UNIVERSITI MALAYA

FAKULTI KEJURUTERAAN
Faculty of Engineering

PROGRAM GUIDEBOOK

SESSION 2024/2025

SEMESTER 2 INTAKE

Bachelor of Civil Engineering

DEPARTMENT OF CIVIL ENGINEERING

TABLE OF CONTENTS

UNIVERSITI MALAYA

Vision, Mission, Core Values, Tagline

VISION

A global university impacting the world.

MISSION

Pushing the boundaries of knowledge and nurturing aspiring leaders.

CORE VALUES

TAGLINE

Home of the Bright, Land of the Brave

Di Sini Bermulanya Pintar, Tanah Tumpahnya Berani

INTRODUCTION TO FACULTY OF ENGINEERING

> *The profession in which a knowledge of the mathematical or natural sciences gained by study, experience and practice is applied with judgement to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind.*

Accreditation Board for Engineering and Technology
(FORMERLY The Engineers' Council for Professional Development (ECPD))

Engineering is not simply an academic field that deals with technology, statistics, and science. It is an exciting and rewarding discipline that has a much wider scope, ranging from basic science to applied technology. Engineers make a significant difference in the lives of millions of people. Through identifying problems and seeking new solutions, they create and design items that benefit the lives of everyone, from cars, computers, and buildings, through to life saving equipment, the generation of energy and medical procedures. Engineering is not about what the world is, it is about what the world can be.

i-LEAD

Innovative engineer with exceptional **L**eadership, **E**thical, **A**daptive and **D**ynamic values

Innovative

Innovative engineers possess the ability to use approaches, processes, resources, behave ours and mindsets of innovation culture using knowledge and expertise in emerging technologies.

Leadership

Effective leadership influences others to effectively collaborate to implement transformative change and innovation. It requires personal effectiveness and the ability to synthesize diverse expertise and skillsets to inspire people to engage with the organization's vision.

Ethical

Ethics in engineering practices is directed by respect for ethical beliefs and values, and for the dignity and rights of others. It promotes good practices through mutual respect and trust, integrity, honesty, accountability, transparency, equality and fairness.

Adaptive

Adaptive engineers embrace change, experimentation and innovation. They leverage on the creativity of an entire organization to adapt and thrive in a multitude and myriad of evolving environments.

Dynamic

Dynamic engineers are influencers, that understand the importance of inspiring others and achieving success through teamwork. They have the ability to properly analyze situations and take deliberate, calculated risks to move the team forward.

MESSAGES FROM DEAN

PROFESSOR IR. DR. NIK NAZRI BIN NIK GHAZALI

"As we launch into another dynamic academic year at Universiti Malaya's Faculty of Engineering, I want to extend my warmest welcome to each of you. This is a time of great potential, where your creativity and determination can lead to groundbreaking advancements. The engineering field is rapidly evolving, and with it comes the responsibility to approach challenges with innovative solutions and a commitment to sustainability. I encourage you to explore the intersections of technology, ethics, and community engagement in your work. Let's harness this opportunity to not only advance your skills but also to become responsible engineers who contribute positively to society.

Moreover, I want to emphasize the value of collaboration and inclusivity in our faculty. Every voice matter, and the diversity of our community enriches our collective experience. I urge you to participate actively in campus life—join clubs, engage in workshops, and seek opportunities for interdisciplinary projects. Together, we can create a supportive environment where everyone feels empowered to share their ideas and pursue their passions. As we move forward, let's commit to uplifting one another, fostering innovation, and making the most of the resources available to us. I am excited to see the extraordinary contributions each of you will make to faculty and beyond."

THE MANAGEMENT

Prof. Ir. Dr. Nik Nazri Nik Ghazali
Dean

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Assoc. Prof. Ir. Dr. Ong Zhi Chao
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Dr. Mohd Usman Mohd Junaidi
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Assoc. Prof. Ir. Dr. Nasrul Anuar Abd Razak
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MESSAGES FROM HEAD OF DEPARTMENT

ASSOCIATE PROFESSOR DR. ZAINAH BINTI IBRAHIM

Welcome to the Department of Civil Engineering at Universiti Malaya! We are delighted to have you as part of our vibrant and dynamic community. As you embark on this exciting academic journey, you are joining one of the most respected and pioneering civil engineering departments in the region.

At the Department of Civil Engineering, we are committed to providing you with a world-class education, hands-on experience, and the opportunity to engage with cutting-edge research. Our dedicated faculty members, state-of-the-art facilities, and close ties with industry will help equip you with the knowledge, skills, and ethical foundation needed to excel in this ever-evolving field.

As civil engineers, you will play a critical role in shaping the future of infrastructure, environmental sustainability, and technological advancements. I encourage you to embrace the challenges, explore your passions, and seize every opportunity for growth, both academically and personally. Beyond the classroom, you will have numerous opportunities to engage in research, internships, and extracurricular activities that will enrich your experience and prepare you for the challenges and rewards of a professional career.

Our department values collaboration, innovation, and lifelong learning. I urge you to actively participate in discussions, ask questions, and seek help when needed. We are here to support you every step of the way and ensure that your time at Universiti Malaya is both enriching and inspiring.

Once again, welcome to the Department of Civil Engineering! We look forward to seeing the great things you will achieve in the years to come.

