



## TEACHING PORTFOLIO

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## 1.0 TEACHING PHILOSOPHY

My task, as a lecturer is to create an atmosphere that fosters learning and that should be of any 21st century educator. I am a lecturer because I have a passion for guiding my students through the learning process. In addition to the passion for the material I present, I tend to encourage learning by creating a relaxed environment for students. Stimulating conversations about concepts being presented and organizing material and equipment in a way that appeals to the learners and makes it easiest to understand. Furthermore, I treat subject matter as interconnected, emphasizing that everything students are learning fits together into a holistic understanding of the world, from which they develop their personal worldview. I also reckon that learning how to find information applies to all areas of life and I use topics and examples that are multidisciplinary. I also believe that respect for my students is one of the most important things I can show. This is to inspire them to respect each other.

In general, students are endowed with many faculties and multiple learning styles: some learn best in lecture atmospheres, some are motivated by discussions while others absorb best when they read and reflect on what they have read. The lecture room setting may stimulate or inhibit learning depending on the dominant learning style of each student. Accommodating various learning styles creates an adequate setting that is conducive to learning. Besides, students take many of their learning habits from the lecturer. If the lecturer does not show interest in the course under study, students themselves are less likely to make effort to learn.

For me, teaching is great fun and challenging. It is a process of trying new approaches and continuously revising to more effectively guide the students. It is a constant reassessment, updating, and adjustment of both the content and presentation, searching for a more effective way to challenge my students to achieve their full potential, to encourage them to thoroughly learn fundamental concepts, and to develop their skills at communication, creative thinking and report writing. It is the joy of seeing the best students excel, seeing the pride of the average student in completing a term project that is longer, more challenging and better crafted than they thought possible, and seeing the satisfaction of the lesser student persevering when they thought they couldn't make it.

As a lecturer, I see myself as a facilitator of learning as well as a motivator because the learning process should be student-centered. I try to set the learning environment as informal, stimulating and creative as possible. Over the years, I have gained confidence, experience through teaching and professional development. I mostly learned from my students' critics and comments to improve my teaching. I continue to look for and develop innovative methods to reach my students.

I always come to class well prepared and organized to make sure that the knowledge I disseminate is correct. I need at least an hour of 'me time' with my own teaching plan and notes because I firmly believe that a disorganized lecture is very distracting to the students. I respect each student as an individual and try to instill in them self-discipline so that they will read the subject matter prior to my lecture and attempt to solve the problems associated with each chapter.

As a lecturer, I believe that I should never stop learning and that by teaching a course, one could learn more and more. I treat each of my courses as an experience from which I, too, can learn something especially ways to teach more effectively with available resources.

## 2.0 TEACHING RESPONSIBILITY

My academic career in UTM begins in 2003 as a tutor. After completing my Master in 2005, I was appointed as a lecturer at Faculty of Civil Engineering (now known as School of Civil Engineering). I was then further my study at PhD level, and completing my PhD study at the University of Leeds, United Kingdom in 2012.

Since then, I was involved with teaching at the undergraduate and postgraduate levels. I mostly teach, yet not limited to the subjects related to geotechnical and rock engineering (Table 1). The level of teaching was from the 1<sup>st</sup> year to the final year students involving between 5 to 7 credits per semester. In each semester, I teach on average two different subjects involving between 60 and 120 students, excluding postgraduate subject which is usually around 5 to 30 students.

**Table 1:** Courses taught from 2012 - 2020

Undergraduate Courses	
SKAA 1012	Fundamentals Engineering
SKAA 2012	Engineering Laboratory
SKAA 2712	Geology and Rock Mechanics
SKAA 4743	Advanced Rock Mechanics and Engineering Geology
SKAB 4042	Integrated Design Project
Post-graduate Courses	
MKAJ 1073	Engineering Rock Mechanics
MKAJ 1063	Geotechnical Earthquake Engineering
MKAJ 1113	Tunnel Engineering
MKAJ 1103	Engineering Geology and Environment

Besides lecturing the mainstream students, I am also involved in teaching at the School of Professional and Continuing Education (UTM SPACE). The students registered under UTM SPACE are matured students that currently working at either government or private bodies in Malaysia. The classes were held during the weekends, at centres across Malaysia.

My preferred teaching theory is Experiential Learning theory. Experiential learning focuses on the idea that the best ways to learn things is by actually having experiences. This will create opportunities for students to have experiences based on the things they are learning, and to ensure that the students take part in the teaching activities and enjoy learning as part of the module.

My other responsibilities include supervision of the undergraduate students, Final Year Project (FYP). My responsibility involves of supervision and facilitation the students. I also evaluate and examine students' theses and presentations at the undergraduate levels. Normally, for every semester, I will supervise between 2 to 4 students. There are 23 undergraduate students who successfully completed their FYP under my supervision since 2012. For FYP project, I encourage my students to explore the field work together some analysis, this practicality will be very useful for their future working environment. By supervising such project work, not only students under my supervision will gain some research knowledge, but also myself as a researcher will benefit in further understanding of the subject in particular, especially those involved with industries.

As an academic, I have a big responsibility to supervise students for their Master and PhD. Table 2 shows a list of my postgraduate students that completed their studies from 2012 till 2020. At postgraduate supervision level, 19 Masters (by Taught) students had graduated with flying colours between 2012 and 2020. For PhD supervision, one student had successfully completed their study between 2016 and 2020, while for Master (by Research), 4 students completed their study with me as the main supervisor (one submitted for examination). Two of my Master students have awarded with the Post Graduate Student Award during their convocation ceremony. Currently, I am supervising 8 PhD students, and there are also some Master students furthered their Ph D study under my supervision.

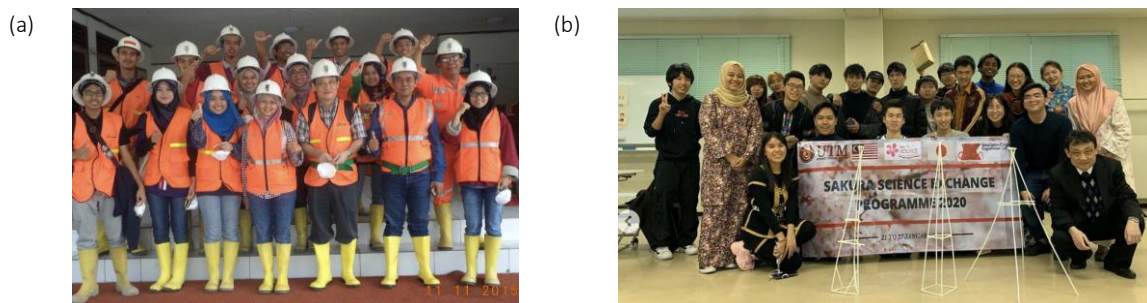
**Table 2:** List of completed Master and PhD students (2012 – 2020)

Oct 2020	Muhammad Irfan bin Shahrin <b>Doctor of Philosophy (Civil Engineering)</b> Thesis Title: Quarry Blast Evaluation System for Rock Fragmentation
March 2016	Sarder Mohammad Yahya <b>M Phil (Civil Engineering)</b> Thesis Title: Analysis of Parameters Affecting Settlement Induced by a Low Overburden Tunnel with Forepoling Pre-support System in Weathered Rock
July 2018	Nor Aziah Ishak <b>M Phil (Civil Engineering)</b> Thesis Title: TBM performance of Sungai Buloh Kajang Line 2
May 2019	Muhammad Junaid <b>M Phil (Civil Engineering)</b> Thesis Title: Effective and Expeditious Multidisciplinary Approach for Feasibility Assessment of Granite Deposit
Oct 2020	Amber Islam <b>M Phil (Civil Engineering)</b> Thesis Title: Structural Health Assessment of Tunnel Lining
Feb 2020	Neesahantani A/P Moganakrisnan <b>M Eng (Civil Engineering)</b> Thesis Title: Correlation Of Uniaxial Compressive Strength Between UCT And Point Load Index of Rock in Klang Valley
Feb 2020	Nalinii Ravichandran <b>M Eng (Civil Engineering)</b> Thesis Title: Determination of K and B During Controlled Blasting For Karstic Limestone Rocks at Klang Valley
May 2019	Karthigeyan s/o Al. Ramanathan <b>M Eng (Civil Engineering)</b> Thesis Title: Effects of quarry blasting towards the residential area at Kangkar Pulai, Johor
May 2019	Nor Shafiqah <b>M Eng (Civil Engineering)</b> Thesis Title: Correlation between point load strength index and uniaxial compressive strength of granite rock samples
June 2018	Rafi Ullah <b>M Eng (Civil Engineering)</b> Thesis Title: Numerical modelling of Forepoles in shallow tunnelling through weathered granite
Jan 2018	Dedy Yusufian Shah <b>M Eng (Civil Engineering)</b> Thesis Title: Slope stability analysis of quarry face at Karang Sambung district, Central Java, Indonesia
Jan 2018	Syed Muhammad Bahthiar Syed Osman <b>M Eng (Civil Engineering)</b> Thesis Title: Fracturing and tensile behaviour of sandstone under Brazilian ring test.

