FACULTY OF ENGINEERING AND ARCHITECTURE
AMERICAN UNIVERSITY OF BEIRUT
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CIVE 461 Transportation Engineering & Laboratory **Spring 2012**

I. Instructors: Dr. Youssef Fawaz yf01@aub.edu.lb
Mr. Akram Haroun (Labs) ah104@aub.edu.lb
Mr. Ashraf Abu Ghaida asa47@aub.edu.lb

II. Lectures: Tuesday, Thursday 4:00 - 7:00 pm Room 543
Lab Sessions: Alternate Wednesdays 2:00 - 6:00 pm Room 210 & Field
Problem Sessions: Alternate Wednesdays 2:00 - 3:30 pm Room 210

III. Course Description:

The course introduces Civil Engineering students to the field of Transportation Engineering through presenting the basics of: Traffic Engineering, and Traffic Flow Theory, and Airport Design. The course also encompasses a laboratory component consisting of carefully structured experiments that reinforce students' understanding of the academic concepts and principles.

IV. Prerequisite: None

V. Course Outline: (*tentative - some changes in content and order may be introduced*)

Unit	Topic	Text	References	No. of Weeks
Unit A	Traffic Analysis • Traffic Flow, Speed and Density • Basic Traffic Flow Models • Queuing Theory • Traffic Analysis at Signalized and Unsignalized Intersections	MK Ch 5		Weeks 1 – 4 Feb 15 – Mar 8
Unit B	Level of Service Analysis • LOS determination • Basic freeway segments • Multilane highways • Two Lanes rural highways	MK Ch 6	HCM 20-23	Weeks 5- 8 Mar 13 – Apr 5
Unit C	Traffic Analysis at Signalized Intersections • Basic concepts and definitions • Analysis using D/D/1 queuing • Optimal traffic signal timing • Development of a traffic signal timing plan	MK Ch7	HCM 16	Weeks 9-10 Apr 10 – Apr 19
Unit D	Macroscopic & Microscopic Traffic Flow Relations • Greenshield & Greenberg models • Two-fluid model of town traffic • Car following models	Notes		Weeks 11- 12 Apr 24 – May 3
Unit E	Planning and Design of Airport Facilities • Airport planning & configuration • Airfield design • Planning & design of terminal areas		HM & dNO	Weeks 13-14 May 8 – May 17

VI. Textbooks and References:

1. [MK] 1. Mannering, Kilareski & Washburn. Principles of Highway Engineering and Traffic Analysis, 4th ed., 2009.
2. [MM] A.S. Murthy and R.H. Mohle, Transportation Engineering Basics, 2nd ed. ASCE (2001)
3. [HCM] Highway Capacity Manual 2000 (HCM 2000): Transportation Research Board, National Research Council, Washington, D.C., 2000.
4. [HM] Horonjeff & Mackelvey. Planning and Design of Airports, 4th ed., 1994.
5. [dNO] de Neufville and Odoni. Airport Systems – Planning, Design, and Management, 2003.
6. [ITE] Manual of Transportation Engineering Studies, Institute of Transportation Engineers, 1994.

VII. Lab Experiments (5 or 6)

1. Application of Poisson process
2. Spot speed studies
3. Gap studies
4. Car following / two-fluid model
5. Turning movement counts / intersection delays
6. LOS & saturation flow rate

VIII. Software: HCS & Synchro

IX. Grading: (*tentative: some adjustments may be introduced*)

Class Participation and Attitude	5%
Lab Sessions and Reports	25%
Midterm	30%
Final Exam **(incl. lab component)**	40%

X. Policy on Late Submission of Lab Reports - A penalty of **10% per day** will be applied.

XI. Guidelines on Academic Integrity (Refer also to guidelines circulated by the Provost on January 5, 2005)

Academic integrity and honesty are central components of a student's education. Ethical conduct maintained in an academic context will be taken eventually into a student's professional career. Academic honesty is essential to a community of scholars searching for and learning to seek the truth. Anything less than total commitment to honesty undermines the efforts of the entire academic community. Both students and faculty are responsible for insuring the academic integrity of the University.

Cheating - Students who use non-permissible written, verbal, or oral assistance, including that obtained from another student during examinations, in course assignments, or on projects, are guilty of cheating. The unauthorized possession or use of examination or course-related material may also constitute cheating. Cheating is essentially fraud. It deceives others and causes them to make an assessment based on a misrepresentation of a student's actual ability or performance. Cheating is a violation of the University's academic regulations and is subject to disciplinary action.

Plagiarism - Plagiarism exists when students claim as their own the work of others. Students who fail to credit properly ideas or materials taken from another, commit plagiarism. Putting your name on a piece of work—any part of which is not yours—constitutes plagiarism, unless that piece is clearly marked and the work from which you have borrowed is fully identified. Plagiarism is a violation of the University's academic regulations and is subject to disciplinary action.

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COURSE OBJECTIVES

1. To introduce students to the basic principles of traffic analysis.
2. To train students in the analysis of signalized intersections including traffic signal timing procedures
3. To train students in Level of Service analysis for different types of highway facilities
4. To introduce students to basic principles in macroscopic and macroscopic traffic modeling
5. To introduce students to basic principles in planning and design of airport facilities
6. To provide students with laboratory (real-world) experience with the properties of transportation systems
7. To familiarize students with the planning of experiments and data collection in the field
8. To train students in the analysis of experimental data and in drawing conclusions from analysis results
9. To encourage effective teamwork and communication skills

COURSE LEARNING OUTCOMES

1. Students shall develop the ability to apply the principles of the principles of basic traffic analysis.
2. Students will demonstrate the ability to analyze the performance of signalized intersections and apply signal timing procedures
3. Students are familiar with performance analysis of highway and freeway facilities
4. Students will demonstrate a basic understanding of macroscopic and macroscopic traffic flow modeling
5. Students are familiar with basic concepts in planning and design of airport facilities
6. Students are familiar with the planning of transportation experiments and data collection in the field
7. Students will demonstrate the ability to analyze experimental data and draw conclusions from experimental results