# King Saud University 2st Semester 1441/42

# College of Engineering

# Civil Engineering Dept.

**CE 436 Traffic Engineering**

Sun.Tues. Thu (9-10) am &Tue (1-2) PM

Location: 1A27, college of Engineering

It’s my pleasure to have you in the Traffic Engineering class! Traffic engineering is concerned with the safety of public, the efficient use of transportation resources, and the mobility of people and goods. Traffic engineers are called on to protect the environment while providing mobility, to preserve a scarce public resource (capacity) while working with others to assure safety and security.

This course gives students in-depth explanations on the Traffic Stream Characteristics, Volume Studies and Characteristics, Speed, Travel Time and Delay Studies, Parking Studies, Accident Studies, Traffic Control Devices, and Intersection Signalization.

هذا المقرر يعطي الطلاب شرح متعمق في خصائص تدفق حركة المرور و دراسة الاحجام المرورية وخصائصها و السرعة ودراسات زمن الرحلة والتأخير ودراسة مواقف السيارات ودراسة الحوادث وأجهزة التحكم المروري واشارة التقاطع.

**Instructor:**

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*Website*: <https://fac.ksu.edu.sa/malmannaa>

**Previous course requirement:**

CE 433 Transportation Systems

**Course objectives**

1.This course focuses on introduction to Traffic Engineering, i.e., study the basic concepts of traffic engineering, stream components and volume studies.

هذا المقرر يركز على مقدمة في هندسة المرور بمعنى دراسة المفاهيم الأساسية لهندسة المرور ومكونات التدفق ودراسات الاحجام المرورية.

2.It, also, studies the application of statistical techniques in traffic engineering, speed, travel time, parking and delay and accident studies.

ايضاً يدرس تطبيق الأساليب الإحصائية في هندسة المرور والسرعة وزمن الرحلة ومواقف السيارات والتأخير ودراسات الحوادث.

3.In addition, the course focuses on control device studies, intersection signalization (fundamental and analysis), arterial design and management system.

كما يركز المقرر في دراسات أجهزة التحكم واشارة التقاطع (الأساسي والتحليل) والتصميم الشرياني ونظام الإدارة.

**Course objectives**

After studying this course, the student is expected to be able to:

1. List, Explain basic concepts and components of Traffic stream.

ذِكر وشرح المفاهيم الأساسية ومكونات التدفق المروري

1. Choose appropriate traffic control device.

اختيار جهاز التحكم المروي المناسب

1. Select modern techniques for traffic management.

اختيار التقنيات الحديثة لإدارة حركة المرور

1. Use the suitable techniques to conduct traffic studies for speed, travel time, delay, accident and parking.

استخدام التقنيات المناسبة لإجراء الدراسات المرورية للسرعة، وزمن الانتقال، والتأخير، والحوادث، ومواقف السيارات

1. Design and analyse intersection signalization. تصميم وتحليل إشارة التقاطع
2. Analyse the observed or collected traffic accident. تحليل المشاهدات أو سجلات الحوادث

المرورية.

**Course Grading**

The final grade for the class will be determined as follows:

|  |  |
| --- | --- |
| **Item** | **Grade (%)** |
| Weekly Quiz | 10 |
| Project | 15 |
| Field trip | 5 |
| Attendance & Participation | 5 |
| Mid-term Exam | 25 |
| Final Exam | 40 |

Note:

1. Your grades will be uploaded to LMS once they’re available.
2. The field trip date will be announced once confirmed.

**Course web page:**

The University’s LMS system (LMS.ksu.edu.sa) will be used to post the course web page. This will give you access to your grades, lecture notes, and course announcements.

**Textbook adopted and supporting references**

|  |  |  |  |
| --- | --- | --- | --- |
| Title of the book | Author's name | Publisher's name | Date of publication |
| **Traffic Engineering** | **William R. McShane, Roger P. Roess and Elena S. Prassas** | **Prentice Hall** | **Latest Edition** |
| Traffic Control Systems Handbook |  | FHWA | 1995 |
| Freeway Traffic Management Handbook |  | FHWA | 1997 |
| Manual on Uniform Traffic Control Devices |  | FHWA | Latest Edition |
| Highway Capacity Manual | Transportation Research Board | Transportation Research Board | Latest Edition |
| INTEGRATION | Volume I&II | Hesham Rakha |  |

**Course Syllabus and Schedule\***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Topic** | **Chapter** | **Reading assignment** | **Recommended problems** |
| **Week1** | Introduction: Course Overview | 1 | 1.1, 1.2, 1.4, 1.5, 1.6 |  |
| **Week2** | Components of the Traffic System: Road Users, Vehicles, Roadway and Control Devices | 2,3,4 | 2.1-2.5,3.1,4.1 | 2-2,2-3,2-4,2-5,2-7 |
| **Week3** | Traffic Stream Characteristics | 5,6 | 5.1-5.4,6.1 | 5-4,5-6,5-7,5-8,5-10,6-2,6-3 |
| **Week4** | Statistics for Traffic Engineers | 7 | 7.1-7.9 | 7-1,7-2,7-3 (a&b) |
| **Week5** | Traffic Data Collection | 8 | 8.1-8.8 | 8-1 |
| **Week6** | Volume Studies and Characteristics | 9 | 9.1-9.4 | 9-3 |
| **Week7** | Speed, Travel Time & Delay Studies | 10 | 10.1-10.5 | 10-1,10-2,10-3,10-5 |
| **Week8** | Traffic Safety Studies | 11 | 11.1-11.7 | 11-1,11-3 |
| **Week9** | Parking Studies |  | 12.1-12.6 | 12.1,12.6 |
| **Week10** | Capacity and LOS Analysis for Freeway | 13,14 | 13.1-13.8,14.1-14.10 | 14-2,14-4,14-5,14-7,14-8 |
| Mid-term Exam: materials covered: ch:1,2,3,4,5,6,7,8,9,10,11,13,14 | | Tuesday,29/7/1441 (24/3/2020) at 12:30 -2:00 PM, | | |
| **Week11** | Traffic Signal Control Overview | 18 19 | 18.1-18.4  19.1-19.6 | 18-1&18-2 |
| **Week12** | Basic Principles of Intersection Signalization | 20 | 20.1-20.6 |  |
| **Week13** | Fundamentals of Signal Timing and Design: Pretimed Signals  Software: INTEGRATION | 21 | 21.1-21.6  Volume I&II | 21-1,21-2,21-3 |
| **Week14** | Analysis of Signalized Intersections | 24 27 | 24.1-24.7  27.1-27.8 | 24.1,24.2 |
| **Week15** | project presentations |  |  |  |
| Final Exam | | Sunday, 8/10/1441,1-4 PM, (tentative) | | |

\*Based the course’s textbook

**Mid-term Exam**

Tuesday,29/7/1441 (24/3/2020) at 12:30 PM to 2:00 PM

**Class attendance**

Attendance will be taken every class at the beginning of the lecture, from the first week until the last day of the semester. Coming late will be counted as half attendance (Note: you will be absent if you’re late by more than 15 min). If needed, you can leave the class but must be back with 5 min. The absence percentage (including the tutorials) will be reported electronically to the Vice dean as it is. Only absence with an excuse will be excluded on the condition of fulfilling the following:

* Has a valid reason. If medical, then it has to be registered on [Seha platform](https://www.seha.sa/Home/SickLeave).
* The excuse is given to the instructor within one weeks from the absent day.

You can check out your attendance electronically by visiting this Google Spreadsheet.

**Project**

The project will be assigned in the fourth week of classes. It will be a group effort by groups of two/three students. The project report is due on Thursday 8/29/1441 (23/4/2020). The presentation will be during the week of 3-7/9/1441 (26-30/4/2020) (tentative).The details will be announced during the semester.