Feb 2017	Nurul Jannah Verankutty <b>M Eng (Civil Engineering)</b> Thesis Title: Finite element modelling of Brazilian ring test
June 2016	Lee She Zan <b>M Eng (Civil Engineering)</b> Thesis Title: Dynamic slope stability analysis during Sabah earthquake.
June 2016	Umar Ali Ahmed <b>M Eng (Civil Engineering)</b> Thesis Title: Particle Image Velocity monitoring of crack propagation in Brazillian test
June 2016	Firas Ahmad Ibrahim <b>M Eng (Civil Engineering)</b> Thesis Title: Numerical simulation of Brazilian test in RS2
June 2016	Hafedz Zakaria <b>M Eng (Civil Engineering)</b> Thesis Title: Prediction of rock engineering properties using Support Vector Machine
June 2016	Hisham Ahamad Hanafiah <b>M Eng (Civil Engineering)</b> Thesis Title: Analysis of group pile movement in PLAXIS
June 2016	Noor Farah Ishak <b>M Eng (Civil Engineering)</b> Thesis Title: Comparison of numerical study in slope stability analysis
Feb 2015	Nurihan Mohd Fauzi <b>M Eng (Civil Engineering)</b> Thesis Title: Behaviour of shale under confinement
Feb 2015	Mohamed Ali Al Bared <b>M Eng (Civil Engineering)</b> Thesis Title: Rock slope stability assessment at Apartment Intan, Cheras
Feb 2015	Chee Khong Siong <b>M Eng (Civil Engineering)</b> Thesis Title: Comparison on the predicted settlement and actual settlement for ground improved using stone column
Feb 2015	Teh Zhi Huan <b>M Eng (Civil Engineering)</b> Thesis Title: Performance of prefabricated vertical drain in soft soil using finite element method
Jan 2014	Lim Eng Soon <b>M Eng (Civil Engineering)</b> Thesis Title: Comparison between RMR and Q-System for support estimation in preliminary design of support system in circular tunnel



Apart from teaching and supervision, I am also appointed as an Academic Advisor to the undergraduate students. During the first week of each semester, I usually meet up with my students by giving some encouragement words and academic advice. I also organised academic visit with my students, for example, with my first cohort students, we participated in Global Outreach Program (GOP) to Bandung, Indonesia, where the students can polish their teamwork and leadership skill when organising the program. Meanwhile, with my second cohort students, we worked together on the proposal and managed to secure the funding from Sakura Science Exchange Program, Japan for an academic visit to Kagoshima, Japan. During the trip, they have learned about the Japanese culture, history and they also visited National Institute of Technology (NIT), Kagoshima and Daiso Company, to gain knowledge on the sustainable construction in Japan. I found that, by organising such activities, other than gaining new knowledge and leadership attribute, we get to know each other closer and they are more willing to share their problems or ideas, Figure 1.



**Figure 1:** Academic visit to (a) Gold Mine in Bongor, Indonesia and (b) PBL activities with NIT students, Kagoshima, Japan

My other responsibility also involve with consultation work. As I have been recognised as Professional Engineer by the Board of Engineers Malaysia (BEM) in 2018, I have been trusted to manage few projects as the Project Leader. Total consultation cost of RM 571,111.00, including project leader and member was registered with UTSB since 2016 (Table 3).

**Table 3:** Involvement of consultation work since 2016

VOT 1600	Kursus Pendek-Rock Engineering Course : Rock Testing, Classification And Slope Analysis Client: Edgenta Environmental & Material Testing Sdn Bhd Cost: RM 6,600.00
VOT 1409	North South Expressway – Structural Asesement for Meru & Menora Tunnels and Principle Investigation at Penang Bridge and Selected Bridges Along North-South Expressway, North South Expressway Central Link and Malaysia Singapore Second Crossing. Client: PLUS. Cost: RM 30,000.00
VOT 1721	Soil Investigation Works For Baleh Hydroelectric Project Client: Geospec Testing Sdn. Bhd. Cost: RM 10,550.00
VOT 1573	Kajian Penyelidikan Kestabilan Cerun Batuan di Bukit Ayam, Pengerang, Johor. Client: Jabatan Kerja Raya. Cost: RM 17,465.00
VOT 1352	North-South Expressway Permanent Stabilization Work for Rock Slope at KM 258.17 Southbound, Section C5 and Bukit Lanjan, Section C4. Client: PLUS Cost: RM 20,000.00
VOT 1279	Pemantauan cerun dan pemasangan peralatan pemantauan gegaran di Logi Rawatan Air Gunung Pulai. Client: Badan Kawal Selian Air Johor (BAKAJ) Cost: RM 457,496.00
VOT 951	Kajian semula geologi, geoteknik dan hidraulogi di persekitaran tadahan Sungai Air Hitam Besar, Gunung Pulai, Kulai Jaya. Client: Jabatan Perhutanan Malaysia. Cost: RM 29,000.00

Other than that, I am very much dedicated my energy and time in UTM to do administration work. Currently, I was appointed as Manager of Professional Development at UTM Academic Leadership (UTMLead) since 2018. I was really honoured to be given the opportunity to lead post, which was aimed to manage the professional development of academic staff, from the recruitment until or after the retirement period. Academic leadership is new to me, but I have learned a lot during that period. Two years' experience in UTMLead was priceless.

Previously, at School of Civil Engineering , I have also served as Program Coordinator for Master of Geotechnics. Here I involved with the preparation of the syllabus and curriculum booklet for the academic programs (COPPA and COPIA) as well as strategic planning for school and departments. From time to time, I was involved as head or committee members for many task forces that focusing on curriculum revision and accreditation, students development, as well as corporate social responsibility programs.

In UTM, I involved in organizing symposiums, conferences and short courses, to name a few; Seminar Pasca-Graduate Kejuruteraan Awam (SEPKA 2106, SEPKA 2018), GEOTROPIKA (held bi-annual) and recently, the Leadership Symposium (Leadsymp) which was held virtually. Additionally, I also was involved in organising the World Tunnelling Conference (WTC), organised by the Institute of Engineer Malaysia (IEM).

In terms of networking, I have established few collaborations with higher learning institution and also industry, locally and internationally (Table 4). I believed, networking is a good platform for the academia to flourish the research work and publication. Meanwhile, the importance of academia-industry linkages has highlighted in the Malaysian Education Blueprint 2015-2025 (Higher Education), where we shall take collaboration between universities and the industry to the next level, as to produce more not only graduates but also research that can leverage on this industry. I also actively contribute as technical committee for Tunnelling and Underground Space Technical Division, IEM and General Secretary of Society for Engineering Geology and Rock Mechanics Malaysia (SEGRM). SEGRM is affiliated to International Society for Rock Mechanics and Rock Engineering (ISRM), and I am the Malaysia representative during the Annual General Meeting, both at International and Asian levels. It was a great experience to sit together and discuss with the expertise in rock engineering field around the world. As I do realise, by actively involved in the societies, we may showcase our expertise and put the UTM name in position. Participating in society also, is a platform for academia to meet with industry. For instance, I have successfully collaborated with the KVMRT and also MRCB-GK for the MRT and LRT2 projects, through the networking that I built up amongst the society.

**Table 4:** List of Collaboration

Name of	Level of Collaboration	Starting Date
MoU with MRCB-GK	Industry/National	Nov 2020*
LoC with Chongqing University, China	Higher Institution/International	2020
LoC with The Ryukyus University, Japan	Higher Institution/International	2019
MoU with National Institute Technology, Japan	Higher Institution/International	2016

\*Proposed signing ceremony was postponed due to Covid-19

With all my teaching experiences in UTM, I feel so honoured to be part of UTM family and this is a beginning for me to bring knowledge and work culture into UTM. I have had enough exposure but I will never stop to give full commitment as I already had the UTM DNA.

