

本課程已納入  
教青局  
持續進修發展計劃



澳門科技大學  
MACAU UNIVERSITY OF SCIENCE AND TECHNOLOGY

持續教育學院  
School of Continuing Studies

## 岩土工程和斜坡穩定性課程 Geotechnical Engineering and Slope Stability Course

註：此課程已獲「建築、工程及城市規劃專業委員會」（土木工程專業範疇）認可時數 12 小時。

### 專業提昇 Professional Enhancement

- 豐富工程師及建築專業人士在現代的斜坡穩定性設計和管理的實踐。
- 提供參與者有關岩土工程的先進知識和技能，特別是針對石坡及土坡的保護。
- 針對增進工程師的實際執業技能。
- Refresh participants on updated and advanced knowledge and skills geotechnical engineering especially on rock and soil slope protection.
- Enrich professionals' practice on the slope stability design and management.
- Focus on modern "Real Engineering Practice".

### 課程簡介 Course Introduction

課程的宗旨是加深建築專業人士在土壤和岩石力學與斜坡穩定性的技術知識的進展。課程將涵蓋岩土勘測、地下勘探、地質勘測、岩石質量分類、土壤和岩石測試，以評估相關的剪切強度參數，並將提供與土壤和岩石斜坡穩定性的分析，和各種相關的斜坡工程治理方案。The course is specially designed for those who want to widen and deepen their knowledge of latest engineering development on soil and rock mechanics in relation to slope stability. The course will cover a wide range of topics including geotechnical investigation, subsurface exploration, geological survey, rock mass classification, soil and rock testing for the evaluation of related shear strength parameters. Finally the analysis of the stability of slopes for various methods in connection to soil and rock will be provided.

### 課程大綱 Course Outlines

1	地質和水文地質 <b>Geological and Hydrogeology</b> [約 2 小時 about 2 hrs]	初步案頭研究、現場觀察、不同地質構造之間的關係，應用地質研究和水文。 Preliminary desk study, site observations, relation between different geological formations, applied geology studies and hydrology.
2	地球物理地下勘探 <b>Geophysical subsurface exploration</b> [約 2 小時 about 2 hrs]	不同的鑽孔方法，鑽孔測量，螺旋鑽和殼鑽孔，沖洗鑽孔，衝擊鑽孔，旋轉鑽孔，擾動和未擾動樣品和地層剖面。 Different drilling methods, the borehole survey, different boring methods, auger and shell boring, wash boring, percussion boring, rotary boring, disturbed and undisturbed sample and the construction of stratigraphic profiles.
3	地球物理勘探和岩石質量分類 <b>Geophysical survey and Rock mass classification</b> [約 2 小時 about 2 hrs]	岩石和不連續取向測繪的勘探技術，岩體定義，岩體力學特徵，岩體質量分類和強度和變形性參數估計。 Survey techniques of rock and discontinuity orientation mapping, definition of rock mass, rock mass mechanical features, rock mass classification and estimation of strength and deformability parameters.
4	土壤和岩石的剪切強度 <b>Shear strength of soil and rock</b> [約 2 小時 about 2 hrs]	三軸剪切試驗，排水，固結不排水和非固結不排水試驗土壤， $c$ 和 $\phi$ 值評價，錐孔滲透試驗。岩石測試包括點載荷試驗，Brazilian 試驗，Golder Hoek 剪切箱試驗，Robertson 剪切箱試驗，和三軸試驗。 Triaxial Shear test, Drained, Consolidated Undrained and Unconsolidated Undrained test of soil, $c$ and $\phi$ values evaluation, Cone Penetration Test. For rock testing including Point Load Test, Brazilian Test, Golder Hoek Shear Box Test, Robertson Shear Box Test and Triaxial Test.

5	土壤斜坡穩定性分析 <b>Soil slope stability analysis</b> [約 2 小時 about 2 hrs]	極限平衡法，無限斜率的安全係數，斜坡分析法如 Fellenius，Bishop，Janbu，Morgestern & Price。基於實驗室測試的土壤和岩石參數的 $c$ 和 $\phi$ 值的選擇。將討論不同分析方法如數值模擬，有限元，概率分析和 CHASM 模型之間的比較。 Limit equilibrium methods, safety factor of infinite slope, method of slicing for slope analysis such as fellenius, Bishop, Janbu, Morgestern & Price. The selection of soil and rock parameters of $c$ and $\phi$ values based on laboratory testing. Comparison between different analysis methods such as numerical modeling, finite element, probability analysis and CHASM models will be discussed.
6	岩石斜坡穩定性分析 <b>Rock slope stability analysis</b> [約 2 小時 about 2 hrs]	岩石形成，傾角，鑽孔日誌，傾角方向，結構輪廓，接縫方向，岩石斜坡穩定性和坡度修復工程。 Rock formation, Dip angle, Borehole log, Direction of Dip angle, Structure contour, Joint orientation, rock slope stability and slope remedial works.