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General complaints	https://helpdesk.um.edu.my/
Academic programmes, entry requirements, applications	study@um.edu.my
Scholarships	bptajaan_aasd@um.edu.my
Visa	Kindly submit application to: Faculty: https://shorturl.at/5EdMR Central: bpvisa_aasd@um.edu.my
Student Confirmation Letter – Active Students	Kindly submit application to Faculty: https://shorturl.at/jxEOe
Problem with MAYA system	Kindly lodge your enquiry/complaint via https://helpdesk.um.edu.my/
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Internship hiring/placement	citra@um.edu.my
Career opportunities / job vacancies / management trainee programmes for UM students	gecc@um.edu.my
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Industry-academia collaborations	industry@um.edu.my
Visit requests by student groups	Schools & local universities: study@um.edu.my International universities: study@um.edu.my
Rental of spaces in UM	Make your booking at https://umpoint.um.edu.my/

STUDENT AFFAIRS

Introduction

Deputy Dean (Student Affairs) Office Faculty of Engineering, Universiti Malaya, is dedicated to supporting the holistic development and well-being of the students. The office oversees various aspects of student life, providing essential services that enhance the student experience, including student welfare, competition, student associations, co-curricular activities, competition, exchange program, professional development opportunities/ upskilling program and scholarship information. We strive to ensure that every student receives the necessary resources and support throughout their academic journey.

Team

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Core Functions

Student Welfare

Our office is committed to student welfare, providing a range of services to address financial aid, counselling, and other support systems.

Co-Curricular Activities

In addition to academic excellence, we believe in the importance of well-rounded personal development. Our office provides resources and opportunities for students to participate in various co-curricular activities, enhancing university experience and preparing for a balanced professional life.

Competitions and Student Clubs

We actively support student participation in engineering competitions, both locally and internationally, to foster innovation and practical learning. Our office also encourages students to join and lead engineering clubs and societies, promoting leadership, teamwork, and co-curricular involvement.

Exchange Programs

We facilitate student exchange programs with universities worldwide, offering our students the opportunity to gain international exposure, broaden their perspectives, and enhance their learning experience in diverse academic and cultural settings.

Upskilling Programs

To ensure our students are equipped for the evolving demands of the engineering industry, we offer a range of upskilling programs, workshops, and training sessions. These initiatives focus on developing critical skills such as leadership, communication, and technical expertise to prepare students for future careers.

Scholarship Opportunities

The Deputy Dean's Office provides information and guidance on various scholarships available to our students. These scholarships aim to support academic excellence and alleviate financial burdens, allowing students to focus on their studies and professional development.

For any inquiries, feel free to reach out to us at fk_tdhep@um.edu.my.
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STUDENT ENGAGEMENT DEPARTMENT

Civil and Environmental Engineering Club Universiti Malaya (CEEC)

Civil and Environmental Engineering Club University Malaya (CEEC UM) is a student body that assists the Civil Engineering Department to take care of the welfare of the department students, facilitate the learning process of students beyond classrooms and ultimately lead to the enhancement of their academic performance. CEEC UM has been established since 2004.

As one of the pioneering societies at Universiti Malaya, CEEC UM has been active in its outreach and engagements with the engineering industry in order to produce the best Civil Engineers, aligned with the vision and mission in hand, CEEC UM has always been committed to striving for excellence

Mission

Provide a platform for students to be exposed to the industrial world.

Vision

Assist in shaping and empowering future leaders in the civil engineering field by sharpening competencies and expanding networks.

Institution of Civil Engineers Universiti Malaya Student Chapter (ICEUMSC)

Institution of Civil Engineers Universiti Malaya Student Chapter (ICEUMSC) is one of the student chapters under the Institution of Civil Engineers (ICE). The club aims to increase students' knowledge and perspective by giving them a range of civil engineering experience, helping students to develop their abilities and share their knowledge, building links with other institutions, organizations, and learned societies as well as organizing civil engineering seminars, workshops, visits, and inter-universities competitions.

Mission and Vision

- Increase students' knowledge and perspective by giving them a range of civil engineering experience.
- Help students to develop their abilities and share their knowledge.
- Build links with other institutions, organizations and learned societies.

Student Mobility Program

Outbound Mobility Program is a program that allows all Universiti Malaya students to spend one or two semesters at our partner universities abroad. Students will be able to take courses in the regular semester with credit transfer opportunity. This program is offered to both undergraduate and postgraduate (coursework mode) students.








RULES AND REGULATIONS

All students are required to follow **Universiti Malaya (Bachelor's Degree) Rules & Regulations 2024**, which include key aspects such as registration, payment, duration of study, structure of programme of study, examination, appeal and graduation. For more detailed information on the university regulations, please meet your Programme Coordinator and/or visit:

https://engine.um.edu.my/um-wow-2024-2025#

ACADEMIC CALENDAR

SEMESTER I				
Orientation Week		29.09.2024	-	06.10.2024
Lectures	7 weeks*	07.10.2024	-	24.11.2024
Mid-Semester I Break	1 week	25.11.2024	-	01.12.2024
Lectures	7 weeks*	02.12.2024	-	19.01.2025
Revision Week	1 week*	20.01.2025	-	26.01.2025
Semester I Final Examination	3 weeks*	27.01.2025	-	16.02.2025
Semester I Break	4 weeks	17.02.2025	-	16.03.2025
	23 weeks			
SEMESTER II				
Lectures	7 weeks*	17.03.2025	-	04.05.2025
Mid-Semester II Break	1 week	05.05.2025	-	11.05.2025
Lectures	7 weeks*	12.05.2025	-	29.06.2025
Revision Week	1 week*	30.06.2025	-	06.07.2025
Semester II Final Examination	3 weeks*	07.07.2025	-	27.07.2025
Semester II Break	4 weeks	28.07.2025	-	24.08.2025
	23 weeks			
SPECIAL SEMESTER				
Lectures	7 weeks*	28.07.2025	-	14.09.2025
Special Semester Final Examination	1 week*	15.09.2025	-	21.09.2025
Break	1 week	22.09.2025	-	28.09.2025
	9 weeks			

