

**THE UNIVERSITY OF ZAMBIA**

**SCHOOL OF ENGINEERING**

**DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**CEE 4612 – HIGHWAY AND TRAFFIC ENGINEERING**

2019 Academic Year Semester 2

Lectures: 4 Hours Per Week

**Course Objectives:**

This course equips students with knowledge of highway engineering which is of paramount importance in ensuring high quality and long-term performance of roads and highways

**Learning Outcomes:**

Graduates from Civil Engineering will be expected to participate in the design, construction and maintenance of roads and highways

**Prerequisites for the Course:**

None

**Course Outline:**

*Table 1: Course outline and schedule for lectures*

Week	Topic	Brief Description
1	<b><i>General Introduction to Highway and Traffic Engineering</i></b>	Overview, Importance of Roadways, Road Classification, Cross sectional Elements, General Pavement Types and Structure
1	<b><i>Components of a Highway System</i></b>	Driver, Vehicle, and Road Characteristics: The Human Response Process, Pedestrians and Cyclists, Braking Distance of Vehicles, Minimum Curvature of a Horizontal Curve, Sight Distance, etc
2	<b><i>Traffic Engineering Studies</i></b>	Spot Speed, Volume, Travel Time and Delay, Parking
3	<b><i>Highway Safety</i></b>	Issues Involved in Transportation Safety, Strategic Highway Safety Plans, Effectiveness of Safety Design Features
4,5	<b><i>Intersection Design &amp; Control</i></b>	Types of Intersections, Design Principles for At-Grade Intersections, Sight Distance at Intersections, Conflict Points at Intersections, Signal Timing
6,7	<b><i>Highway Capacity &amp; LOS</i></b>	Traffic Flow Elements, Fundamental Diagram of Flow, Two-Lane Highways, Multilane Highways, Basic Freeway Sections
<b>Week 8: Mid-Term Test</b>		
9,10	<b><i>Highway Location, Geometric Design, and Highway Drainage</i></b>	Highway Location, Cross-Section Elements, Vertical Alignment, Horizontal Alignment, Design Consistency
11, 12	<b><i>Highway Materials</i></b>	Soil characteristics, types and methods of soil classification, compaction and drainage characteristics of soils, soil stabilization, types of roadway surfacings, bituminous materials, Superpave Asphalt Binder Grading System, Asphalt Concrete, Asphalt Concrete Mix Design
13, 14	<b><i>Structural Design of Pavement Layers</i></b>	Flexible Pavement and their Design Methods, Rigid Pavements and their Design Methods, Mechanistic-Empirical Pavement Design. Design of surface and sub-surface drainage
15	<b><i>Pavement Maintenance &amp; Rehabilitation</i></b>	Pavement Evaluation, Maintenance and Rehabilitation Techniques

Table 2: Schedule for Labs, Assignments, and Quizzes

Week	Lab Title	Assignments	Quizzes
1			
2	TBA		1
3	TBA	1	
4	TBA		2
6	TBA	2	
7	TBA		3
<b>Week 8 – Mid-Term</b>			
9	TBA		
10	TBA	3	4
11	TBA		
12	TBA	4	5
13	TBA		
14	TBA	5	6
15	TBA		

### Assessment:

**Continuous Assessment = 40**

**Exam = 60**

Component of Assessment	Contribution towards overall grading (%)
Assignments	5
Quizzes	10
Laboratory/Field Sessions	5
Midterm Test	20
Final Examination	60
<b>Total</b>	<b>100</b>

### Reference Material:

#### 1. Prescribed Books

- Cartlidge Duncan, Quantity Surveyor's Pocket Book, 3rd Ed, 2017
- Garber, N. J., & Hoel, L. A. (2014). Traffic and highway engineering. Cengage Learning.
- Mamlouk, M. S., & Zaniewski, J. P., Materials for civil and construction engineers 2006.
- Neil J and Dhir, R. K, Civil Engineering Materials, 1997.
- O' Flaherty C.A., Highways: The Location, Design, Construction and maintenance of Pavements, Fourth Edition, 2002, Butterworth-Heinemann. ISBN 13: 9780750650908

#### 2. Recommended Books

- American Association of State Highway and Transportation Officials (AASHTO). 2011. A Policy on Geometric Design of Highways and Streets. Washington, D.C.
- Gichaga, FJ and Parker, NA, Essential of Highway engineering with Reference to warm climates, ANSTI Technology Series, Macmillan Publishers, ISBN 0-333-44856-1, 1988

- Mallick R.B. and El-Khorci T., Pavement Engineering: Principles and Practice, 2009, CRC Press. SBN-13: 9781439870358

### **Software**

- Civil 3D
- IHSDM
- GIS
- SAS

### **Course Lecturer:**

Lecturer 1: Mr. L.H. Kamisa  
Room 202  
School of Engineering Main Building  
Email: [Luckson.kamisa@unza.zm](mailto:Luckson.kamisa@unza.zm)  
Office Hours: Mondays from 10:00 -12:00 hours

### **Important Notes:**

1. Assignments and Labs are due one week from the day it is issued or done
2. Labs can be done in groups of three people maximum (Not Assignments!!!)
3. Copied Assignments and Labs will get Zero!!!!
4. If you do not attend the lab session, do not submit a lab report

**“We are engineers, we are worth what we know!!!”**  
**Therefore,**  
**“Study to be accomplished, not to be affluent!!!!”**