

CIVL 4710 – SOIL SLOPE ENGINEERING

COURSE SYLLABUS

SPRING 2022/23

UNITS [3-0-0:3]

COURSE CREDITS AND FORMAT

TOTAL CREDITS	3
LECTURE (Week 1-13)	Tuesday 3:00 - 5:50pm, Room G003, CYT Building
TUTORIAL	Computational Lab (3207), Use Lecture Time

INSTRUCTOR & TEACHING ASSISTANTS

Instructor:	Dr Jidong ZHAO	Room 4406	Ext: 8481	Email: jzhao@ust.hk
Teaching Assistants	To be confirmed			

COURSE DESCRIPTION

This final-year elective course aims to teach students to apply the fundamental principles of saturated and unsaturated soil mechanics to the analysis and design of slope stability. The course covers slope failure mechanisms, transient seepage analysis, measurement and selection of shear strength parameters, historical and recent methods of slope stability analysis, designs of slope stabilization measures and instrumentation. New components on using computer software for slope stability analysis will also be introduced into the course.

COURSE OUTCOMES

From this course, the students are expected to master the fundamental theories and knowledge in the stability analysis of soil slopes, the failure of which proves to be a recurring natural hazard for both Hong Kong and around the world. They will obtain the various analytical and numerical skills in treating a complicated practical slope problem to evaluate its safety and design proper stabilization measures if they are needed. These skills and knowledge are closely contingent to the practical needs if the students wish to become a geotechnical engineer after graduation.

PREREQUISITE or CONCURRENT

CIVL 3730 – Fundamentals of Geotechnics

CIVL 3740 - Geotechnical Analysis and Design

ASSESSMENT ITEMS AND WEIGHTINGS

Assignments	=	45% (5 x 9%)
Group Project Individual Report	=	45%
Project Presentation & Interview	=	10%

TENTATIVE COURSE CONTENTS & SCHEDULE

1. Introduction (Week 1)
2. Theory of Soil strength (Week 1-2)
3. Methods of slope stability analysis (Week 4-5)
 - * *Tutorial-1*: Use of SLOPE/W for slope stability analysis
4. Transient seepage analysis (Week 6-9)
 - * *Tutorial-2*: Use of SEEP/W & SLOPE/W for slope stability analysis
 - * *Tutorial-3*: Use of SEEP/W & SLOPE/W for slope stability analysis under rainfall infiltration
 - * *Tutorial-4*: Use of SEEP/W & SLOPE/W for slope stability analysis under rapid drawdown
5. Design of slope stabilization measures and soil nailing in loose fills (Week 10)
 - * *Tutorial-5*: Use of SLOPE/W for slope stabilization analysis
6. Field instrumentation & probabilistic approach in slope engineering (Week 11-12)
 - * *Tutorial-6*: Use of other software for slope stability analysis
7. Other special topics on slope engineering (Week 13)

REFERENCES

1. J.M. Duncan, S.G. Wright, *Soil strength and slope stability*, John Wiley & Sons (Imprint: Hoboken, N.J.), 2005. (Online version available @ HKUST library)
2. E.N. Bromhead, *The Stability of Slopes*. Blackie Academic & Professional, 1992.
3. R. Chowdhury, *Slope Analysis*. Elsevier Scientific Publishing, 1978.
4. D. Brunsden, D.B. Prior, *Slope Instability*. John Wiley & Sons, New York, 1984.