Note:
(*) The Academic Calendar has taken into account public and festive holidays and is subject to change:

Deepavali	01 November 2024 (Friday)
Christmas Day	25 December 2024 (Wednesday)
New Year	01 January 2025 (Wednesday)
Chinese New Year	29 & 30 January 2025 (Wednesday & Thursday)
Federal Territory Day	01 February 2025 (Saturday)
Thaipusam	11 February 2025 (Tuesday)
Nuzul Al-Quran	17 March 2025 (Monday)
Eidul Fitri	31 March & 01 April 2025 (Monday & Tuesday)
Wesak Day	12 May 2025 (Monday)
His Majesty's King's Birthday	02 June 2025 (Monday)
Eidul Adha	06 June 2025 (Friday)
Awal Muharam	27 June 2025 (Friday)

BACHELOR OF CIVIL ENGINEERING

Introduction

The Department of Civil Engineering is one of the first academic departments set up under the Faculty of Engineering, University of Malaya in 1956. The Department currently offers academic programme at undergraduate, Master of Engineering Science and Doctor of Philosophy levels.

The Department is sub-divided into four clusters, namely, Structural and Material; Water and Environment; Soil, Geotechnical Engineering and Survey; Transport and Construction Management. The department is actively engaged in R&D works with financial support from the University, government, and other industrial grants. Many academic members of the Department are also pursuing engineering consultancies requiring expertise in multidisciplinary areas.

The Bachelor of Engineering (Civil) programme was introduced in the year 1956 as a 4-years programme under the Term System. The programme was recognized by the Malaysian Public Services Department (JPA) and the Board of Engineers Malaysia (BEM). In the 1996/1997 academic session, a major change was undertaken in the programme where the Bachelor of Engineering (Civil) programme was offered as a 3-years degree programme under the semester system (Sistem Pengajian Tiga Tahun, SPTT). In the same academic session, the Bachelor of Engineering (Environmental) programme was introduced as a 3-years degree programme. Both programmes were accredited by the Board of Engineers Malaysia on 21 August 2000.

Starting from the 2000/2001 academic session, under the instructions from the Ministry of Education of Malaysia, both programmes were offered as a 4-years degree programme under the semester system (Sistem Pengajian Empat Tahun, SPET). The first batch of graduates from these two programmes graduated in August 2004.

For the betterment and continuous quality improvement of the programme, a series of 5-year cycles of curriculum review exercises has been performed. The curriculum review is done to align the programme in accordance with the requirements of the MQF, EAC, industries and other stakeholders. Following a major curriculum review in 2015, a new curriculum structure was introduced starting from the 2016/2017 academic session where the programme has been renamed as Bachelor of Civil Engineering. The latest cycle of curriculum review was conducted in 2021 and an updated curriculum is implemented for the intake session 2022/2023 onwards.

Programme Synopsis

Name of University	Universiti Malaya University of Malaya (UM)
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Name of Department	Department of Civil Engineering, Faculty of Engineering
Name and Telephone of Contact Person	Assoc. Prof. Dr Zainah Ibrahim Head of Department Tel: 03-79674460 Fax: 03- 79675330 E: zainah@um.edu.my
Programme for Accreditation	Bachelor of Civil Engineering
EAC Reference Number	BEM/004/0100/M (008) Cert No: 1119 (The latest BEM certificate for the Bachelor of Engineering (Civil) programme is given in Appendix 1.1)
Degree to be Awarded and Abbreviation:	Bachelor of Civil Engineering B. Civil Eng.
Mode of Study	Full Time
Duration of Programme (in years)	Four (4) Years (Minimum duration is 8 full Semesters, and Maximum duration is 12 Semesters)
Medium of Instruction of Programme Evaluated	English
Language Available for Reference Materials	Lecture notes are provided to students and are available in English. All engineering and supplementary texts adopted for use as reference materials are in English.
IHL Academic Session	2024/2025 SEM 1: September – January SEM 2: February - June SS: July - August
URL Address	**https://engine.um.edu.my** **https://www.um.edu.my**

Outcome-Based Education (OBE)

Outcome-Based Education (OBE) had been implemented in the Faculty of Engineering since 2004, in accordance with the directives of the Ministry of Higher Education Malaysia and the Board of Engineers Malaysia (BEM). This is also one of the requirements for Malaysia to become a full member of the Washington Accord (WA), an international agreement to mutually recognize Bachelor degrees in the field of engineering.

OBE is an internationally practised educational model that focuses on the measurement of student outcomes and the implementation of corrective measures to overcome deficiencies in course delivery methods/assessment/student attitude, etc. Curriculum is designed with specific course outcomes (COs) to prepare the graduates to achieve the graduate attributes/programme outcomes (POs) at the point of graduation. The POs are designed to produce graduates who are well-prepared to achieve the programme educational objectives (PEOs) 3 - 5 years after they have graduated. The PEOs and POs had been formulated in consultation with all major stakeholders (employers, alumni and students), to meet the demands of a challenging and globalized workplace.

PROGRAMME STRUCTURE

BACHELOR OF CIVIL ENGINEERING

Courses	Content	Credit Hours
University Courses	GIG1012: Philosophy and Current Issues* / GLT1049: *Bahasa Melayu Komunikasi***	2
	GIG1013: Appreciation of Ethics and Civilization	2
	GIG1003: Basic Entrepreneurship Enculturation	2
	GLTXXXX: English Communication Programme ‡	4
	University Elective Courses (Student Holistic Empowerment)	8
	Co-Curriculum	2
Sub-total Credit Hours		**20**
Faculty Courses	Faculty Core Courses	12
Sub-total Credit Hours		**12**
Department Courses	Department Core Courses	96
	Department Elective Courses	15
Sub-total Credit Hours		**111**
TOTAL CREDIT HOURS		**143**

* Compulsory for local students.
** Compulsory for international students.
‡ Students are required to complete the courses based on their English Proficiency qualification (MUET/IELTS/TOEFL), as stipulated in the respective PATH on page 33.

ACADEMIC PLANNER

SEMESTER 2 INTAKE, SESSION 2024/2025

YEAR 1						
CODE	**COURSE**	**S2**	**S1**	**SS**	**TOTAL CREDIT**	**PRE-REQUISITE**
UNIVERSITY COURSES						
GIG1012 / GLT1049	Philosophy And Current Issues* / *Bahasa Melayu Komunikasi* **	2				
GIG1003	Basic Entrepreneurship Enculturation	2				
GLTXXXX	English Communication I	2				
GIG1013	Appreciation of Ethics and Civilisations		2			
GLTXXXX	English Communication II		2			
Sub-total Credit Hours		6	4		10	
UNIVERSITY ELECTIVE COURSES (STUDENT HOLISTIC EMPOWERMENT)						
Cluster 1	Thinking Matters: Mind and Intellect		2			
Sub-total Credit Hours			2		2	
FACULTY COURSES						
KIX1001	Engineering Mathematics 1		3			
KIX1002	Engineering Mathematics 2	3				
Sub-total Credit Hours		3	3		6	
DEPARTMENT CORE COURSES						
KIA1004	Mechanics Of Materials	3				
KIA1005	Engineering Survey	3				
KIA1007	Programming And Information System	3				
KIA1002	Engineering Mechanics		3			
KIA1003	Civil Engineering Materials		3			
KIA1006	Civil Engineering Drawing And CAD		3			
Sub-total Credit Hours		9	9		18	
TOTAL CREDIT HOURS		18	18	0	36	

* Compulsory for local students.
** Compulsory for international students.
University courses subject to availability.

YEAR 2						
CODE	COURSE	S2	S1	SS	TOTAL CREDIT	PRE-REQUISITE
UNIVERSITY ELECTIVE COURSES (STUDENT HOLISTIC EMPOWERMENT)						
Cluster 2	Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul	2				
Cluster 3	Technology/Artificial Intelligence and Data Analytics: I-Techie		2			
Cluster 4	Global Issues and Community Sustainability: Making The World A Better Place		2			
Sub-total Credit Hours		2	4		6	
FACULTY COURSES						
KIX2005	Law, Ethics and Sustainability For Engineers	3				
Sub-total Credit Hours		3			3	
DEPARTMENT CORE COURSES						
KIA2001	Theory Of Structures		3			KIA1002 and KIA1004
KIA2003	Fluid Mechanics		3			
KIA2010	Soil Mechanics I		3			
KIA2011	Pavement Engineering		2			
KIA2013	Principles Of Environmental Engineering		3			
KIA2005	Water Resources	3				
KIA3014	Fundamentals Of Sustainability In Civil Engineering	2				
KIA3015	Construction Management And Technology	3				
KIA2015	Surveying Fieldwork	2				KIA1005
KIA2016	Highway Engineering	3				
Sub-total Credit Hours		13	14		27	
TOTAL CREDIT HOURS		18	18		36	

YEAR 3						
CODE	COURSE	S2	S1	SS	TOTAL CREDIT	PRE-REQUISITE
UNIVERSITY COURSES						
	Co-Curriculum	2				
Sub-total Credit Hours		2			2	
FACULTY COURSES						
KIX2006	Engineering Economics and Project Management		3			
Sub-total Credit Hours			3		3	
DEPARTMENT CORE COURSES						
KIA2012	Reinforced Concrete Design I	3				
KIA2014	Soil Mechanics II	2				
KIA3003	Traffic Engineering	3				
KIA3006	Foundation Engineering	3				
KIA3013	Water Supply And Sewerage	2				KIA2003
KIA3001	Statistics and Numerical Techniques		3			
KIA3002	Structural Steel Design		3			KIA1002 and KIA1004
KIA3011	Open Channel Hydraulics		3			KIA2003
KIA3016	Structural Analysis		3			KIA2001
KIA4001	Final Year Project (P)		3P			
KIA4018	Integrated Design Project I		2			
KIA3008	Industrial Training			5		
Sub-total Credit Hours		13	17	5	35	
TOTAL CREDIT HOURS		15	20	5	40	

YEAR 4						
CODE	COURSE	S2	S1	SS	TOTAL CREDIT	PRE-REQUISITE
DEPARTMENT CORE COURSES						
KIA3012	Reinforced Concrete Design II	3				KIA2012
KIA4001	Final Year Project (P)	3				
KIA4019	Integrated Design Project II	3				KIA4018
KIA3010	Geotechnical Engineering		3			KIA2010
KIA4020	Engineers and Society		2			
KIA4035	Prestressed Concrete Design		2			
Sub-total Credit Hours		9	7		16	
DEPARTMENT ELECTIVE COURSES						
KIAXXXX	ELECTIVE COURSE I	3				
KIAXXXX	ELECTIVE COURSE II	3				
KIAXXXX	ELECTIVE COURSE III		3			
KIAXXXX	ELECTIVE COURSE IV		3			
KIAXXXX	ELECTIVE COURSE V		3			
Sub-total Credit Hours		6	9		15	
TOTAL CREDIT HOURS		15	16		31	

