CB564 Special Topics In Geotechnical Eng.

COURSE INFORMATION

Prerequisites	Academic Year & Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Laboratory	
CB463	5	9 – 10	2	2	0	3

COURSE AIM

The course aims at building up the student activities directed for the advanced practical topics in geotechnical engineering as well as to the fundamentals of geo-environmental engineering. Through using; communication technologies and skills, engineering technologies, data collection and interpretation, and writing technical reports referring to the relevant literature.

COURSE WEEKLY CONTENTS

1	Soil reinforcement: Reinforced soil properties, elements of a reinforced earth system, design criteria, construction considerations, foundation with soil reinforcement
2	Ground modification: Ground modification concept, need for improvement.Mechanical and chemical techniques of soil stabilization
3	Soil improvement: Foundations on problematic subsurface soil conditions, foundation design precautionsVibro-floatation, sand drain, pre-compression.
4	Mat foundations: Types and usage of mat foundations.Classical design methods.Numerical design method
5	State of unsaturated soil: Suction and potential of soil water, suction regimes and soil-water characteristic curve, material variables
6	State of stress in unsaturated soil: Effective stress, hysterisis in soil-water characteristic curve, representation of stress tensor
7	Shear strength of unsaturated soil: Extended Mohr-Coulomb criterion, shear strength parameters.Capillary cohesion in unsaturated soils, validity of effective stress as a state variable.Effect of suction on lateral earth pressure + Midterm Exam
8	Water flow in unsaturated soils: Hydraulic conductivity function, steady infiltration and evaporation, measurement of hydraulic conductivity.Suction and hydraulic conductivity models
9	Transport of contaminants in the subsurface: Contaminant release, contaminant transport, fate of contaminants in the subsurface
10	Waste treatment methods: Stabilization, solidification, mechanisms, technology, testing, field implementation, design.Case studies.
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12	Land disposal of waste:Landfill operations, site selection, liner collection systems, cover systems.Contaminant transport through landfill barriers, landfill stability, closure and post-closure care
13	Land disposal of waste:Landfill operations, site selection, liner collection systems, cover systems.Contaminant transport through landfill barriers, landfill stability, closure and post-closure care
14	Site remediation: Site characterization, geophysics, boring and sampling, monitoring wells.Geographic information systemSite and subsurface characterization, methodology, planning.
15	Containment: Passive contaminant control systems.Ground water control technologies, active systems

STUDENT GRADING & ASSESSMENT

Weeks	Exams		Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	**20**	**Midterm**	←	10 MARKS To be freely distributed among possible assessments			→	**30**
8 to 12	←			20 MARKS			→	**20**
13 to 15	←			10 MARKS			→	**10**
16 or 17	**40**	**Final**						**40**
Total	**Exams**		**Assign.**	**Quizzes**	**Reports**	**Present.**	**Lab.**	100

REFERENCES

Textbook	Design and Construction, Tomlinson, M., Pearson Education, 2nd Edition, 2008.
Other	Analysis and Design, BOWLES, J. E., McGraw-Hill, New York, 5th Edition., 1996. Design and Construction, TOMLINSON, M. J. and Boorman R., Longman, London, 6th Edition, 1995.