	Class 38	Various methods of determining centre or locus of slip surface.	
	Class 39	Ground Improvement Methods Soil Stabilization and Preloading	
Week 14			
	Class 40	Simplified Bishop method of stability analysis	
	Class 41	Taylor's chart.in analyzing stability of slopes.	
	Class 42	Ground Improvement Methods SCP and Stone Columns	

ASSESSMENT STRATEGY

Components		Grading	CO	Bloom's Taxonomy
Continuous Assessment (40%)	Class Test/ Assignment (1-3)	20%	CO1, CO4	C1,C2
	Class Participation	5%	CO2	C2
	Mid Term	15%	CO2, CO3	C2,C3
Final Exam		60%	CO1	C1, C2
			CO2	C2,C3
			CO3	C2, C3
			CO4	C2, C3, C4
			CO5	C2, C3, C4
Total Marks		100%		

(CO = Course Outcome, C = Cognitive Domain, P = Psychomotor Domain, A = Affective Domain)

REFERENCES BOOKS

1. Foundation Engineering - R.B. Peck, W.E. Hanson and T.H. Thornburn
2. Principles of Foundation Engineering: SI Edition - B.M. Das
3. "Foundation Analysis and Design" by Joseph E. Bowles

REFERENCE SITE

http://www.google.com

COURSE INFORMATION	
Course Code: EWCE 351	Credit Hour: 4.0
Course Title: Transportation Engineering	Contact Hour: 4.0

PRE-REQUISITE

None

CURRICULUM STRUCTURE

Outcome Based Education (OBE)

SYNOPSIS/ RATIONALE

In this course students will be introduced with basic knowledge on transportation modes and system, geometric design of high ways and traffic engineering. Student will be further exposed to intelligent transportation system and traffic impact assessment which will be useful in later semesters and also in professional life.

OBJECTIVE

1. To acquire knowledge on geometric design of highways.
2. To orient with road traffic systems including fundamentals of traffic engineering.
3. To understand basics of transport planning.
4. To get acquainted with Intelligent Transportation System (ITS) and Traffic Impact Assessment (TIA).

COURSE OUTCOMES & GENERIC SKILLS

No	Course Outcome	Corresponding POs	Bloom's Taxonomy*	CP	CA	KP	Assessment Methods
CO1	Explore the problems related to different geometric features of the highways including finding solutions to common challenges encountered.	PO – 1,5	C2	3		1	T, M, F
CO2	Forecast travel demands using contemporary methods for effective transportation planning.	PO – 2	C3	2,5		2,5	As g
CO3	Analyze traffic characteristics and flow parameters. They will also be able to plan and design two phase traffic signal, road sign, marking and street lighting.	PO – 1,3	C2	3		1	T, M. F
CO4	Investigate road traffic accident.	PO – 2,4	C4	1,4, 7		4,5	Pr
CO5	Have clear idea about different tools and functioning of ITS. They will also know the procedures for conducting TIA.	PO - 1	C2			1	M, F

**Level of Bloom's Taxonomy:*

C1 - Remember | C2 - Understand | C3 - Apply | C4 - Analyze | C5 - Evaluate | C6 - Create

(CP – Complex Problems, CA – Complex Activities, KP – Knowledge Profile, T – Test, PR – Project, Q – Quiz, M – Mid Term Exam, Asg – Assignment, Pr – Presentation, R – Report, F – Final Exam)

COURSE CONTENT

Transport planning, concepts, scope and hierarchy, process, goals and objectives. Socio-economic activities, land use-transport interaction, travel demand forecasting, Transportation system of Bangladesh. Geometrical design of highways, cross-section elements, curves and sight distances,

Pavement types, materials, functions and design, Traffic engineering: fundamentals of traffic engineering, vehicle and traffic characteristics, traffic control devices and systems, Intelligent transportation system.

SKILL MAPPING (CO – PO MAPPING)

No	Course Outcome	PROGRAM OUTCOMES (POs)											
		1	2	3	4	5	6	7	8	9	10	11	12
CO1	Explore the problems related to different geometric features of the highways including finding solutions to common challenges encountered.	3				1							
CO2	Forecast travel demands using contemporary methods for effective transportation planning.		2										
CO3	Analyze traffic characteristics and flow parameters. They will also be able to plan and design two phase traffic signal, road sign, marking and street lighting.	3		1									
CO4	Investigate road traffic accident.		3		3								
CO5	Have clear idea about different tools and functioning of ITS. They will also know the procedures for conducting TIA.	2											

(Numerical method used for mapping which indicates 3 as high, 2 as medium and 1 as low level of matching)

JUSTIFICATION FOR CO – PO MAPPING

	Mapping	Corresponding Level of Matching	Justifications
	CO1 – PO1	3	Knowledge of mathematics and engineering fundamentals has to be applied to explore the problems related to geometric features and to find solutions to common problems.
	CO1 – PO5	1	In order to identify the problem and probable solutions related to geometric features of roadway, use of various modern equipment (Theodolite, total station, EDM etc) is necessary.
	CO2 – PO2	2	To forecast the travel demand it is necessary to use principles of mathematics and analyze complex problems in real situations.

	CO3 – PO1	3	Knowledge of mathematics and engineering fundamentals has to be applied to explore the problems related to traffic engineering and to find solutions to common problems.
	CO3 – PO3	1	Ability to design complex problems related to various regulatory measures eg. traffic signal, road sign, road markings etc.
	CO4 – PO2	3	Investigation of road traffic accident needs ability to identify and analyze complex engineering problems and also the gamut of transportation knowledge.
	CO4 – PO4	3	Investigation of road traffic accident needs the ability to collect, collate and analyze traffic/accident data and also the ability to investigate complex problems.
	CO5 – PO1	2	Apply the knowledge of mathematics, science and engineering fundamentals.

TEACHING AND LEARNING STRATEGY		
	Teaching and Learning Activities	Engagement (Hours)
	Face-to-face Learning • Lecture • Practical/ Tutorial/ Studio • Student – Centered Learning	56 -- --
	Self- Directed Learning • Non-face-to-face learning • Revision of the previous lecture at home • Preparation for final examination	12 24 63
	Formal Assessment • Continuous Assessment • Final Examination	2 3
	Total	160
TEACHING METHODOLOGY		
	Lecture and Discussion, Problem Based Method	
COURSE SCHEDULE		

		Intended Topics to be Covered	Assessment
Week 1	Class 1	Introduction to traffic engineering	
	Class 2	Road traffic system and its components	

	Class 3	Traffic characteristics, vehicle characteristics and road user characteristics	
	Class 4	Traffic characteristics, vehicle characteristics and road user characteristics	
Week 2	Class 5	Traffic survey and studies	
	Class 6	Traffic volume studies	CT 1
	Class 7	Traffic volume studies	
	Class 8	Traffic speed studies	
Week 3	Class 9	Traffic speed studies	
	Class 10	Traffic delay studies	
	Class 11	Origin destination survey	
	Class 12	Parking studies	
Week 4	Class 13	Traffic Control Devices, traffic signs and road markings	
	Class 14	Traffic Control Devices, traffic signs and road markings	
	Class 15	Traffic signal, types and design	
	Class 16	Traffic signal, types and design	
Week 5	Class 17	Street lighting	
	Class 18	Terminals – Bus and truck terminals	
	Class 19	Elements of Geometric Design and design controls/criteria	
	Class 20	Traffic Elements of highway design and LOS	
Week 6	Class 21	Functional classification of road and road hierarchy	
	Class 22	Roadway cross-section and various elements of a road	
	Class 23	Roadway cross-section and various elements of a road	Mid Term Exam
	Class 24	Sight distances - Passing sight distance and stopping sight distance	
Week 7	Class 25	Sight distances - Passing sight distance and stopping sight distance	
	Class 26	Sight distances - Passing sight distance and stopping sight distance	
	Class 27	Super elevation and its characteristics	
	Class 28	Intersection- Design principle, alignment, classification	
Week 8	Class 29	Intersection- Design principle, alignment, classification	
	Class 30	Grade separation and interchange	CT 2
	Class 31	Grade separation and interchange	
	Class 32	Horizontal alignment and horizontal curves	
Week 9	Class 33	Vertical alignment and vertical curves	
	Class 34	Basic elements of transportation planning and concepts	
	Class 35	Basic elements of transportation planning and concepts	
	Class 36	Scope of transportation planning, goals and	