### 3.0 TEACHING METHODOLOGY AND STRATEGY

I strongly believe that active learning is an essential component of every class which require students to apply, analyse and evaluate the subject matter rather than just recall of factual material. This is in compliance with the Outcome-Based Education (OBE) system which was implemented in UTM since 2004. The OBE system is also required in the accreditation of a particular programme by the Malaysian Quality Agency (MQA) and Engineering Accreditation Council (EAC). As designed in OBE, the lecturer are becoming more like the moderator to think of:

- What do we want the students to have or be able to do?
- How can we best help students achieve it?
- How will we know whether they students have achieved it?
- How do we close the loop for further improvement (Continuous Quality Improvement (CQI))?

With that, during the first class at each semester, I will table out the OBE for each courses so that the student will have a clear view, what to achieve at the end of the course. I will try to relate each topic with the actual design and construction practices so that student will appreciate of what was being taught instead of learning to pass the exam. Here, I found that, consultation work that I have involved, helped me a lot in updating the recent design and technologies applied in the industries. At this point, I usually show photos or models including several examples to relate them with the current topic. My classroom will have an environment in which all students will be free to ask questions, make suggestions and share opinion.

As a facilitator, it really helps to make the teaching of rock engineering less difficult. Thus, I use the whiteboards as well as on-screen presentation (power-point and video) in my lectures especially if the topic that requires real condition and too difficult or complex to conveniently draw on the board. Previously before UTM e-learning was a mainstream, I handed out hard copies of the power-point slides before class so that the students could use them to take notes. As we are moving towards 4th Industrial Revolution, everything is digitalized and I try to maximize the use of internet and teaching

related applications. Work is faster and convenient as well as less dependable on papers; we can save trees and of course the money. Technology is helping me a lot in my teaching strategies.

As mentioned earlier, my teaching methodology is based on active learning, which consists of a variety of methods including lectures, class discussion, group work and presentations. I try to use simple language to explain concepts and emphasize the applications for the knowledge. I also applied the experimental learning (EXL), in which is the process of learning through experience, and is more specifically defined as "learning through reflection on doing". I also organised the site visit and applied the slope assessment at real slope condition for my students' project (Figure 2). By doing so, the students can experience the actual condition and gain more understanding of what they have learnt in the classroom. I received good reflection from my students, in which they are happy with this method and found that it is very much helpful for them to visualise what they have learnt in the class.



**Figure 2:** Site visit and fieldwork organised for students' project.

To face the challenges, I as a lecturer, I need to keep abreast with the current trend of teaching. A pure face-to-face learning, or a pure online class might not be an effective teaching platform. Thus, a combination of these approaches, or called blended learning, can be an effective teaching platform. Blended learning is an education program that combines online digital media with traditional methods. For an example, I use videos from YouTube to introduce some of the case history of rock

slope failures to the students. The students then were asked to discuss and give their opinions on the topic of the class.

The concept of blended learning and active learning are much discussed in New Academia Learning Innovation (NALI), which is a framework comprising student-centered and blended learning philosophy, multiple learning modes and materials. As UTM is the champion of NALI, I am a proud staff of UTM feel very encouraged to apply blended and active learning concepts in the class. These are much facilitated by the e-learning platform that allows me to upload slides, videos, and assignments. The students may also use the e-learning platform as a forum for discussion, peer-review their classmate's presentations using polls, answering online quizzes, and submitting assignments.

I interact with the class a lot. I posed questions to the class and used them to start discussions. The lecture is flexible enough so as to be able to change according to the pace of the students and I am willing to entertain, in detail, ideas or questions, which arise spontaneously in the classroom. After going through the theoretical part, I would ask the students to solve a few other problems. Students are encouraged to actively participate in class. I also give students

The COVID-19 pandemic has created unexpected challenges in virtually all industries, and education is certainly no exception. While the rapid pivot to a new teaching modality has been difficult for teachers and students alike, I have also viewed it as an opportunity to reconsider my own teaching practices and think critically about the type of classroom environment that I want to create. Though I have my own personal relationship and interests to the course content, I am always mindful that each student enters the classroom—virtual or otherwise—from their own context, goal and limitations. My teaching philosophy has developed around this fact, and the transition to online learning has been an opportunity for me to develop student-centered teaching strategies to best meet their individual needs and expectations.

The new online teaching environment presents the ability for teachers to recreate a classroom environment from the ground up. One of my considerations has been the fact that “active participation” can take on many different forms and may look different for each student. To that end, I have created as many opportunities for student engagement as possible. When choosing the online education format, I will begin with pulling-out the poll on the students’ internet availability. As to ensure that none of my student will be left out, I used hybrid learning model, a combination of both synchronous and asynchronous learnings.

Most online conferencing platforms include tools such as audience polling, break-out groups, hand-raising, or even just the ability for students to leave comments and ask questions via text chat. Rather than endorse one mode of engagement as the preferred format, I encourage students to use whatever method works best for them at any given time, including the WhatsApp Application. While this does cede some of my own control over the classroom environment, this strategy empowers individual students to shape their own experience. It is truly a new skill for me!

Lastly, I always upgraded my knowledge by going to the libraries, surfing the internet and also reading journal. By attending conferences, workshop and seminar, I also updated my knowledge other than building up the networking.



#### 4.0 DESCRIPTION OF COURSE MATERIALS

The description of the course materials (teaching plan) for the selected courses is as the following:

SKAB 2712: Geology and Rock Mechanics (APPENDIX A)

MKAJ 1113: Tunnel Engineering (APPENDIX B)

## 5.0 EFFORT TO IMPROVE TEACHING

I improve my teaching skill by updating myself with the latest information on teaching and learning processes. I have been working really hard for several years to improve my teaching styles based on all remarks from my students. I have found that by remaining flexible and modifying my teaching methods from time to time will creating more enjoyable yet informative situation in class. I will ensure that from time to time, I will be more organised and always in focus with my teaching responsibility. I also urge myself to be more current, creative and critical in my teaching especially when imparting knowledge to my students. I always try my best to find the most effective way to explain a specific topic clearly and precisely. Be familiar in depth of my subject area and I also try hard to identify the best approach to deliver the subject content to my students. Curriculum revisions are performed every semester, in the way by building up the Course Assess Reports. In this report, the performances of the students are assessed, analysed and reflected to find out what are lacked during the course session. Students comments and reviews are taken into account to improve my teaching methods and delivery.

## 6.0 EVALUATION OF TEACHING

Teaching evaluations are available in the UTM e-PPP online system. The students evaluate their lecturers at the end of semester for each course they registered. Table 5 shows the selected teaching evaluation for undergraduate and postgraduate courses, full reports are attached in the APPENDIX C.

**Table 5:** e-PPP evaluation

ePPP evaluation	Undergraduate Course		Post-graduate Course
	SKAA 2712	SKAA 4723	MKAJ 1073
Min Anda	4.39	4.63	4.71
Min Fakulti	4.53	4.54	4.48
Min Universiti	4.54	4.55	4.62
Rank di UTM	P2	P3	P3

The following are some of the comments given by my students.

Senarai Komen Pelajar Subjek SKAB2712

1. good
2. The lecturer is cheerful and active during classes. The ways that the lecturer used to teach are very understandable. The classes are effective and useful.
3. experienced, professional, really like her teaching
4. great lecture

Senarai Komen Pelajar Subjek SKAA4723

1. Good
2. Very good
3. Lecture delivered in a very easy and clear way for student to understand. A very passionate lecturer as well !
4. A very passionate lecturer
5. the way she explained can easily understood
6. All good

## 7.0 PRODUCT OF TEACHING

Sometimes, I received visits from my students who had graduated and achieved success career. I regard this as an intangible product of my teaching. The tangible outcomes from my teaching experiences mostly are publications in a form of research papers, e-proceedings and book chapters. The evidence of students learning also can be demonstrated in terms of students' group assignment/project. From on the assignment and learning theory that I applied, I have took part in the engineering education exhibition as shown in APPENDIX D. Another product of my teaching is letters of recommendation for my students. I have written many such letters for my students to help them obtain scholarships, jobs and admission to universities for further studies. These letters of recommendation show my commitment to help my students.

