LEcTURER/UNIT CoORDINATOR
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Consultation hours: by appointment

UNIT COnTENT
The unit covers numerical techniques for predicting the bearing capacity of foundations and for designing against collapse of other geotechnical structures including slopes, embankments and retaining structures. Several analytical and numerical approaches used in geotechnical applications are introduced and the finite element method is addressed in detail. Students use prewritten MATLAB functions to assemble their own finite element programs to model a range of geotechnical problems. The advanced topics of non-linear simulations and advanced constitutive models are also included.

EXPECTED OUTCOMES
It is anticipated that students who successfully complete this unit will be able to:

- Understand the role of geotechnical analysis in the design process
- Understand the basis for different methods of analysis including closed form, limit analysis and numerical analysis.
- Formulation of finite element method for linear elastic solids, including:
  - role of shape functions
  - numerical integration,
  - load and displacement boundary conditions
  - generation of geostatic state of soil
- Finite element programming (using MATLAB)
- Particular geotechnical issues
- Non-linear solution schemes
- Triaxial stress space
- Application of finite element method to compute the collapse of geotechnical structures
- Advanced constitutive modelling

ASSESSMENT
Assessment consists of 6 assignments, a mid-semester test and a final examination. The assignments provide continuous assessment and address the skills associated with gaining technical competence and understanding of the finite element method for geotechnical analysis. The assignments, mid-semester test and final examination test students' knowledge of fundamentals and their ability to formulate and solve a range of problems. In addition, regular non-assessed tutorial assignments will be provided, along with solutions.
ASSESSMENT MECHANISM

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Contribution</th>
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<tbody>
<tr>
<td>1 6 assignments based on the lectures worth 5% each</td>
<td>30%</td>
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<tr>
<td>2 1-hour mid-semester test (Semester week 7)</td>
<td>20%</td>
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<td>3 3-hour final examination at the end of semester</td>
<td>50%</td>
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RECOMMENDED READING


IMPORTANT INFORMATION

- No supplementary examinations will be available for the unit
- Unit marks may be scaled in accordance with Faculty policy (see [http://www.ecm.uwa.edu.au/for/students/assess](http://www.ecm.uwa.edu.au/for/students/assess))
- Students should be aware of the University guidelines on Academic Dishonesty (see [http://www.ecm.uwa.edu.au/students/exams/dishonesty](http://www.ecm.uwa.edu.au/students/exams/dishonesty))
- Students should be aware of the Faculty Policy for Appeals (see [http://www.ecm.uwa.edu.au/students/exams](http://www.ecm.uwa.edu.au/students/exams))
- Students should be aware of the Charter of Student Rights (see [http://www.secretariat.uwa.edu.au/home/policies/charter](http://www.secretariat.uwa.edu.au/home/policies/charter))