DEPARTMENT ELECTIVE COURSES

CODE	COURSE	CREDIT HOURS	PRE-REQUISITE
KIA4005	Rekabentuk Struktur Keluli Lanjutan *Advanced Structural Steel Design*	3	
KIA4006	Rekabentuk Kayu *Timber Design*	3	
KIA4007	Kejuruteraan Angin dan Gempabumi *Wind and Earthquake Engineering*	3	
KIA4008	Kejuruteraan Jambatan *Bridge Engineering*	3	
KIA4036	Teknologi dan Kejuruteraan Konkrit *Concrete Engineering and Technology*	3	
KIA4012	Kejuruteraan Batuan *Rock Engineering*	3	
KIA4013	Pembaikan Tanah *Ground Improvements*	3	
KIA4017	Teknik-teknik Kuantitatif dalam Pengurusan Pembinaan *Quantitative Techniques in Construction Management*	3	
KIA4021	Konkrit Pra Tuang dan IBS *Precast Concrete and IBS*	3	
KIA4022	Bangunan Hijau *Green Building*	3	
KIA4023	Pembaikan dan Pemulihan *Repair and Rehabilitation*	3	
KIA4024	Pengurusan dan Perawatan Sisa *Waste Management and Treatment*	3	
KIA4025	Kawalan Hakisan dan Endapan *Erosion and Sediment Control*	3	
KIA4026	Proses dan Pengurusan Pantai dan Pesisir *Coastal Processes and Management*	3	
KIA4027	Penilaian Impak Alam Sekitar dan Sistem Pengurusan Persekitaran *Environmental Impact Assessment and Management Systems*	3	
KIA4028	Hidrologi Lanjutan *Advanced Hydrology*	3	
KIA4029	Hidraulik Lanjutan *Advanced Hydraulics*	3	
KIA4030	Kecerdasan Buatan dalam Kejuruteraan Awam *Artificial Intelligence in Civil Engineering*	3	
KIA4031	Sistem Transit Bandar Massa *Urban Mass Transit System*	3	
KIA4032	Perancangan dan Audit Keselamatan Jalan Raya *Highway Planning and Road Safety Audit*	3	
KIA4033	Sistem Pengangkutan Lanjutan *Advanced Transportation System*	3	
KIA4034	Kejuruteraan Kualiti Air Permukaan *Surface Water Quality Engineering*	3	

UNIVERSITY COURSES

The list of university courses offered for each semester could be found through the following link:

https://citra.um.edu.my/list-of-university-courses

A. Student Holistic Empowerment (SHE)

The Student Holistic Empowerment (SHE) courses are categorized into four () clusters:

Cluster 1

Thinking Matters: Mind and Intellect

Cluster 2

Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul

Cluster 3

Technology/Artificial Intelligence and Data Analytics: i-Techie

Cluster 4

Global Issues and Community Sustainability: Making the World a Better Place

All students are required to register one (1) course from each cluster.

B. Co-curricular Courses

The list of co-curricular courses available is as follows:

CODE	COURSE
GKA1001	Attach@Industry
GKI1001	Independent Research
GKK1001	Community Services
GKP1001	Talent Development
GKS1001	Volunteerism
GKU1001	Entrepreneurship

PATH FOR ENGLISH COMMUNICATION PROGRAMME

ENGLISH COMMUNICATION PROGRAMME (UNIVERSITY COURSE) LIST OF COURSES TO BE COMPLETED BY ALL STUDENTS			
PATH 1	**PATH 2**	**PATH 3**	**PATH 4**
• **MUET BAND 2** • **IELTS Band 4.0** • **TOEFL Paper – Based Test (437 – 473)** • **TOEFL Computer – Based Test (123 – 150)** • **TOEFL Internet – Based Test (41 – 52)** • **PTE (Academic) – (10 – 28)**	• **MUET BAND 3** • **IELTS Band 4.5 – 5.0** • **TOEFL Paper – Based Test (477 – 510)** • **TOEFL Computer – Based Test (153 – 180)** • **TOEFL Internet – Based Test (53 – 64)** • **PTE (Academic) – (29 - 41)**	• **MUET BAND 4** • **IELTS Band 5.5 – 6.0** • **TOEFL Paper – Based Test (513 – 547)** • **TOEFL Computer – Based Test (183 – 210)** • **TOEFL Internet – Based Test (65-78)** • **PTE (Academic) – (42 – 57)** • **FCE (B & C)** • **GCE A Level (English) (Minimum C)** • **IGCSE/GCSE (English) (A, B & C)**	• **MUET BAND 5 & BAND 6** • **IELTS Band 6.5 – 9.0** • **TOEFL Paper – Based Test (550 – 677)** • **TOEFL Computer – Based Test (213 – 300)** • **TOEFL Internet – Based Test (79 – 120)** • **PTE (Academic) (58 – 90)** • **FCE (A)** • **GCE A Level (English) (B & A)**
Students need to complete 2 courses (2 courses x 2 credits each) from this PATH	Students need to complete 2 courses (2 courses x 2 credits each) from this PATH	Students need to complete 2 courses (2 courses x 2 credits each) from this PATH	Students need to complete 2 courses (2 courses x 2 credits each) from this PATH
COMPULSORY GLT1018 – Proficiency in English I	**COMPULSORY** GLT1021 – Proficiency in English II	**COMPULSORY** GLT1024 – Proficiency in English III	**CHOOSE TWO:** • GLT1027 – Advanced Oral Communication* • GLT1028 – Advanced Business Writing* • Alternative courses - Foreign Language *Students can only register for one course per semester
** **CHOOSE ONE**: • GLT1019 – Let's Speak • GLT1020 – Fundamental Writing	** **CHOOSE ONE**: • GLT1022 – Speak Up • GLT1023 – Effective Workplace Writing	** **CHOOSE ONE**: • GLT1025 – Effective Oral Communication • GLT1026 – Writing at the Workplace	