## 8.0 TEACHING GOALS

My teaching goal is to inspire and promote my students to love learning. For the most part, learning takes place in many different circumstances and contexts. Although everyone is capable of learning, a student's desire to learn is a vital to mastering new concepts, principles and skills.

Continuous improvement and innovation is one of the key steps for education in the 21<sup>st</sup> century, I hope to impart to students that learning is an everlasting process. It includes improving oneself professionally, including me. As I continue to instruct classes, I aim to enhance my ease and confidence in front audiences to develop my way of teaching too. I plan to use different methods and means of presenting information to my classes to have a great learning atmosphere.

### *On-going activities*

- Revising and updating the course notes and assignments every semester.
- Updating this teaching portfolio annually in order to re-evaluate and rejuvenate my teaching philosophy.
- Continue to upgrade methodology in order to give the best to the students.
- Stay current in my discipline by reading the appropriate journals, attending conferences in order to integrate relevant issue into the classroom.
- Continue to upgrade my e-learning materials.
- Continue to produce teaching module for my subjects.
- Review on forthcoming textbooks.

### *Short-term Goals*

- Put hand-outs of courses' slides on the Web so the students have convenient access to them.
- Obtain a constant increase in my teaching evaluations on the overall course.
- Integrate state-of-the-art computer-based teaching presentations for each class that I teach in order to increase students' understanding.

- Joint-preparation of textbooks with other lecturers teaching the same course.

#### *Long-term Goals*

- Produce Micro-Credential for the course that I teach.
- Set up a MOOC for Rock Engineering course.

*APPENDIX A:*

*COURSE INFORMATION GEOLOGY & ROCK MECHANICS (SKAB 2712)*


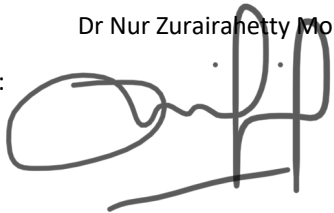
## COURSE INFORMATION

<b>School/Faculty:</b>	Civil Engineering	<b>Page:</b>	1 of 5
<b>Program name:</b>	Bachelor of Engineering (Civil)		
<b>Course code:</b>	SKAB 2712	<b>Academic Session/Semester:</b>	2017/2018/1
<b>Course name:</b>	Geology and Rock Mechanics	<b>Pre/co requisite (course name and code, if applicable):</b>	SKAB 1713
<b>Credit hours:</b>	2		

<b>Course synopsis</b>	This course is designed to enable students to evaluate, to apply and to analyse the relevant geological and rock mechanics principles in designing safe and economical rock engineering structures. In geology, the related topics on rock types/classifications, geological structures and geological processes are taught. Having acquired this knowledge, the principles of rock mechanics are then introduced mainly to highlight the relevance of engineering properties of geological materials in designing rock engineering projects. These principles include engineering properties of rock material, rock discontinuities and rock stabilisation systems. At the end of the course, students should acquire the related knowledge and principles in geology and rock mechanics, and should be able to apply these knowledge and principles in designing safe and economic engineering structures in rock masses.			
<b>Course coordinator (if applicable)</b>	Prof. Dr. Edy Tonnizam Mohamad, <i>P.Geol</i>			
<b>Course lecturer(s)</b>	<b>Name</b>	<b>Office</b>	<b>Contact no.</b>	<b>E-mail</b>
	Prof. Dr. Edy Tonnizam Mohamad, <i>P.Geol</i>	D03-223	Ext 31767	edy@utm.my
	Ir. Dr. Rini Asnida Abdullah	M47-119	Ext 31537	asnida@utm.my

### Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:

No.	CLO	PLO	Weight (%)	T & G Skills <sup>1</sup>	CPS, CEA, KP	T&L methods	Assessment methods <sup>2</sup>
CLO1	<b>Identify</b> the types & classifications of geological materials & structures, and to <b>recognise</b> the relevant principles of geology and rock mechanics that are related to civil engineering activities (knowledge & understanding).	PLO1	50%	C1	WK1	Lecture, active learning	T, F

<b>Prepared by:</b>  Name: Prof. Dr. Edy Tonnizam Mohamad, <i>P.Geol</i>  Signature:  Date:	<b>Certified by:</b>  Name: Dr Nur Zurairahetty Mohd Yunus Signature:  Date:
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<b>School/Faculty:</b>	Civil Engineering	<b>Page:</b>	2 of 5
<b>Program name:</b>	Bachelor of Engineering (Civil)		
<b>Course code:</b>	SKAB 2712	<b>Academic Session/Semester:</b>	2017/2018/1
<b>Course name:</b>	Geology and Rock Mechanics	<b>Pre/co requisite (course name and code, if applicable):</b>	SKAB 1713
<b>Credit hours:</b>	2		

CLO2	<b>Use</b> and <b>apply</b> the relevant principles of geology and rock mechanics in civil engineering construction (application).	PLO2	20%	C3	WK1	Lecture, active learning	T, F
CLO3	<b>Apply</b> and <b>analyse</b> important geological & rock mechanics principles in designing civil engineering structure in rock masses (analysis).	PLO2	20%	C4	WK1	Lecture, active learning	T, F
CLO4	<b>Recognise</b> and <b>evaluate</b> a safe and economical design of civil engineering structures in rock mass (Evaluation).	PLO4	10%	C6, A3	WP1, EA1, WK 8	Problem-based learning	Asg
		Refer <sup>1</sup> Taxonomies of Learning and UTM's Graduate Attributes, where applicable for measurement of outcomes achievement <sup>2</sup> T – Test; Q – Quiz; HW – Homework; Asg – Assignment; PR – Project; Pr – Presentation; F – Final Exam etc.					

#### Details on Innovative T&L practices:

No.	Type	Implementation
1.	Active learning	Conducted through in-class activities
2.	Problem-based learning	Conducted through assignment. Students in a group of 5 are given 1 project for each group with rock mechanics and geology issues such as rock tunnel, rock excavation etc. Students must give their judgement and solutions to the problem. The submission need to be given in the form of written reports.

#### Weekly Schedule:

Week 1	Course introduction. Anatomy of earth. The process related to the formation of earth surface and structures: volcanic, tectonic & gradation processes (sedimentation and erosion).
Week 2	Elements, minerals and composition of rocks. Mode of formation and classification of igneous rocks, and basic rock & mineral identification (Tutorial/lab).
Week 3	Mode of formation and classification of <b>sedimentary rocks</b> , and basic rock & mineral identification (Tutorial/lab). Mode of formation and classification of <b>metamorphic rocks</b> , and basic rock & mineral identification (Tutorial/lab)
Week 4	Brief introduction on basic engineering properties of rock. Relation between engineering properties of rock and construction and design of civil engineering structures.
Week 5	Rock cycle and related processes.

<b>School/Faculty:</b>	Civil Engineering	<b>Page:</b>	3 of 5
<b>Program name:</b>	Bachelor of Engineering (Civil)		
<b>Course code:</b>	SKAB 2712	<b>Academic Session/Semester:</b>	2017/2018/1
<b>Course name:</b>	Geology and Rock Mechanics	<b>Pre/co requisite (course name and code, if applicable):</b>	SKAB 1713
<b>Credit hours:</b>	2		

	Geologic time scale and stratigraphy in construction activities. Geomorphology/geological structures: fold, bedding, joints and faults.
Week 6	Effect of geological structures/discontinuities on construction in rock masses. Geometrical measurement on important components of geological structures; stereo-net projection method.
Week 7	Weathering and Erosion: related processes, agent and their geological environment, process on formation of soil from weathering of rock. Assessment on weathering zone/grade (ISRM method) and its effect on rock properties (grade, strength and permeability). Factors affecting engineering properties of rock mass. <b>TEST 1</b>
<b>Week 8</b>	<b>Mid-Semester Break</b>
Week 9	Introduction to Rock Mechanics. Structures constructed & excavated in rock masses. Scale effect between rock discontinuities and structures being constructed.
Week 10	Rock classification for engineering purposes, elements for classification, elements for the classification. Classification approach: RQD, RMR and Q-system.
Week 11	Common methods for the assessment of rock material and rock mass properties in the laboratory and field. Geological processes and structures associated with <i>in situ</i> stresses in rock. <b>GROUP ASSIGNMENT</b>
Week 12	Loading and deformation of rock masses in the formation geological structures. Loading on rock masses due to civil engineering structures: rock slope, excavation in rock and structure foundation.
Week 13	Basic parameters for the design of rock slope and underground excavation: the use of stereonet projection. Reinforcement and support system for unstable rock masses; principles and methods.
Week 14	Common reinforcement and support methods for structures in rock mass. Specific rock stabilization methods: rock bolt, dowel, grouting/shotcrete, wire-mesh, drainage systems.
Week 15	Criteria for selecting suitable stabilisation methods. Selection based on mode of instability, discontinuities, rock types and state of weathering.
<b>Week 16</b>	<b>STUDY WEEK AND FINAL EXAM</b>

