

# Fall 2017 CE 471: Principles of Transportation Engineering

## Sonny Astani Department of Civil and Environmental Engineering

### University of Southern California

This is a 3-unit undergraduate civil engineering course covering the principles of design, planning, operation and control of transportation systems.

## Course Instructor

Ketan Savla, KAP 254A, 213 740 0670, [ksavla@usc.edu](mailto:ksavla@usc.edu).

Office hours: Mondays 5 pm - 6 pm, and Fridays 11 am - noon in KAP 254A, or by appointment.

## Teaching Assistant

Mohammad Motie, [motiesha@usc.edu](mailto:motiesha@usc.edu).

Office hours: Wednesdays 10 am - noon and Thursdays 10 am - noon in KAP 239 (tentative)

## Class location, hours, and website

Lectures will be held Mondays 6:30-9:10 PM in room KAP 148.

The class will use the blackboard website at USC, <https://blackboard.usc.edu/>, as the primary medium for distribution of course material and announcements.

## Prerequisites

Students enrolling in this course are required to have taken a course from MATH 226 or MATH 227 or MATH 229. In addition, prior experience with an introductory course on systems and/or on optimization will be helpful but not required.

## Grading

- 10% Class attendance and participation
- 20% Homeworks  
There will be a total of six homeworks in this course.
- 20% Midterm exam (October 16 2017)
- 20% Class project
- 30% Final exam (December 11 2017)

Students will be graded based on their total scores (possibly relative to the overall class performance) The following is merely a rough guideline, and is subject to revision depending on the overall class performance:

|              |   |
|--------------|---|
| 90 % - 100 % | A |
| 80 % - 89 %  | B |
| 70 % - 79 %  | C |
| 60 % - 69 %  | D |
| <60 %        | F |

## Required textbook

C. S. Papacostas and P. D. Prevedouros, "*Transportation Engineering and Planning*", Third Edition, Prentice Hall, 2001.

## Additional material

Additional material will be posted on the course blackboard website as and when required.

## Class project

The purpose of the class project is to encourage students to explore material related to but outside the material covered in lectures. The process is supposed to get students acquainted with tools for independent study.

Students are required to form groups of 3 each, and select a topic for their project. Each group is expected to make project proposal, interim report, final report and in-class presentation. In each group, students are expected to collaborate to prepare the project proposal, interim report, final report and in-class presentation; however, individual contribution of every student will be tested in the Q & A session following the in-class presentation.

## Important dates for the class project

Project proposal due: October 2, 2017 (via email to the instructor)

Interim report due: November 6, 2017 (via email to the instructor)

In-class project presentation: November 27, 2017

Final report due: December 4, 2017 (via email to the instructor)

## Guidelines and specifications for the class project

**Project topic:** The project topic should be related to the material covered in the class. Each group is then expected to choose papers, book chapters or case studies related to their topic, do independent study and develop new results. A good starting point to search for topics and material for the project is the set of references at the end of chapters in the textbook. New results could be in the form of simulation studies, case studies on data sets, etc.

**Project proposal:** One page document, minimum of 10 pt, single spaced, single column, containing:

1. project topic,
2. names of group members,
3. references to the material that the group plans to cover, and
4. short description of the goals of the project.

**Interim report:** A maximum of 4 page document, minimum of 10 pt, single spaced, single column, containing:

1. project topic,
2. names of group members,
3. review of literature,
4. preliminary results.

**Final report:** A maximum of 8 page document, minimum of 10 pt, single spaced, single column, containing:

1. project topic,
2. names of group members,
3. review of literature,
4. final results and conclusion.

**In-class presentation:** A total of 15 min consisting of a 10-min presentation (maximum of 10 slides) shared between all the group members, followed by a 5 min Q& A session with the instructor, where questions will be asked to every group member about any part of the project.

## Tentative Course Schedule

Note: The course schedule will be regularly updated during the semester by taking into account the progress of the class.

## Statement on Academic Conduct and Support Systems

### Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>. Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://adminopsnet.usc.edu/department/department-public-safety>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The *Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

### Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

| Date   | Topics  | Reading Assignment  | Homework #<br>out | Homework #<br>due |
|--------|---|---|-------------------|-------------------|
| 21 Aug | Introduction, Equations of motion                   | Ch. 1, Ch. 2: sections 2.1 thru 2.3   | 1                 |                   |
| 28 Aug | Human factors, Geometric Design                     | Ch. 2: sections 2.3, 2.4.4, 2.4.5, 2.4.7  |                   |                   |
| 4 Sept | No class - Labor day                                |   |                   |                   |
| 11 Sep | Geometric Design, Traffic Flow Theory               | Ch. 2: section 2.4.9, Ch. 3: sections 3.1 thru 3.4  | 2                 | 1                 |
| 18 Sep | Traffic Flow Theory & Statistics                    | Ch. 3: section 3.4, Ch. 13: sections 13.3 and 13.4  |                   |                   |
| 25 Sep | Traffic Flow Theory & Capacity Analysis             | Ch. 3: sections 3.5, 3.6, Ch. 4: sections 4.3.1, 4.3.2, 4.3.3, 4.4, 4.5.1, 4.5.2, 4.5.3, 4.6.1, 4.6.2 | 3                 | 2                 |
| 2 Oct  | Capacity Analysis                                   | Ch. 4: sections 4.6.3 and 4.6.4   |                   |                   |
| 9 Oct  | Capacity and Level of Service Analysis              | Ch. 4: sections 4.6.6., 4.7.1 and 4.7.2, overview of Ch. 5 and Ch. 6                                  | 4                 | 3                 |
| 16 Oct | Mid-term Exam                                       |   |                   |                   |
| 23 Oct | Trip Generation & Trip Distribution                 | Ch. 8: sections 8.1 and 8.2   |                   |                   |
| 30 Oct | Trip Distribution, Mode Choice & Probability        | Ch. 8: sections 8.2 and 8.3; and Ch. 13: sections 13.1 and 13.2                                       | 5                 | 4                 |
| 6 Nov  | Mode Choice and Trip Assignment                     | Ch. 8: sections 8.3 and 8.4   |                   |                   |
| 13 Nov | Trip Assignment & Wardrop Equilibrium               | Ch. 8: sections 8.5.6 - 8.5.10  | 6                 | 5                 |
| 20 Nov | Demand-Forecasting, and Air Quality & Noise Impacts | Ch. 8: section 8.7; Ch. 10: sections 10.2.4-10.2.5, 10.3.1-10.3.2, 10.4.5                             |                   |                   |
| 27 Nov | Class project presentations                         |   |                   | 6                 |
| 11 Dec | Final exam  |   |                   |                   |