** These courses have prerequisites and students can only register for them after obtaining a PASS in the compulsory course as stipulated in the respective PATH.

LIST OF FOREIGN LANGUAGE COURSES

Alternative Courses for Path 4

No.	Course Code	Course Name	Credit Hours
1	GLT1029	Bahasa Arab Asas 1 / *Basic Arabic Language 1*	2
2	GLT1030	Bahasa Arab Asas 2 / *Basic Arabic Language 2*	2
3	GLT1031	Bahasa Jepun Asas 1 / *Basic Japanese Language 1*	2
4	GLT1032	Bahasa Jepun Asas 2 / *Basic Japanese Language 2*	2
5	GLT1033	Bahasa Korea Asas 1 / *Basic Korean Language 1*	2
6	GLT1034	Bahasa Korea Asas 2 / *Basic Korean Language 2*	2
7	GLT1035	Bahasa Parsi Asas / *Basic Persian Language*	2
8	GLT1036	Bahasa Portugis Asas 1 / *Basic Portuguese Language 1*	2
9	GLT1037	Bahasa Portugis Asas 2 / *Basic Portuguese Language 2*	2
10	GLT1038	Bahasa Rusia Asas 1 / *Basic Russian Language 1*	2
11	GLT1039	Bahasa Rusia Asas 2 / *Basic Russian Language 2*	2
12	GLT1040	Bahasa Sepanyol Asas 1 / *Basic Spanish Language 1*	2
13	GLT1041	Bahasa Sepanyol Asas 2 / *Basic Spanish Language 2*	2
14	GLT1042	Bahasa Thai Asas 1 / *Basic Thai Language 1*	2
15	GLT1043	Bahasa Thai Asas 2 / *Basic Thai Language 2*	2
16	GLT1044	Bahasa Turki Asas / *Basic Turkish Language*	2

COURSE INFORMATION

University Courses

GIG1012: Falsafah dan Isu Semasa / *Philosophy and Current Issues*

Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Melayu *Malay*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menjelaskan isu semasa berlandaskan ilmu falsafah, Falsafah Pendidikan Kebangsaan dan Rukun Negara. 2. Menerangkan isu semasa berdasarkan aliran pemikiran utama dalam pelbagai aliran falsafah. 3. Menghuraikan isu semasa melalui perspektif perbandingan falsafah sebagai asas bagi menjalinkan dialog antara budaya. *At the end of the course, students are able to:* 1. *Explain current issues based on philosophy, the Philosophy of National Education and the Rukunegara.* 2. *Explain current issues based on the main of thoughts from the various streams of philosophy.* 3. *Explain current issues through a comparative perspective of philosophy as a basis for establishing inter-cultural dialogue.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi hubungan ilmu falsafah dengan Falsafah Pendidikan Kebangsaan dan Rukunegara. Penggunaan falsafah sebagai alat untuk memurnikan budaya pemikiran dalam kehidupan melalui seni dan kaedah berfikir serta konsep insan. Topik utama dalam falsafah iaitu epistemologi, metafizik dan etika dibincangkan dalam konteks isu semasa. Penekanan diberi kepada falsafah sebagai asas bagi menjalin dialog antara budaya serta memupuk nilai sepunyai. Di hujung kursus ini pelajar akan mampu melihat disiplin-disiplin ilmu sebagai satu badan ilmu yang komprehensif dan terkait antara satu sama lain. *This course covers philosophical relations with the Philosophy of National Education and Rukunegara. The use of philosophy as a tool to purify the culture of thought in life through the arts and methods of thinking and human concepts. The main topics in philosophy are epistemology, metaphysics and ethics discussed in the context of current issues. Emphasis is given to philosophy as a basis for fostering intercultural dialogue and fostering one's values. At the end of this course students will be able to see the disciplines of science as one comprehensive body of knowledge and related to each other.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 70% Peperiksaan Akhir / *Final Examination*: 30%

GIG1013: Penghayatan Etika dan Peradaban / *Appreciation of Ethics and Civilisations*

Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Melayu (pelajar warganegara) / Bahasa Inggeris (pelajar bukan warganegara) *Malay (local students) and English (international students)*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menjelaskan konsep etika dari peradaban yang berbeza. 2. Membandingkan sistem, tahap perkembangan, kemajuan sosial dan kebudayaan merentas bangsa. 3. Membincangkan isu kontemporari berkaitan ekonomi, politik, sosial, budaya dan alam sekitar daripada perspektif etika dan peradaban. *At the end of the course, students are able to:* *1. Explain the ethical concepts of different civilizations.* *2. Compare systems, levels of development, social progress and culture across nations.* *3. Discuss contemporary issues related to economic, political, social, cultural and environmental from the perspective of ethics and civilization.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menerangkan tentang konsep etika daripada perspektif peradaban yang berbeza. Ia bertujuan bagi mengenal pasti sistem, tahap perkembangan, kemajuan dan kebudayaan sesuatu bangsa dalam mengukuhkan kesepaduan sosial. Selain itu, perbincangan berkaitan isuisu kontemporari dalam aspek ekonomi, politik, sosial, budaya dan alam sekitar daripada perspektif etika dan peradaban dapat melahirkan pelajar yang bermoral dan profesional. Penerapan amalan pendidikan berimpak tinggi (HIEPs) yang bersesuaian digunakan dalam penyampaian kursus ini. Di hujung kursus ini pelajar akan dapat menghubungkaitkan etika dan kewarganegaraan berminda sivik. *This course discusses ethical concepts from different civilization perspectives. It aims to identify the systems, developmental stages, progress and culture of a nation in strengthening social cohesion. In addition, discussions on contemporary issues in the economic, political, social, cultural and environmental aspects from an ethical and civil perspective can produce students who are morally and professionally sound. The application of appropriate High Impact Education Practices (HIEPs) is used in the delivery of this course. At the end of this course students will be able to relate ethics and civic-minded citizenship.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 70% Peperiksaan Akhir / *Final Examination*: 30%

GIG1003: Asas Pembudayaan Keusahawanan / *Basic Entrepreneurship Enculturation*

Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan konsep asas keusahawaan. 2. Menghasilkan idea keusahawanan yang kreatif dan inovatif. 3. Membangunkan kerangka rancangan perniagaan. *At the end of the course, students are able to:* *1. Explain the basic concepts of entrepreneurship.* *2. Producing creative and innovative entrepreneurial ideas.* 3. *Develop a business plan framework.*
Sinopsis Kandungan Kursus / *Synopsis of Course Contents*	Kursus ini menerapkan elemen asas pembudayaan keusahawanan kepada semua pelajar. Inisiatif ini diambil untuk membuka minda dan merangsang semangat keusahawanan kepada kumpulan sasar yang berpotensi. Antara topik yang akan diajar termasuklah konsep dan perkembangan keusahawanan, faktor yang menggalakkan keusahawanan, perkembangan keusahawanan di Malaysia, etika keusahawanan, kreativiti dan inovasi dalam keusahawanan dan merancang perniagaan. Di samping itu, kursus ini juga memberikan pelajar latihan yang lebih bermakna dan berkesan mengenai pemikiran, kemahiran dan kecekapan keusahawanan. *The course will attempt to inculcate the basic elements of entrepreneurship in the students. Initiatives are taken to open their minds and motivate the entrepreneurial spirit in this potential target group. The course encompasses theory and development of entrepreneurship, factors affecting entrepreneurship, entrepreneurship development in Malaysia, ethics of entrepreneurship, creativity and innovation in entrepreneurship and developing business plans. This course also incorporates a direct exposure to entrepreneurial mindset, skills and competencies.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100% Peperiksaan Akhir / *Final Examination*: 0%

English Communication Programme (Path 1)

GLT1018: Proficiency in English I

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	CEFR A2+ • MUET BAND 2 • IELTS Band 4.0 • TOEFL Paper-Based Test (437 – 473) • TOEFL Computer-Based Test (123 – 150) • TOEFL Internet-Based Test (41 – 52) • PTE (Academic) – (10 – 28)
Course Learning Outcomes	At the end of the course, students are able to: 1. Identify information in short, simple reading texts. 2. Present ideas related to everyday topics. 3. Use grammar correctly to express ideas.
Synopsis of Course Contents	This course is designed for students with basic proficiency in English. Focus is on building speaking and reading competence with an emphasis on accuracy in grammar and on vocabulary building.
Assessment Weightage	Continuous Assessment: 60% Final Examination: 40%

GLT1019: Let's Speak

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	GLT1018
Course Learning Outcomes	At the end of the course, students are able to: 1. Organise a speech in stages. 2. Apply appropriate skills and strategies when delivering a short speech. 3. Present a short speech.
Synopsis of Course Contents	This course focuses on preparing a speech in English accurately and coherently. It also develops students' speech planning skills in stages. Students will learn to speak accurately using the appropriate language strategies to a selected audience.
Assessment Weightage	Continuous Assessment: 100% Final Examination: 0%

GLT1020: Fundamental Writing

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	GLT1018
Course Learning Outcomes	At the end of the course, students are able to: 1. Write short, connected texts on familiar subjects. 2. Organise ideas effectively for different purposes.
Synopsis of Course Contents	This course is designed for students with a pre-intermediate level of proficiency in English. It focuses on writing skills, with an emphasis on accuracy in grammar and vocabulary building. Students will be exposed to writing strategies that will enable them to write short texts effectively for different purposes.
Assessment Weightage	Continuous Assessment: 100% Final Examination: 0%

English Communication Programme (Path 2)

GLT1021: Proficiency in English II

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	CEFR B1 • MUET BAND 3 • IELTS Band 4.5 – 5.0 • TOEFL Paper-Based Test (477 – 510) • TOEFL Computer-Based Test (153 – 180) • TOEFL Internet-Based Test (53 – 64) • PTE (Academic) – (29 - 41)
Course Learning Outcomes	At the end of the course, students are able to: 1. Write clear connected texts on a wide range of topics. 2. Present ideas and opinions clearly and coherently. 3. Interpret information from texts on various topics.
Synopsis of Course Contents	This course is designed to improve students' English Language proficiency in terms of accuracy and language use at the intermediate level. Students will be exposed to a variety of reading texts in order to improve their reading skills. They will also be given ample speaking practice to develop their confidence in communicating and interacting with others in a multitude of situations. The course improves students' skills in writing texts coherently on various topics.
Assessment Weightage	Continuous Assessment: 60% Final Examination: 40%