		objectives	
Week 10	Class 37	Classification of transportation system and functional classification of land transport system	
	Class 38	Socio-economic activities and land use pattern-transport iteration	CT-3
	Class 39	Data collection and travel surveys	
	Class 40	Travel demand forecasting, trip generation, trip distribution and modal split	
Week 11	Class 41	Travel demand forecasting, trip generation, trip distribution and modal split	
	Class 42	Travel demand forecasting, trip generation, trip distribution and modal split	
	Class 43	Transportation system of Bangladesh	
	Class 44	Pavement and its types	
Week 12	Class 45	Function of various pavements	
	Class 46	Materials used in pavement construction	CT 4
	Class 47	Aggregates - classification and properties	
	Class 48	Aggregates - classification and properties	
Week 13	Class 49	Bituminous materials – classification and properties	
	Class 50	Bituminous materials – classification and properties	
	Class 51	Flexible pavement design	
	Class 52	Flexible pavement design	
Week 14	Class 53	Rigid pavement design	
	Class 54	Rigid pavement design	
	Class 55	Intelligent transportation system	
	Class 56	Intelligent transportation system	

ASSESSMENT STRATEGY

Components		Grading	CO	Bloom's Taxonomy
Continuous Assessment (40%)	Class Test/ Assignment (1-4)	20%	CO1, CO2, CO3	C2, C3, C4
	Class Participation	5%	CO 1-5	C1, C2
	Mid Term	15%	CO1, CO3, CO5	C1, C2
Final Exam (60%)		60%	CO 1-5	C1, C2
Total Marks		100%		

(CO = Course Outcome, C = Cognitive Domain, P = Psychomotor Domain, A = Affective Domain)

REFERENCES BOOKS

1. Highway Engineering – Paul H. Wright, 6th Ed.
2. Transportation Engineering and Transport Planning – L.R. Kadiyali
3. Transportation Planning and Traffic Engineering – O'Flaherty

REFERENCE SITE

http://classroom.google.com/...../.....

COURSE INFORMATION	
Course Code: EWCE 352	Credit Hour: 1.5
Course Title: Transportation Engineering Sessional	Contact Hour: 3.0

PRE-REQUISITE

EWCE 351 (Transportation Engineering)

CURRICULUM STRUCTURE

Outcome Based Education (OBE)

SYNOPSIS/ RATIONALE

In this course the students will learn to perform mix design for highway materials and capacity analysis for road traffics, which they can apply professionally.

OBJECTIVE

1. To learn testing of highway materials and mix design
2. To perform analysis on road traffic capacity

COURSE OUTCOMES & GENERIC SKILLS

No	Course Outcome	Corresponding POs	Bloom's Taxonomy*	CP	CA	KP	Assessment Methods
CO 1	Students will be able to design mixture of highway materials	PO – 2,3	C4	1,3		3	Q, R
CO 2	Students will be able to understand the parameters for quality control of highway materials	PO – 1	C2	4		1	Q, R

**Level of Bloom's Taxonomy:*

C1 - Remember C2 - Understand C3 - Apply C4 - Analyze C5 - Evaluate C6 - Create

(CP – Complex Problems, CA – Complex Activities, KP – Knowledge Profile, T – Test, PR – Project, Q – Quiz, M – Mid Term Exam, Asg – Assignment, Pr – Presentation, R – Report, F – Final Exam)

COURSE CONTENT

Testing and quality control of highway materials, bituminous mix design, roadway traffic and capacity analysis.

SKILL MAPPING (CO – PO MAPPING)

No	Course Outcome	PROGRAM OUTCOMES (POs)											
		1	2	3	4	5	6	7	8	9	10	11	12
CO1	Students will be able to design mixture of highway materials		2	3									