**Transferable skills (generic skills learned in course of study which can be useful and utilised in other settings):**

Team working  
Written communication

<b>School/Faculty:</b>	Civil Engineering	<b>Page:</b>	4 of 5
<b>Program name:</b>	Bachelor of Engineering (Civil)		
<b>Course code:</b>	SKAB 2712	<b>Academic Session/Semester:</b>	2017/2018/1
<b>Course name:</b>	Geology and Rock Mechanics	<b>Pre/co requisite (course name and code, if applicable):</b>	SKAB 1713
<b>Credit hours:</b>	2		

**Student learning time (SLT) details:**

Distribution of student Learning Time (SLT) Course content outline					Teaching and Learning Activities		TOTAL SLT
	Guided Learning (Face to Face)				Guided Learning Non-Face to Face	Independent Learning Non-Face to face	
CLO	L	T	P	O			
CLO 1	10h			3h	6h	6h	40h
CLO 2	6h			3h	6h	4h	16h
CLO 3	6h			3h	6h	4h	16h
CLO 4	6h			5h	3h	3h	8h
<b>Total SLT</b>	<b>28h</b>			<b>14h</b>	<b>21h</b>	<b>17h</b>	<b>80h</b>

Continuous Assessment		PLO	Percentage	Total SLT
1	Test 1	PLO1 PLO2	25	As in CLO1, CLO2
2	Assignment	PLO4	25	As in CLO4
Final Assessment			Percentage	Total SLT
1	Final Examination	PLO1 PLO2	50	As in CLO1, CLO2, CLO3
<b>Grand Total</b>			<b>100</b>	<b>80h</b>

L: Lecture, T: Tutorial, P: Practical, O: Others

**Special requirement to deliver the course (e.g: software, nursery, computer lab, simulation room):**

Geology and rock mechanics lab

**Learning resources:**

**Text Books:**

A. C. McLean and C.D. Gribble (1980), Geology for Civil Engineers ISBN 0046240024.  
F.G. Bells (1993), Fundamentals of Engineering Geology, ISBN 0408011606.  
B.H.G. Brady and E.T. Brown (1985), Rock Mechanics for Underground Mining, ISBN 0046220046.  
J.A. Hudson (1989), Rock Mechanics Principles in Engineering Practice, ISBN 040803081-X.  
ISRM, (1981) Rock characterisation testing and monitoring, ISRM Suggested method.  
H. R. Perry (1996) Engineering Geology an Environmental Approach, 2nd. Edition, Prentice Hall, ISBN 0-13-177403-4.  
C.M. Christopher (1981) Engineering Geology, Bells & Howell Co. ISBN 0-675-08032-0.

<b>School/Faculty:</b>	Civil Engineering	<b>Page:</b>	5 of 5
<b>Program name:</b>	Bachelor of Engineering (Civil)		
<b>Course code:</b>	SKAB 2712	<b>Academic Session/Semester:</b>	2017/2018/1
<b>Course name:</b>	Geology and Rock Mechanics	<b>Pre/co requisite (course name and code, if applicable):</b>	SKAB 1713
<b>Credit hours:</b>	2		

**Additional Notes:**

Note (power-points) on geology & rock mechanics.

**Online**

<http://elearning.utm.my>

**Academic honesty and plagiarism:**

Assignments are individual tasks and NOT group activities (UNLESS EXPLICITLY INDICATED AS GROUP ACTIVITIES) Copying of work (texts, simulation results etc.) from other students/groups or from other sources is not allowed. Brief quotations are allowed and then only if indicated as such. Existing texts should be reformulated with your own words used to explain what you have read. It is not acceptable to retype existing texts and just acknowledge the source as a reference. Be warned: students who submit copied work will obtain a mark of **zero** for the assignment and disciplinary steps may be taken by the Faculty. It is also unacceptable to do somebody else's work, to lend your work to them or to make your work available to them to copy.

**Other additional information (Course policy, any specific instruction etc.):**

-

**Disclaimer:**

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*APPENDIX B:*

*COURSE INFORMATION TUNNEL ENGINEERING (MKAJ 1113)*

## COURSE INFORMATION

<b>School/ Faculty:</b>	Civil Engineering/Engineering	<b>Page:</b>	1 of 6
<b>Program Name:</b>	Master of Engineering (MEng) (Geotechnics)		
<b>Course code:</b>	MKAJ1113	<b>Academic Session/Semester:</b>	2018/2019
<b>Course name:</b>	Tunnel Engineering	<b>Pre/co requisite (course name and code, if applicable):</b>	Engineering Rock Mechanics (MKAJ1073)
<b>Credit hours:</b>	3		

<b>Course synopsis</b>	<p>This elective course is offered by the Department of Geotechnics and Transportation for Master Engineering. (Geotechnics). The course deals with tunnel construction in ground conditions consisting of common geological materials such as soils, rocks and a mixture of both. The content is tailored to enable the students to acquire essential knowledge on related activities in tunnel construction. The first part of the module aims to equip students with the relevant knowledge on collecting, evaluating and interpreting of ground investigation data which is often complex and variable in nature. These include the important aspects of <i>in situ</i> geological and stress conditions. The second part is to expose the students on the basic design approach on excavation and stabilisation methods, with consideration on the interacting effects of major geological discontinuities and, existing underground and surface structures. The application of finite element software and estimating stress distribution around an excavation is also included in determining the structural integrity of the excavation, and the appropriate reinforcement and support systems to be installed. The final part outlines the strategies for managing the risk on health and safety, and identifies the common hazards encountered in tunnelling and underground work. This course implement experiential learning and generalised blended learning.</p>			
<b>Course coordinator</b>	Ir. Dr. Rini Asnida Abdullah			
<b>Course lecturer(s)</b>	<b>Name</b>	<b>Office</b>	<b>Contact no.</b>	<b>E-mail</b>
	Ir. Dr. Rini Asnida Abdullah	M47-119	Ext 31537	asnida@utm.my
	Dr. Siti Norafida Jusoh	M50	Ext 36858	snorafida@utm.my

<b>Prepared by:</b>	<b>Certified by:</b>
Name: Ir Dr Rini Asnida Abdullah	Name: Dr Nur Zurairahetty Mohd Yunus
Signature: 	Signature: 
Date: 1/8/2018	Date:

<b>School/ Faculty:</b>	Civil Engineering/Engineering	<b>Page:</b>	2 of 6
<b>Program Name:</b>	Master of Engineering (MEng) (Geotechnics)		
<b>Course code:</b>	MKAJ1113	<b>Academic Session/Semester:</b>	2018/2019
<b>Course name:</b>	Tunnel Engineering	<b>Pre/co requisite (course name and code, if applicable):</b>	Engineering Rock Mechanics (MKAJ1073)
<b>Credit hours:</b>	3		

**Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:**

No.	CLO	PLO (Code)	Weightage (%)	*T & G Skills	T&L methods	**Assessment methods
CLO1	To <b>analyse</b> the ground reaction curve and able to comprehensively understand the principle of tunnel design in rock condition, appropriate methods for respective excavation, support and ground improvement.	PLO2	25	C4	Lecture, active learning	T/A/P/Pr/F
CLO2	Understand parameter incorporated in the rock mass classification system and able to <b>evaluate</b> the parameter for suitable support requirement in tunnel.	PLO2	25	C6	Lecture, active learning	T/A/P/Pr/F
CLO3	Able to <b>describe</b> the principles of soil-structure interaction and analyse modes of deformation of tunnels through the use of empirical methods, analytical methods and numerical methods.	PLO1	50	C1	Lecture, active learning	T/A/P/Pr/F

**Details on Innovative T&L practices:**

No.	Type	Implementation
1.	Active learning	Conducted through in-class activities
2.	Generalised blended learning	Conducted through in-class activities.

**Weekly Schedule:**

Week 1	<b>INTRODUCTION</b> Introduction to the course information MKAJ1113: Course learning outcome and assessment method Explanation of the course learning outcome and assessment methods Introduction of tunnel engineering. Type of underground structure: cavern, tunnel History and application of tunnel (ancient tunnel, military tunnel, irrigation) General annotations used in tunnelling
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<b>School/ Faculty:</b>	Civil Engineering/Engineering	<b>Page:</b>	3 of 6
<b>Program Name:</b>	Master of Engineering (MEng) (Geotechnics)		
<b>Course code:</b>	MKAJ1113	<b>Academic Session/Semester:</b>	2018/2019
<b>Course name:</b>	Tunnel Engineering	<b>Pre/co requisite (course name and code, if applicable):</b>	Engineering Rock Mechanics (MKAJ1073)
<b>Credit hours:</b>	3		

Week 2	<b>SITE INVESTIGATION FOR UNDERGROUND STRUCTURE</b> Site investigation methods for tunnels in different ground conditions: BH, geophysical method Geological and hydrogeological condition Evaluate ground conditions and risk assessment
Week 3	<b>UNDERGROUND EXCAVATION IN ROCK</b> Tunnel, shaft, drift and cavern Virgin & regional stress. Geological conditions & stress distribution. 2- & 3-D stress field at depth. Stress distribution in circular single opening in homogeneous rock
Week 4	<b>UNDERGROUND EXCAVATION IN ROCK</b> Construction induced stresses around a tunnel; tangential, radial & shear stresses Stress distribution in Yield Zone and its effect on stability of tunnel Effect of rock mass (discontinuities, strength & weathering) on thickness of yield zone. Minimising and controlling the thickness of yield zone. <b>#ASSIGNMENT 1</b>
Week 5	<b>TUNNELLING IN HARD ROCK</b> Introduction to tunnelling in hard rock, ground problems and behaviour Principle of designing tunnel in rock/hard ground: Ground reaction curve Selection of tunnelling method: TBM, Mechanised, NATM, Shield
Week 6	<b>SUPPORT SYSTEM FOR TUNNELLING IN THE HARD ROCK</b> Pre-support, permanent and temporary support Fore polling, grouting, wire mesh, rock bolt
Week 7	<b>ROCK MASS CLASSIFICATION FOR TUNNEL APPLICATION</b> Types of classification system and parameters incorporated in the system RMR Q-System Support system in the tunnel using Q-system <b>#ASSIGNMENT 2</b>
Week 8	Semester break
Week 9	<b>UNDERGROUND BLASTING</b> Type of blasting Blast design for underground excavation
Week 10	<b>FIELD VISIT TO TUNNEL PROJECT/INDUSTRIAL TALK</b>



<b>School/ Faculty:</b>	Civil Engineering/Engineering	<b>Page:</b>	4 of 6
<b>Program Name:</b>	Master of Engineering (MEng) (Geotechnics)		
<b>Course code:</b>	MKAJ1113	<b>Academic Session/Semester:</b>	2018/2019
<b>Course name:</b>	Tunnel Engineering	<b>Pre/co requisite (course name and code, if applicable):</b>	Engineering Rock Mechanics (MKAJ1073)
<b>Credit hours:</b>	3		

Week 9	<b>TUNNELLING IN SOFT GROUND</b> Revision on the basic soil parameters, soil problems and behaviour Introduction to tunnelling in soft soil, history and function General profile, principal parts and features Principal design and construction requirements
Week 10	<b>TUNNELLING IN SOFT GROUND</b> Tunnel construction methods; classical method, mechanical drilling, cut and cover, shield and boring (TBM), slurry and EPB technology etc, for tunnel in dry soil and immersed tunnel <b>#ASSIGNMENT 3</b>
Week 11	<b>TUNNELLING IN SOFT GROUND</b> Prediction of surface and sub-surface settlements due to tunnelling; longitudinal and transverse Volume lost, $V_L$ , Greenfield, Gaussian distribution Effects on existing underground structures Tunnel lining design
Week 12	<b>NUMERICAL MODELLING FOR TUNNEL</b> Introduction to ABAQUS - Hands-on software
Week 13	<b>INSTRUMENTATION AND MONITORING</b> Introduction to instrumentation for monitoring Understanding concept of monitoring system for underground /deep excavation Interpretation and understanding of the data obtained from Geotechnical Instrumentation
Week 14	<b>HEALTH, SAFETY AND ENVIRONMENT CONSIDERATION</b> Hazard types and safety measures (e.g. Fire, Ventilation, Transport, Machines, Drainage, Safety emergency, Evacuation etc.) Working in confined spaces and compressed air Environmental management on a tunnelling site - noise, dust, vibration, emissions, odours, traffic and other nuisances, waste management, waste water management, ecology and archaeology
Week 15	<b>TUNNEL HEALTH ASSESSMENT AND REHABILITATION</b> Tunnel assessment system (FHWA) Crack, leakage, carbonation Test type and rehabilitation work

**Transferable skills (generic skills learned in course of study which can be useful and utilised in other settings):**

Team working  
Written communication

<b>School/ Faculty:</b>	Civil Engineering/Engineering	<b>Page:</b>	5 of 6
<b>Program Name:</b>	Master of Engineering (MEng) (Geotechnics)		
<b>Course code:</b>	MKAJ1113	<b>Academic Session/Semester:</b>	2018/2019
<b>Course name:</b>	Tunnel Engineering	<b>Pre/co requisite (course name and code, if applicable):</b>	Engineering Rock Mechanics (MKAJ1073)
<b>Credit hours:</b>	3		

#### Student learning time (SLT) details:

Distribution of student Learning Time (SLT) Course content outline					Teaching and Learning Activities		TOTAL SLT
	Guided Learning (Face to Face)				Guided Learning Non-Face to Face	Independent Learning Non-Face to face	
CLO	L	T	P	O			
CLO 1	12h			6h	3h	20h	41h
CLO 2	10h			10h	3h	10h	33h
CLO 3	20h			5h	6h	15h	46h
<b>Total SLT</b>	<b>42h</b>			<b>21h</b>	<b>12h</b>	<b>45h</b>	<b>120h</b>

Continuous Assessment		CLO	Percentage	Total SLT
1	Assignment 1	CLO1	20	(As mention in CLO1)
2	Assignment 2	CLO2	20	(As mention in CLO2)
3	Assignment 3	CLO3	20	(As mention in CLO3)
Final Assessment			Percentage	Total SLT
1	Final Examination	CLO 1, 2 &3	40	2h 30m
<b>Grand Total</b>			<b>100</b>	<b>120h</b>

L: Lecture, T: Tutorial, P: Practical, O: Others

#### Special requirement to deliver the course

(e.g: software, nursery, computer lab, simulation room):

Computer laboratory with ABAQUS, site visit (optional)

#### Learning resources:

##### Text book (if applicable)

1. Gary B. Hemphill, 2013. Practical Tunnel Construction, John Willey & Sons
2. Thomas R. Kuesel, 1996. Tunnel Engineering Handbook 2nd ed. 1996. Kluwer Academic Publisher.
3. Hoek's Corner. Free online library. <https://www.rocksolid.com/learning/hoek-corner>

<b>School/ Faculty:</b>	Civil Engineering/Engineering	<b>Page:</b>	6 of 6
<b>Program Name:</b>	Master of Engineering (MEng) (Geotechnics)		
<b>Course code:</b>	MKAJ1113	<b>Academic Session/Semester:</b>	2018/2019
<b>Course name:</b>	Tunnel Engineering	<b>Pre/co requisite (course name and code, if applicable):</b>	Engineering Rock Mechanics (MKAJ1073)
<b>Credit hours:</b>	3		

**Academic honesty and plagiarism:**

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**Other additional information (Course policy, any specific instruction etc.):**

-

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## *APPENDIX C*

### *e-PPP EVALUATIONS*

**Nama** : RINI ASNIDA BINTI ABDULLAH  
**Fakulti** : 5102-Sekolah Kejuruteraan Awam  
**Subjek** : SKAB2712

5102087

**Seksyen : 02**  
**Laporan Penilaian Pengajaran Pensyarah**  
**Semester 2 Sesi 20192020**

Bil. Responden : 38

Bil. Pelajar Mendaftar : 46

**A. Pengajaran**

Min Anda : 4.38947  
 Min Fakulti : 4.55  
 Min Universiti : 4.55

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.42	0.00	0.00	5.26	47.37	47.37
2	4.39	0.00	0.00	7.89	44.74	47.37
3	4.39	0.00	0.00	5.26	50.00	44.74
4	4.32	0.00	0.00	7.89	52.63	39.47
5	4.42	0.00	0.00	5.26	47.37	47.37

**B. Penyampaian**

Min Anda : 4.39  
 Min Fakulti : 4.53  
 Min Universiti : 4.54

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.34	0.00	0.00	10.53	44.74	44.74
2	4.37	0.00	0.00	5.26	52.63	42.11
3	4.42	0.00	0.00	5.26	47.37	47.37
4	4.42	0.00	0.00	5.26	47.37	47.37
5	4.39	0.00	0.00	5.26	50.00	44.74
6	4.37	0.00	0.00	10.53	42.11	47.37
7	4.42	0.00	0.00	7.89	42.11	50.00

**C. Penilaian**

Min Anda : 4.38  
 Min Fakulti : 4.51  
 Min Universiti : 4.52

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.39	0.00	0.00	7.89	44.74	47.37
2	4.42	0.00	2.63	5.26	39.47	52.63
3	4.39	0.00	0.00	7.89	44.74	47.37
4	4.39	0.00	2.63	5.26	42.11	50.00
5	4.32	0.00	0.00	10.53	47.37	42.11

**D. Hubungan Pensyarah dan Pelajar**

Min Anda : 4.42  
 Min Fakulti : 4.53  
 Min Universiti : 4.56

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.39	0.00	0.00	5.26	50.00	44.74
2	4.47	0.00	0.00	2.63	47.37	50.00
3	4.37	0.00	0.00	7.89	47.37	44.74
4	4.47	0.00	0.00	5.26	42.11	52.63
5	4.39	0.00	0.00	5.26	50.00	44.74

**Statistik Pencapaian Keseluruhan**

Min Anda : 4.39593  
 Min Fakulti : 4.53  
 Min Universiti : 4.54  
 Rank Anda Di UTM : P2

**Catatan :** P1 : Rank <= 20%  
 P2 : 20% < Rank <= 40%  
 P3 : 40% < Rank <= 60%  
 P4 : 60% < Rank <= 80%  
 P5 : Rank > 80%

**Penerapan Kemahiran Generik**

Item	Frekuensi (Peratus)			
	1	2	3	4
1	2.63	10.53	39.47	47.37
2	0.00	7.89	44.74	47.37
3	2.63	2.63	50.00	44.74
4	0.00	7.89	42.11	50.00
5	7.89	5.26	39.47	47.37
6	10.53	10.53	31.58	47.37
7	2.63	2.63	42.11	52.63

**MENU PENGAJAR  
SISTEM PENILAIAN PENGAJARAN PENSYARAH**

Senarai Komen Pelajar Subjek SKAB2712

1. good
2. The lecturer is cheerful and active during classes. The ways that the lecturer used to teach are very understandable. The classes are effective and useful.
3. experienced, professional, really like her teaching
4. great lecture

[ [Keluar Sistem](#) ]

**Nama** : RINI ASNIDA BINTI ABDULLAH  
**Fakulti** : 5102-Sekolah Kejuruteraan Awam  
**Subjek** : SKAA4723

5102056

**Seksyen : 01**  
**Laporan Penilaian Pengajaran Pensyarah**  
**Semester 1 Sesi 20192020**

Bil. Responden : 35

Bil. Pelajar Mendaftar : 39

**A. Pengajaran**

Min Anda : 4.66857  
 Min Fakulti : 4.54  
 Min Universiti : 4.55

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.71	0.00	0.00	2.86	22.86	74.29
2	4.69	0.00	0.00	2.86	25.71	71.43
3	4.77	0.00	0.00	2.86	17.14	80.00
4	4.54	0.00	0.00	5.71	34.29	60.00
5	4.63	0.00	0.00	5.71	25.71	68.57

**B. Penyampaian**

Min Anda : 4.63  
 Min Fakulti : 4.54  
 Min Universiti : 4.55

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.63	0.00	0.00	0.00	37.14	62.86
2	4.69	0.00	0.00	0.00	31.43	68.57
3	4.69	0.00	0.00	0.00	31.43	68.57
4	4.60	0.00	0.00	2.86	34.29	62.86
5	4.69	0.00	0.00	2.86	25.71	71.43
6	4.51	0.00	0.00	8.57	31.43	60.00
7	4.63	0.00	0.00	5.71	25.71	68.57

**C. Penilaian**

Min Anda : 4.56  
 Min Fakulti : 4.52  
 Min Universiti : 4.53

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.57	0.00	0.00	5.71	31.43	62.86
2	4.51	0.00	0.00	5.71	37.14	57.14
3	4.57	0.00	0.00	5.71	31.43	62.86
4	4.57	0.00	0.00	5.71	31.43	62.86
5	4.57	0.00	0.00	8.57	25.71	65.71

**D. Hubungan Pensyarah dan Pelajar**

Min Anda : 4.69  
 Min Fakulti : 4.55  
 Min Universiti : 4.57

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.66	0.00	0.00	2.86	28.57	68.57
2	4.69	0.00	0.00	2.86	25.71	71.43
3	4.69	0.00	0.00	0.00	31.43	68.57
4	4.71	0.00	0.00	0.00	28.57	71.43
5	4.69	0.00	0.00	0.00	31.43	68.57

**Statistik Pencapaian Keseluruhan**

Min Anda : 4.63636  
 Min Fakulti : 4.54  
 Min Universiti : 4.55  
 Rank Anda Di UTM : P3

**Catatan :** P1 : Rank <= 20%  
 P2 : 20% < Rank <= 40%  
 P3 : 40% < Rank <= 60%  
 P4 : 60% < Rank <= 80%  
 P5 : Rank > 80%

**Penerapan Kemahiran Generik**

Item	Frekuensi (Peratus)			
	1	2	3	4
1	0.00	2.86	45.71	51.43
2	0.00	2.86	42.86	54.29
3	0.00	0.00	42.86	57.14
4	0.00	2.86	40.00	57.14
5	0.00	5.71	34.29	60.00
6	2.86	5.71	45.71	45.71
7	0.00	2.86	40.00	57.14

**MENU PENGAJAR  
SISTEM PENILAIAN PENGAJARAN PENSYARAH**

Senarai Komen Pelajar Subjek SKAA4723

1. Good
2. Very good
3. Lecture delivered in a very easy and clear way for student to understand. A very passionate lecturer as well !
4. A very passionate lecturer
5. the way she explained can easily understood
6. All good.
7. NONE

[ [Keluar Sistem](#) ]



**Nama** : RINI ASNIDA BINTI ABDULLAH  
**Fakulti** : 5102-Sekolah Kejuruteraan Awam  
**Subjek** : MKAJ1073

5102029

**Seksyen : 01**  
**Laporan Penilaian Pengajaran Pensyarah**  
**Semester 1 Sesi 20182019**

Bil. Responden : 8

Bil. Pelajar Mendaftar : 9

**A. Pengajaran**

Min Anda : 4.6  
 Min Fakulti : 4.48  
 Min Universiti : 4.59

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.63	0.00	0.00	0.00	37.50	62.50
2	4.50	0.00	0.00	0.00	50.00	50.00
3	4.63	0.00	0.00	0.00	37.50	62.50
4	4.63	0.00	0.00	0.00	37.50	62.50
5	4.63	0.00	0.00	0.00	37.50	62.50

**B. Penyampaian**

Min Anda : 4.75  
 Min Fakulti : 4.49  
 Min Universiti : 4.63

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.75	0.00	0.00	0.00	25.00	75.00
2	4.75	0.00	0.00	0.00	25.00	75.00
3	4.75	0.00	0.00	0.00	25.00	75.00
4	4.75	0.00	0.00	0.00	25.00	75.00
5	4.75	0.00	0.00	0.00	25.00	75.00
6	4.75	0.00	0.00	0.00	25.00	75.00
7	4.75	0.00	0.00	0.00	25.00	75.00

**C. Penilaian**

Min Anda : 4.75  
 Min Fakulti : 4.44  
 Min Universiti : 4.59

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.75	0.00	0.00	0.00	25.00	75.00
2	4.75	0.00	0.00	0.00	25.00	75.00
3	4.88	0.00	0.00	0.00	12.50	87.50
4	4.63	0.00	0.00	12.50	12.50	75.00
5	4.75	0.00	0.00	0.00	25.00	75.00

