School of Civil and Environmental Engineering

Term 1, 2020

CVEN3203 APPLIED GEOTECHNICS AND ENGINEERING GEOLOGY

COURSE DETAILS			
Units of Credit	6		
Contact hours	5 hours per week		
Class	Tues,	2:00 – 4:00	Clancy Aud
	Thurs,	12:00 – 2:00	Clancy Aud
Workshop	Thurs,	2:00 – 4:00 or 4:00 – 6:00	Various
Geology Quiz (Wk7)	Tues,	4:00 – 6:00 or 6:00 – 8:00	Various

Course Coordinator and Lecturer Dr Kurt Douglas Þ•“! š“Î¥•s;,€ÀL¬aæ¬ interaction with the ground surface. Geotechnical Engineers attempt to describe and/or model this interacti efficient design.

So far, you have studied CVEN3202 Soil Mechanics. Therefore, by now you sho engineering classification of soil; how soil behaves under imposed stresses and flows through soil and its effect on engineered structures; and also basic slope sta areas that you have not covered that will be addressed in this course:

(A) How to relate the ‘real-world’ geological environment to your knowledge of ‘clas

(B) How to combine your current knowledge and Part (A) to perform a Geotechnica

Part (A) Engineering Geology

A Geotechnical Engineer must have an understanding not only of engineering prin and the inherent variability and challenges it has for engineering. This cours understanding of geology including how geotechnical materials are formed, wha and how to describe them using engineering and geological terms. It will at understanding of the challenges a geological environment may have for a particu the end of the course you should, for any site and engineering project, be able preliminary geotechnical model for the site that can be used for design or (b) complex geology with Engineering Geologists to again come up with a suitable geo

Part (B) Applied Geotechnics

This part of the course represents the 'final stage' of a Geotechnical project. It will require you to study the conventional methods for the design and analysis of common geotechnical constructions including shallow and deep (pile) foundations and retaining walls. For many of you, this will be your final course in Geotechnical Engineering and we hope you gain an appreciation of some of the complexities of Geotechnical Engineering.

Those, no doubt attractive and highly intelligent students, looking for a demanding and challenging yet very satisfying career will obviously wish to pursue Geotechnical Engineering further. We have a number of Geotechnical electives in final year that will extend your knowledge even further into areas like advanced soil mechanics; applications of computer simulation techniques to geotechnical engineering problems; ground improvement and the design of pavements, tunnels and slopes. Come and talk to us if you want to know more.

As a graduate Geotechnical Engineer, you might expect to work on projects as diversified as: building and bridge foundation design; dam design and construction; road pavement design; slope stability analysis and stabilisation; and tunnel and mine design. Most typically you will do a part-time coursework masters with us

Skills for collaborative and multi-disciplinary work	The parts in Assignment 1 will be performed in groups. From previous experience, groups that receive high marks generally have good collaboration between members.
Skills for effective communication	Assignments are expected to be presented in a professional 'report style' manner (unless stated otherwise)

TEACHING STRATEGIES

The contents of this subject will be presented to you in a number of formats. Each of these are explained below together with our expectations of you.

Lectures: In the first part of the course, formal lectures will be presented to discuss the basic geological principles. As geology is a very visual subject, PowerPoint and video presentations will be used to enhance various aspects of the course. In the second part of the course, the lectures will provide and familiarise you with the design and analysis methods used in engineering practice. Equally important, you will be exposed to the theories on which these methods are based so that you can understand the assumptions and limitations of the methods, and possible modifications. Alternative methods other than those covered in the lectures exist in practice. It is important for a qualified engineer to understand and to critically examine those using fundamental theories.

You are expected to attend all the lectures as they will greatly assist in understanding what is presented in the textbook and lecture notes. The lectures will also be a primary point of communication between the class and us. Further communication will be via your student email and Moodle. It is very important that you frequently check your messages.

Demonstrations/workshops: The demonstrations/workshops in the first half of this subject are used to teach you 'hands-on' rock and mineral description and classification; geological processes, geological mapping and the preparation of preliminary geotechnical models. You will be expected to be present and participate at all workshops, as they will contain material not covered in the lectures. In the second half of the course, the workshops will provide you with the opportunity to discuss the lecture material with your demonstrators and to solve the set workshop

EXPECTED LEARNING OUTCOMES

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies

ASSESSMENT

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. The Final Examination is worth 50% of the Final Mark if class work is included and 100% if class work is not included. The class work is worth 50% of the Final Mark if included. *A mark of at least 40% in the final examTd [(ex)-8 (7P5.7 (i)-24.124 .008 Tw 64f)-41.4 (ia4.048 -1.3 f)3.5 (oo. .8 (h)24.2 (i)-24 (s)7l8 -1.31 T(if)-39.6 ( )24.2 (i)-2*

ASSESSMENT OVERVIEW

Item	Length	Weight	Learning outcomes assessed	Assessment Criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Geology Workshops		5%	1	Satisfactory completion of pre-work and the complete weekly activity during the workshop will receive full marks. Significant partial completion, half marks	In class during Workshops Weeks 1 to 5.		In Workshop
Geology Assignment		25%	1	Part A: You will be assessed on your ability to: create a preliminary geological model; develop a site description and plan; and perform and present geological mapping. Part B: You will be assessed on the poster presentation and quality of your description of your geological observations.	4pm Wednesday 1st April, Week 7		Within 3 weeks of submission
Geology Quiz	1 hour 15 mins	20%	1	Quiz 1 will be closed book and will test your 1			

RELEVANT RESOURCES

Textbooks - Geology

No compulsory text for geology however the following gives a good summary of various engineering geology topics:

Waltham, A. (2009) Foundations of Engineering Geology, 3rd Edition, Spon Press. [E-book Available Online through library]

Other Useful Geotechnical Sources

Journals:

All journals can be found in The University of New South Wales Library (or online via the library resource database – i.e. catalogue).

Australian Geomechanics Journal	PJ624.1513205/3
Canadian Geotechnical Journal	PJ620.19105/1
Engineering Geology: an International Journal.	PJ624.1505/12
Ground Engineering	PJ624.05/91
Journal of Geotechnical and Geoenvironmental Engineering.	PJ624.05/66
Geotechnical and Geological Engineering.	PJ622.05/158
Environmental & Engineering Geoscience.	PJ550/E650
Geotechnique.	PJ624.15105/10
Proc. of the Institution of Civil Engineers. Geotechnical Engineering.	PJ624.05/46
Bulletin of Engineering Geology and the Environment.	PQ624.1505/11
Rock Mechanics and Rock Engineering.	PJ624.1505/7
International Journal of Rock Mechanics and Mining Sciences.	PJ622.05/4

Internet sites:

Many Internet sites exist. Useful links are available in Moodle for many of the lectures. The following are links to some of the main Geotechnical sites:

Australian Geomechanics Society: http://australiangeomechanics.org [Those looking for geotechnical work opportunities should see the 'corporate members' page for a list of geotechnical related companies working in Australia]

SCHOOL PRIZES

Results in this course may contribute to the Geotechnical Engineering Discipline Prize presented at the fourth year dinner. In 2019 the prize was worth $1000 and was sponsored by the geotechnical consultancy Pells Sullivan Meynink.

ACADEMIC ADVICE

(Formerly known as Common School Information)

For information about:

- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations: student.unsw.edu.au/special-consideration
- Solutions to Problems,
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC.

Refer to Academic Advice on the School website available at:

https://www.engineering.unsw.edu.au/civil-engineering/student-resources/policies-procedures

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership