work through.

Topic I: Identification and assessment of areas in Chicago, which most need transportation, affordable housing and economic development investments.

A. Theoretical Background

1. Classification of Urban Simulation Models
2. Spatial interaction models
3. Random utility models
4. Models of land-use and transportation interactions

B. Tools

1. GIS
2. Multi-criteria Decision Making and SDSS
3. Statistical methods
4. Spatial interaction modeling
5. Accessibility measurement
6. Superdecisions (maybe)

C. Data Needed

D. Applications

1. Indicators of deprivation and need
2. Measurement of accessibility
3. Assessment of travel costs
4. Weighted prioritization of areas

Assignment: One 10-page essay and one application or data exercise

Topic II: Simulate the vehicular traffic environment in order to understand risks to pedestrian vehicle crashes in the River North, Chicago.

A. Theoretical Background

1. Basics of Network Analysis
2. Traffic flow modeling
3. Safety analysis
4. Classification of network analysis models
5. Microsimulation

B. Tools

1. Introduction to EMME 3.1 (tentative; depends on ability to recruit guest lecturer)
2. Corsim

3. Introduction to EPA MOVES Model (tentative)

C. Data needed

D. Applications

1. Model of congested network
2. Measures of effectiveness (travel time, speeds)

Assignment: One 10-page essay and one application or data exercise

3. **Readings** (incomplete)

- 1) Alan Wilson – spatial interaction model
- 2) Sen and Smith – spatial interaction model
- 3) Land-use and transportation Southworth report
- 4) Meyer, Gómez-Ibáñez, Tye and Winston book Essays in Transportation Economics and Policy – chapter on disaggregate random utility models
- 5) Boyce retrospective paper
- 6) Beckman, Winston and McGuire network equilibrium
- 7) Sheffi chapter 1
- 8) JTS special issue on accessibility measures
- 9) Traffic flow theory on monograph on microscopic models