**教學對象 Target Audience** 執業土木工程師及建築專業人士 Civil Engineers and construction professionals

**授課語言 Medium of Instruction** 以廣東話講授，筆記以英文為主  
 Delivered in Cantonese with notes mainly in English

**報名地點 Venue for Enrollment**

澳門氹仔偉龍馬路澳門科技大學 O 座二樓 O204 室

O204, 2/F Block O, Macau University of Science and Technology, Avenida Wai Long, Taipa, Macau

**上課地點 Venue for Class**

澳門氹仔偉龍馬路澳門科技大學（**確實地點將於確認開課時以手機短訊通知**）

Macau University of Science and Technology, Avenida Wai Long, Taipa, Macau

**上課日期 Course Date & Time**

課程編號 Course code : 1710260168-0	19 <sup>th</sup> & 26 <sup>th</sup> May 2018	週六 Sat 10:00-13:00 & 14:00-17:00	總課時 12 小時 Total 12 hours
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**課程費用 Tuition Fee** MOP 2,400

**收生名額 Class Size** 40

**\* 報名注意事項 Enrollment Notes \***

**報名時間：星期一至五(9:00 - 20:00)、星期六(9:00 - 13:00) [公眾假期除外]**

**Operation hours: Monday to Friday (9:00 – 20:00) ; Saturday (9:00 - 13:00) [Close at Public Holidays]**

- 首次報讀本院短期課程者，請先登入**網上報名系統**（網址：<https://coes-stud.scs.must.edu.mo/oasc/PersonalInfo.do>）或掃描以下的 QR Code，選擇 **<工程學和工程行業>** 類別，預先登記個人資料（不需上傳身份證），填妥資料後，帶備身份證正、副本及相片 1 張至本院辦理報名。

For those who enroll for our courses for the first time, please go to <https://coes-stud.scs.must.edu.mo/oasc/PersonalInfo.do> or scan the QR Code below, choose the category of **<Engineering>**, and input personal information (no need to upload ID copy). After registration online successfully, please come to our school to make payment. You should bring along with your ID card and copy, and a passport size photo.

- 報讀者可以現金/本票或劃線支票（抬頭請寫“澳門科技大學持續教育學院”或“SCHOOL OF CONTINUING STUDIES MACAU UNIV. OF SCIENCE AND TECHNOLOGY”）繳付學費及材料費，**現金收費上限為澳門幣/港幣 5,000 元**。

Tuition fee and materials fee (if any) should be paid by cash or by cheque/Cashier Order (Please make payable to “SCHOOL OF CONTINUING STUDIES MACAU UNIV. OF SCIENCE AND TECHNOLOGY” ). **Cash is accepted for payment of not more than MOP5,000.**

- 所有費用一經繳交，恕不退還（本院取消開辦該課程除外）或轉讓。

All payment made is not refundable (except that the course is cancelled by the School) or transferable.



4. 如課程報名人數不足，本院保留課程取消或延期的權利。

The School reserves the right to cancel or postpone the courses if minimum class size is not reached.

## **查詢 Enquiries**

Tel: 8796 1998      Email: [scs@must.edu.mo](mailto:scs@must.edu.mo)

Website: <http://www.must.edu.mo/scs/diploma-certificate-programs>

持續教育學院致力開拓終身學習機會，如欲收到本學院之課程資料，可發電郵至 [scs@must.edu.mo](mailto:scs@must.edu.mo)，並提供閣下之電郵地址，標題主旨為“加入通知群組”。

The School of Continuing Studies develops life-long learning opportunities. Should you wish to receive information on our programs / courses, please send us an email (to [scs@must.edu.mo](mailto:scs@must.edu.mo)) stating your email address in your email and “Join the mailing list” in the Subject line.

我們亦為機構/政府部門/學校等提供內部培訓，按各機構不同之要求(主題/時間/地點/對象)而訂定培訓內容。請與我們聯絡。

We also offer in-house training for corporations/Government Departments/schools, tailor-made with respect to your choices of topics, time, place, and group of attendees. Please contact us for more information.