Description: Geomechanics

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
<th>Units</th>
<th>Campus</th>
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<tbody>
<tr>
<td>CIV</td>
<td>2401</td>
<td>66981</td>
<td>2, 2007</td>
<td>ONC</td>
<td>1.00</td>
<td>Toowoomba</td>
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Academic group: FOENS
Academic org: FOES03
Student contribution band: 2
ASCED code: 030911

STAFFING
Examiner: Jim Shiau
Moderator: Mark Porter

RATIONALE

SYNOPSIS
All engineers working with soils must understand the range of techniques available for determining their physical and mechanical properties. In this course, students will be introduced to the basic concepts of soil mechanics that are widely used in the design of Geotechnical engineering problems such as flow nets, soil consolidation, and shear strength of soils. It is also intended that the student will gain competence in the theory and design of slopes, shallow foundations, and retaining walls. The emphasis throughout the course is placed on a practical understanding of these topics.

OBJECTIVES
The course objectives define the student learning outcomes for a course. The assessment item(s) that may be used to assess student achievement of an objective are shown in parenthesis. On completion of this course, students should be able to:

1. explain the nature of soils, physical and plastic properties, compaction and laboratory measurement techniques; (2 Hour Open Examination)
2. describe the concept of effective and total stresses in saturated soils; (2 Hour Open Examination)
3. apply Darcy's Law to simple soil structures and find permeability characteristics from the provided test data; (Assignment 1; 2 Hour Open Examination)
4. employ the procedures involved in constructing flow nets to solve specific problems; (Assignment 1; 2 Hour Open Examination)
5. explain the elastic behaviour of soils; calculate the stress distribution due to external loads, and employ influence charts for calculating vertical pressures; (2 Hour Open Examination)
6. calculate the consolidation settlement under a single footing using the concept of one dimensional consolidation theory; (Assignment 2; 2 Hour Open Examination)
7. calculate elastic settlement under a variety of external loading systems; (Assignment 2; 2 Hour Open Examination)
8. describe the general concept of shear in soil; discuss the Mohr-Coulomb failure criteria and determine the shear strength parameters via laboratory test results; (2 Hour Open Examination)
9. calculate the lateral earth pressure behind gravity walls; (2 Hour Open Examination)
10. determine the factor of safety of simple earth slopes; (2 Hour Open Examination)
11. determine the ultimate bearing capacity of shallow foundations; (2 Hour Open Examination)

TOPICS

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
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<tbody>
<tr>
<td>1. Introduction and Physical Properties of Soils</td>
<td>10.00</td>
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<tr>
<td>2. Effective Stress Concept</td>
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<td>3. Permeability</td>
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<td>4. Flow Nets</td>
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<td>5. Stress Distribution in Soil</td>
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<td>6. Consolidation of Soil</td>
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<td>7. Settlement of Structures</td>
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<td>8. Shear Strength of Soil</td>
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<td>9. Lateral Earth Pressure</td>
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<tr>
<td>10. Stability of Slopes</td>
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<tr>
<td>11. Bearing Capacity of Shallow Foundation</td>
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TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at http://bookshop.usq.edu.au click 'Semester', then enter your 'Course Code' (no spaces).

CIV2401 Geomechanics Study Books, USQ Publication,

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.


**STUDENT WORKLOAD REQUIREMENTS**

<table>
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<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>Directed Study</td>
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</tr>
<tr>
<td>Examinations</td>
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</tr>
<tr>
<td>Lectures</td>
<td>26.00</td>
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<tr>
<td>Private Study</td>
<td>61.00</td>
</tr>
<tr>
<td>Report Writing</td>
<td>20.00</td>
</tr>
<tr>
<td>Tutorials</td>
<td>26.00</td>
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</table>

**ASSESSMENT DETAILS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
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<tbody>
<tr>
<td>ASSIGNMENT 1</td>
<td>100.00</td>
<td>10.00</td>
<td>07 Sep 2007</td>
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<tr>
<td>ASSIGNMENT 2</td>
<td>200.00</td>
<td>20.00</td>
<td>12 Oct 2007</td>
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<td>2 HOUR OPEN EXAMINATION</td>
<td>700.00</td>
<td>70.00</td>
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(see note 1)

**NOTES**

1. Student Administration will advise students of the dates of their examinations during the semester.

**IMPORTANT ASSESSMENT INFORMATION**

1. Attendance requirements:
   It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.

2. Requirements for students to complete each assessment item satisfactorily:
   To satisfactorily complete an individual assessment item a student must achieve at least 50% of the marks or a grade of at least C-. (Depending upon the requirements in Statement 4 below, students may not have to satisfactorily complete each assessment item to receive a passing grade in this course.)

3. Penalties for late submission of required work:
   If students submit assignments after the due date without prior approval then a penalty of 20% of the total marks available for the assignment will apply for each working day late.
4 Requirements for student to be awarded a passing grade in the course:
   To be assured of receiving a passing grade a student must submit all of the assessment
   items and achieve at least 50% of the available marks for each of those items. Should a
   student gain more than 50% of the total weighted marks for the course but fail to achieve
   50% of the available marks for an assessment item, they will be awarded a supplementary
   examination and/or assigned additional work to allow them to demonstrate to the Examiner
   that they have achieved the required standard in the objectives assessed by that assessment
   item.

5 Method used to combine assessment results to attain final grade:
   The final grades for students will be assigned on the basis of the weighted aggregate of
   the marks (or grades) obtained for each of the summative assessment items in the course.

6 Examination information:
   In an Open Examination, candidates may have access to any material during the
   examination except the following: electronic communication devices, bulky materials,
   devices requiring mains power and material likely to disturb other students.

7 Examination period when Deferred/Supplementary examinations will be held:
   Any Deferred or Supplementary examinations for this course will be held during the
   examination period at the end of the semester of the next offering of this course.

8 University Regulations:
   Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10
   Academic Misconduct for further information and to avoid actions which might contravene
   University Regulations. These regulations can be found at the URL
   http://www.usq.edu.au/corporateservices/calendar/part5.htm or in the current USQ
   Handbook.

**ASSESSMENT NOTES**

1 The due date for an assignment is the date by which a student must despatch the assignment
   to the USQ. The onus is on the student to provide proof of the despatch date, if requested
   by the Examiner.

2 Students must retain a copy of each item submitted for assessment. This must be produced
   within five days if required by the Examiner.

3 In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the
   examiner of a course may grant an extension of the due date of an assignment in extenuating
   circumstances.

4 The Faculty will normally only accept assessments that have been written, typed or printed
   on paper-based media.

5 The Faculty will NOT accept submission of assignments by facsimile.

6 Students who do not have regular access to postal services or who are otherwise
   disadvantaged by these regulations may be given special consideration. They should
   contact the examiner of the course to negotiate such special arrangements.

7 In the event that a due date for an assignment falls on a local public holiday in their area,
   such as a Show holiday, the due date for the assignment will be the next day. Students are
   to note on the assignment cover the date of the public holiday for the Examiner's
   convenience.

8 Students who have undertaken all of the required assessments in a course but who have
   failed to meet some of the specified objectives of a course within the normally prescribed
   time may be awarded one of the temporary grades: IM (Incomplete - Make up), IS
   (Incomplete - Supplementary Examination) or ISM (Incomplete -Supplementary
Examination and Make up). A temporary grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.

9 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).