



Ministry of Higher Education and Scientific research

Erbil Polytechnic University

Technical Engineering College/Erbil

Highway Engineering Department

**Subject: Traffic Engineering and Transportation
Engineering**

Course Book for 3rd Academic Year

Lecturer's name: Grdamand J. Mohammed

M.Sc. Academic Year: 2023/2024

Course Book

1. Course name	Traffic Engineering and Transportation Engineering
2. Lecturer in charge	Grdamand J. Mohammed
3. Department/ College	Highway Engineering Department.
4. Contact	e-mail: Grdamand.mohammed@epu.edu.iq
5. Time (in hours) per week	Theory: 4 Hours Practical: 0 Hours
6. Office hours	2 days per week (Tuesday and Tuesday) from 8:30 to 1:30
7. Course code	TTE 601
8. Teacher's academic profile	BSc in civil Engineering at technical Engineering college/Erbil(2009) MSc in General civil engineering at Nottingham University-UK (2014)
9. Keywords	Traffic, Transportation, Operation, Design
10. Course overview:	<p>Traffic engineering is a branch of civil engineering that uses engineering techniques to achieve the safe and efficient movement of people and goods on roadways. It focuses mainly on research for safe and efficient traffic flow, such as road geometry, sidewalks and crosswalks, cycling infrastructure, traffic signs, road surface markings and traffic lights. Traffic engineering deals with the functional part of transportation system, except the infrastructures provided. The knowledge and skills that you will learn in this module will enable you to be able to work as a traffic engineer.</p>
11. Course objective:	<p>To introduce fundamental knowledge of traffic engineering so that students can understand and be able to deal with traffic issues including safety, planning, design, operation and control. Students will learn and be able to use software such as Highway Capacity Software and Synchro in traffic engineering projects.</p>
12. Student's obligation	<p>a. To attend the classes regularly with minimum absence. b. To participate actively in the class discussion and Q&A session c. Study on daily basis to digest the class material d. To write note off-handouts</p>

- e. Prepared for sudden Quizzes
- f. Vet through the references provided by the lecturer and to solve as much as possible of homework and exercises for the subjective materials.
- g. Prepare the assignment and the seminar as instructed by the lecturer.

13. Forms of teaching

1. A handout will be given to the students
2. All lectures by PowerPoint
3. Notes and questions are explained on white board.
4. Videos will be played during the lectures.

14. Assessment scheme

1. Two exams will be held in the January and May.
2. Theoretical Exam each season.
3. Quiz and activities in class.

15. Student learning outcome:

Students who successfully complete this course will be able to:

1. Use statistical concepts and applications in traffic engineering.
2. Identify traffic stream characteristics.
3. Understand elements of highway safety and approaches to accident Studies.
4. Design a pre-timed signalized intersection, and determine the signal splits.
5. Design an actuated signalized intersection.
6. Identify level of services for arterials.
7. Utilize modern software tools (HCS and Syncro) for network representation and traffic simulation.
8. Utilize modern software tools to estimate traffic measures such as delay and LOS for signalized and unsignalized intersections.
9. Understand, conduct and interpret data for traffic simulation experiments.
10. Understand the contemporary issues related to the use of advanced technology in traffic modeling and control.
11. Design transportation related project in a team of two or three students and submits a final report.
12. Understand Warrants and ability to use them to evaluate intersections.

16. Course Reading List and References:

- Key references:
 1. Kadiyali, L.R. `Traffic Engineering and Transport Planning', Khanna Publishers.
 2. Drew, D.R. `Traffic Flow Theory and Control', McGraw Hill Book Co.
 3. IRC and IS Publications.
 4. Institute of Transportation Engineers, `Manual of Transportation Engineering Studies', Prentice Hall
 5. JotinKhisty and B. Kent Lall "Transportation Engineering –An Introduction- PHI,

New Delhi, 3rd Indian Edition, 2006

6. Khanna and Justo, 'Text book of Highway Engineering', Nemchand Brothers, Roorkee, 2000.
7. Papacostas, C.A., 'Fundamentals of Transportation Engineering', Prentice-Hall of India Private Limited, New Delhi, 2000.
8. William R. McShane and Roger P. Roess, 'Traffic Engineering', Prentice hall, New Jersey, 2000.
9. Hutchinson, B.G., 'Principles of Urban Transport System Planning' - McGraw Hill Book Co., London, UK, 1982.
10. Institute of Traffic Engineers - 'An Introduction to Highway Transportation Engineering' New York., 1982
11. www.itsa.com
12. www.msrdc.org
13. www.itsindia.org
14. ITS Online @ www.itsonline.com

17. The Topics:	Lecturer's name
<p>Introduction:</p> <ul style="list-style-type: none">• Components of road traffic - the vehicle,• Driver and road.• Objectives and scope of traffic engineering. <p>Traffic Engineering:</p> <ul style="list-style-type: none">• Road user characteristics;• Human and vehicle characteristics,• Factors affecting road traffic;• Methods of measurement.• Concepts of passenger car units for mixed traffic flow. <p>Traffic Engineering Studies and Analysis:</p> <ul style="list-style-type: none">• Sampling in traffic studies;• Adequacy of sample size;• Application of sampling methods for traffic studies,• objectives, methods of traffic study, equipment, data collection, analysis and interpretation (including case studies) of:<ul style="list-style-type: none">(i) Spot speed(ii) Speed and delay(iii) Volume(iv) Origin - destination	

(v) Parking .

- Application in intersection design.

Traffic Regulations and Control:

- General regulations;
- Regulations on Vehicles,
- Drivers and flow; Other regulations and control.
- Traffic management;
- Noise and air pollution due to road traffic and method of control.

Traffic Control Devices:

- Traffic signs,
- Markings,
- Islands and signals.
- Different methods of signal design; redesign of existing signal including case studies.
- Signal system and co-ordination. Evaluation and design of road lighting.

Transport Planning Contents

Land use and Transportation System :

- Introduction-Urban system Components-Concepts and definitions-Criteria for measuring urban sprawl— Location theory-urban growth or decline

Transportation Planning Process:

- Introduction-Definition-Factors to be considered;
- Land use transportation planning;
- systems approach-Stages Inventory of Existing Conditions-Difficulties in implementation.

Transport Surveys :

- Basic Movements- Study Area-Zones-Surveys- Planning of different types of surveys and interpretation,
- Travel demand;
- Traffic surveys for mass transit system planning.-

Trip Generation and Distribution:

- Factors governing trip generation and attraction – Application of Regression Analysis- Methods of trip distribution; Growth and Synthetic Models- Calibration and Application of gravity model.- Category analysis. Problems

<p>Modal Split and Assignment:</p> <ul style="list-style-type: none"> • Factors affecting modal split; Modal split in transport planning; Principles of traffic assignment; assignment techniques. Problems <p>Land Use Models –</p> <ul style="list-style-type: none"> • Lowry Model-Hansen’s Accessibility Model-Density Saturation Gradient Model-Problems (Exception Lowry Model) <p>Mass Transit Systems : Types- Capacity, Fleet planning and Scheduling</p>	
<p>18. Practical Topics (If there is any)</p>	
<p>no</p>	
<p>19. Examinations:</p> <p>Theory:</p> <p>Exam papers usually contain 4 or 5 questions on question about %30 is about theoretical lectures the rest are computational questions.</p>	
<p>20. Extra notes:</p> <p>no</p>	