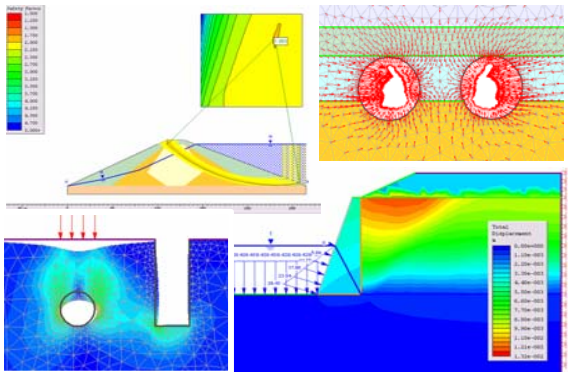
C . I . T . I . E . S .

Introduction to Numerical Analysis for Geotechnical Problems
A TWO Day Short Course at Queen's University

June 21 8:30 – 5:00
June 22 8:30 - 2:00
Meet in Lobby of Ellis Hall
Queen's University
Kingston, Ontario

Need to analyze problems concerning slope stability and reinforcement, shallow tunnels, trenches and embankments?

Gain the background and confidence you need to tackle these problems with commercially available finite element and limit equilibrium software.



This course is made possible with support from Infrastructure Canada.

Course Objectives

This course will provide you with the necessary theory and practical background needed to confidently utilize modern analysis software to achieve practical solutions to geotechnical problems.

This course is intended for engineers and managers who have a background in geotechnique but who have limited experience in the use of numerical codes (finite element, limit equilibrium) to solve problems in geotechnical stability and ground-support interaction.

The course will include a blend of basic modelling theory (only as much as is needed to respect the model !) and hands-on practical application. During the working sessions we will explore the dos and don'ts of model setup and execution, the key concerns related to input quality and model selection, and the promises and pitfalls of model interpretation.

Participants are encouraged to bring one or two problems related to geotechnical stability (construction, rehabilitation, hazard assessment) from their own experience. We will spend part of the time working on modelling solutions to your own problems.

Course Details

Participants in this course will:

- **Learn the foundations of limit equilibrium modelling**
- **Learn the necessary theoretical basics of finite element analysis**
- **Get hands-on experience with industry-standard software tools**
- **Develop an appreciation for the benefits and limitations of numerical analysis**
- **Develop an understanding of model behaviour and input sensitivity**
- **Develop a focused approach to model interpretation**

Lectures, design exercises, and hands-on work will take place in a comfortable, well equipped electronic classroom and laboratory at Queen's. With snacks and lunch provided as part of the course, you will be able to focus on learning and developing skills. All teaching materials will be provided in convenient printed and electronic form for your use during and after the course.

The course practical exercises will make use of the RocScience suite of geotechnical software. You should be familiar with the Windows XP computer operating system.

Course Schedule

Day 1 (8:30 – 5:00)
Introduction to Geotechnical Analysis
Introduction to Modelling (hands on)
Types of Models
Modelling theory
Limit Equilibrium (LE)
Finite Element Analysis (FEM)
Model Comparison – LE (hands on)
Lunch
Model Comparison – FEM (hands on)
Keeping it Simple...
What makes a model tick?
Material Properties (interactive)
Boundary Conditions (interactive)
Model Solution Parameters (interactive)
Model interpretation:
FofS, Limit States, Design Acceptability

Day 2 (8:30 – 2:00)
Getting Complicated:
Water And Reinforcement
Hands on examples:
An Excavated Slope Problem
A Reinforced Embankment Problem
A Shallow Tunnel/Culvert Problem
Run Your Own Problem
Lunch
Q and A during and after Lunch
Wrap-Up.

Please Note: All software and equipment will be supplied. While you are welcome to bring a laptop, we cannot install the course software on personal computers.

Registration Information

To register, please complete and send this form to:

CITIES
***Geo*Engineering Centre**
Queen's University
Ellis Hall, 58 University Avenue
Kingston, ON K7L 3N6

Payment should be made by cheque or major credit card to CITIES, c/o Queen's University. If paying by credit card, please contact James Dykes (below) for payment details.

Name:_____
Organization:_____
Address:_____
City:_____
Province:_____
Postal Code:_____
Email:_____
Telephone:_____ **Fax:**_____

Enclose cheque for registration fees of $ 800 +48.00 (GST) = $ 848.00
Please notify us of GST exempt status.

Note: Refunds will be given up to 14 days before the first day of class. Following this date, fees will be credited to future CITIES courses.

Please inform us of any special dietary requirements.

For More Information Contact:
James Dykes, CITIES Program Manager
Tel: (613) 533-3315, fax: (613) 533-2128
james.dykes@ce.queensu.ca

About the Instructor:

Mark Diederichs, PhD., PEng.
is an associate professor of Geological Engineering at Queen's University. He has been active in geotechnical engineering as a teacher, researcher and consultant for 18 years and has given numerous industry courses on engineering geology and applied geotechnical analysis.

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Course participants are awarded Continuing Education Units under CITIES affiliation with the Engineering Institute of Canada's Participating Partners Program