**D. Hubungan Pensyarah dan Pelajar**

Min Anda : 4.73  
 Min Fakulti : 4.52  
 Min Universiti : 4.67

Item	Min	Frekuensi (Peratus)				
		1	2	3	4	5
1	4.63	0.00	0.00	12.50	12.50	75.00
2	4.75	0.00	0.00	0.00	25.00	75.00
3	4.75	0.00	0.00	0.00	25.00	75.00
4	4.75	0.00	0.00	0.00	25.00	75.00
5	4.75	0.00	0.00	0.00	25.00	75.00

**Statistik Pencapaian Keseluruhan**

Min Anda : 4.71022  
 Min Fakulti : 4.48  
 Min Universiti : 4.62  
 Rank Anda Di UTM : P3

**Catatan :** P1 : Rank <= 20%  
 P2 : 20% < Rank <= 40%  
 P3 : 40% < Rank <= 60%  
 P4 : 60% < Rank <= 80%  
 P5 : Rank > 80%

**Penerapan Kemahiran Generik**

Item	Frekuensi (Peratus)			
	1	2	3	4
1	0.00	0.00	50.00	50.00
2	0.00	0.00	37.50	62.50
3	0.00	0.00	37.50	62.50
4	0.00	0.00	37.50	62.50
5	0.00	0.00	37.50	62.50
6	0.00	0.00	50.00	50.00
7	0.00	0.00	0.00	0.00

*APPENDIX D:*  
*PRODUCT OF TEACHING*



## ABSTRACT

In Civil engineering, construction of road or building sometimes encounter the rock slope. To ensure the stability of rock slope is secured, one must understand the rock properties. By acknowledge of rock mass classification and kinematic analysis, engineer will be able to forecasting the internal displacements and plans for any construction in certainty. To achieve this, a series of field study using Schmidt hammer, compass, and software together with desk study such as aerial photographic and field mapping is important. Therefore, to enrich student with experience in the desk study and field mapping, a field excursion of geomechanics mapping had been carried out at Bukit Ayam, Pengerang (South-eastern part of Johor) and Mutiara Court Apartment, Cheras (east of Kuala Lumpur). Study sites were selected base on the engineering problem that present at both site. These field excursions are combination of interactive active learning and experiential learning for final year and master class of Civil Engineering students. Students' feedback on conducted activity and their performance based on course learning outcome are reported here in. It was found that this activity has effectively kill two birds with one stone, (1) students able to learn on how to identify the rock classification system via hands-on activity at site and (2) students also developed soft skills in communication as they have to discuss and make decision during the group project. From the education perspective, the field excursions had lead to positive impact on enhancing and increasing students' confidence level in applying the rock assessment at field.

## OBJECTIVES

1. To expose students to the potentials of rock slope failures (determine the rock mass area and identify its weakness joint zone, fractures and parameters of discontinuities)
2. To enable student analyze the stability of rock condition using Slope Mass Rating (SMR) and kinematic analysis

Students were divided into 10 groups where each group consist of 4 under graduate students and 1 post graduate student. A rock section of 10 meter long was assigned to each group to identify its aperture, roughness, strength, dip angle and dip direction. Schmidt hammer, Egeo compass (installed in phone) and ruler was used to gathered all data.

### BUKIT AYAM, PENGERANG SITE

### MUTIARA COURT APARTMENT SITE

Rock fall event in this study area is not only induced by the discontinuities in rock mass but also due to the change in the forces acting on the rock (i.e., rainfall, load on surface).



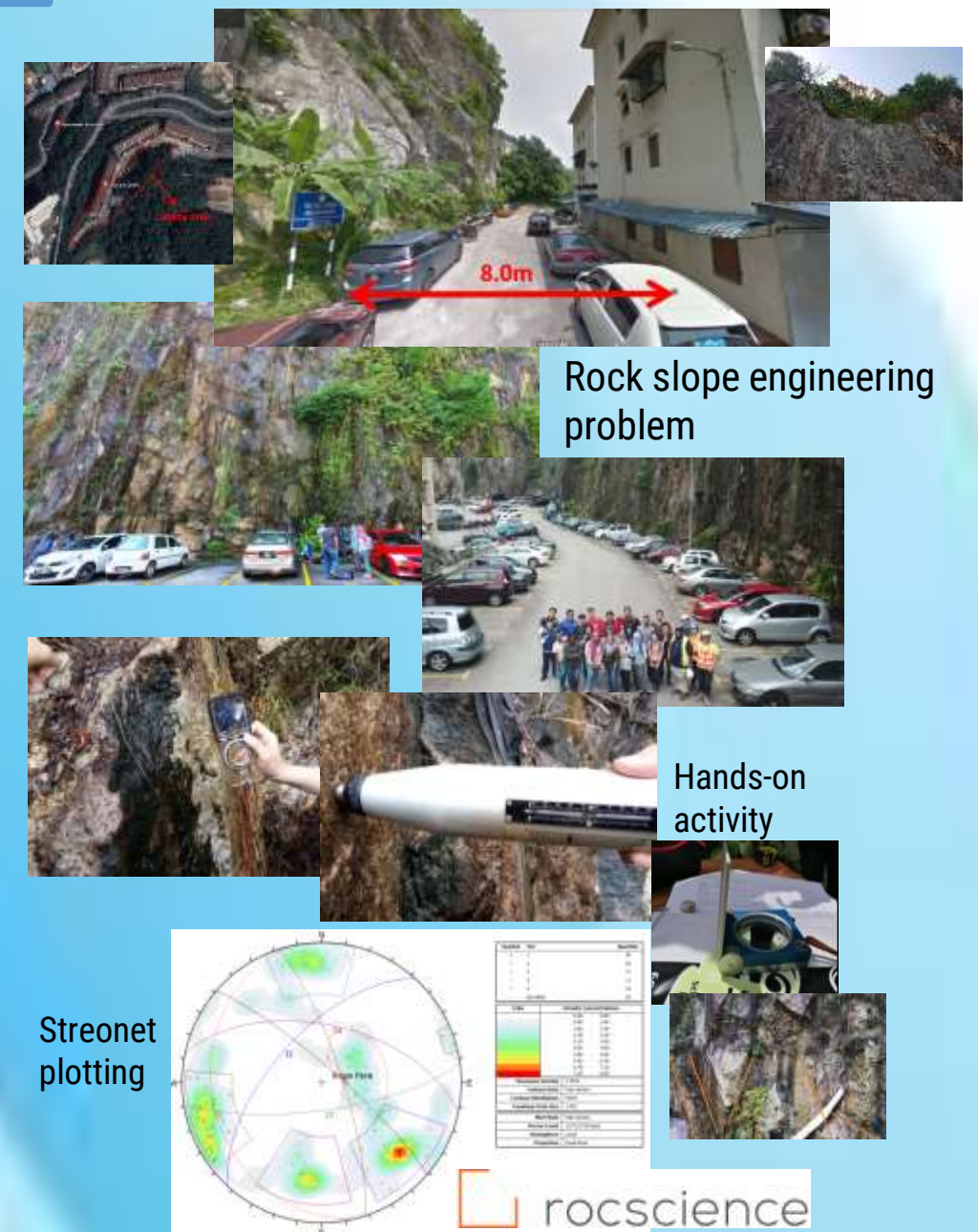
Field Excursion

Recognize rock joint (field mapping of rock face and collect orientation data)

SLOPE MASS RATING (SMR)

Plot streonet (using ROCSCIENCE DIPS software)

Proposed suitable remedies action



## STUDENTS FEEDBACK

- i) The fieldwork and rock slope stability assessment offers the engineers with very valuable input to understand the engineering rock mechanic.
- ii) Students are also benefited from first-hand experience discontinuity survey (kinematic analysis) and rock mass classification (Slope Mass Rating).

Designated experiential learning enable lecturer to convey the teaching more effectively

## USEFULNESS

Enrich students' confidence

Prepare students for future undertakings

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RG1: "enhance students' understanding of real-life practices"

RG2: "increase confidence level"; "improve skill and knowledge"

RG3: "exposure to a real-world experience of geology"

## VALUE ADDED

(Group responses)

RG4: "helps to be more prepared by stepping into the professional field"

RG5: "Built teamwork"

## COMMERCIALIZATION POTENTIAL

1. Designated experiential learning module can be packaged as a part of Teaching module and can be offered to other institution
2. Copyright of T&L activity framework

## RECOGNITION

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