GLT1022: Speak Up

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	GLT1021
Course Learning Outcomes	At the end of the course, students are able to: 1. Present ideas clearly and accurately. 2. Employ appropriate communication strategies to converse effectively.
Synopsis of Course Contents	This course focuses on speaking English accurately and coherently at the intermediate level. It develops students' communication strategies that enable them to interact appropriately in a variety of informal situations.
Assessment Weightage	Continuous Assessment: 100% Final Examination: 0%

GLT1023: Effective Workplace Writing

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	GLT1021
Course Learning Outcomes	At the end of the course, students are able to: 1. Use appropriate format and language structures in correspondence writing. 2. Apply appropriate tone and style according to purposes of correspondence.
Synopsis of Course Contents	This course introduces writing strategies at the intermediate level. Students will be exposed to a range of workplace communication. They will learn how to produce effective written communication and improve their overall skills in writing.
Assessment Weightage	Continuous Assessment: 100% Final Examination: 0%

English Communication Programme (Path 3)

GLT1024: Proficiency in English III

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	CEFR B2 • MUET BAND 4 • IELTS Band 5.5 – 6.0 • TOEFL Paper – Based Test (513 – 547) • TOEFL Computer – Based Test (183 – 210) • TOEFL Internet – Based Test (65-78) • PTE (Academic) – (42 – 57) • FCE (B & C) • GCE A Level (English) (Minimum C) • IGCSE/GCSE (English) (A, B & C)
Course Learning Outcomes	At the end of the course, students are able to: 1. Demonstrate an understanding of complex texts on concrete topics. 2. Write clear, detailed texts on a wide range of subjects. 3. Share opinions fluently and spontaneously.
Synopsis of Course Contents	This course is designed to fortify students' English Language proficiency in terms of accuracy and effectiveness at a developing upper intermediate level. Students will be taught the four language skills with a focus on reading, writing and speaking. They will be exposed to a variety of texts to develop a higher level of proficiency that will allow them to apply the skills learnt.
Assessment Weightage	Continuous Assessment: 60% Final Examination: 40%

GLT1025: Effective Oral Communication

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	GLT1024
Course Learning Outcomes	At the end of the course, students are able to: 1. Write relevant outlines for presentations. 2. Present an impromptu speech. 3. Adhere to appropriate strategies in oral communication.
Synopsis of Course Contents	The course encompasses different aspects of oral communication used in delivering speeches and presentations at the high intermediate level. Appropriate examples from a variety of situations are used as practice materials for students to analyse, discuss and apply the strategies taught.
Assessment Weightage	Continuous Assessment: 100% Final Examination: 0%

GLT1026: Writing at the Workplace

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	GLT1024
Course Learning Outcomes	At the end of the course, students are able to: 1. Write texts using appropriate tone and style. 2. Complete an informal report for workplace purposes. 3. Prepare a formal report for workplace purposes.
Synopsis of Course Contents	This course will introduce students to effective writing skills at the workplace. Using relevant materials, students will be taught in stages how to produce documents within a workplace context.
Assessment Weightage	Continuous Assessment: 100% Final Examination: 0%

English Communication Programme (Path 4)

GLT1027: Advanced Oral Communication

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	CEFR C1 • MUET BAND 5 & BAND 6 • IELTS Band 6.5 – 9.0 • TOEFL Paper – Based Test (550 – 677) • TOEFL Computer – Based Test (213 – 300) • TOEFL Internet – Based Test (79 – 120) • PTE (Academic) (58 – 90) • FCE (A) • GCE A Level (English) (B & A)
Course Learning Outcomes	At the end of the course, students are able to: 1. Integrate the effective use of language structures in communication 2. Present a persuasive speech 3. Develop appropriate interpersonal communication skills.
Synopsis of Course Contents	The course encompasses different aspects of oral communication used in delivering speeches and presentations at the high intermediate level. Appropriate examples from a variety of situations are used as practice materials for students to analyse, discuss and apply the strategies taught.
Assessment Weightage	Continuous Assessment: 100% Final Examination: 0%

GLT1028: Advanced Business Writing

Credit	2
Course Pre-requisite(s) / Minimum Requirement(s)	CEFR C1 • MUET BAND 5 & BAND 6 • IELTS Band 6.5 – 9.0 • TOEFL Paper – Based Test (550 – 677) • TOEFL Computer – Based Test (213 – 300) • TOEFL Internet – Based Test (79 – 120) • PTE (Academic) (58 – 90) • FCE (A) • GCE A Level (English) (B & A)
Course Learning Outcomes	At the end of the course, students are able to: 1. Apply appropriate features of effective business writing. 2. Prepare documents common in business writing. 3. Produce a report for workplace purposes.
Synopsis of Course Contents	This course is designed to equip students with the necessary writing skills to meet the needs of the workplace. Students will also be taught how to produce clear, accurate and well organised professional business documents. Students will be required to analyse and respond to a variety of situations and to write for identified audiences. The course also explores the ways in which technology helps shape business writing and communication.
Assessment Weightage	Continuous Assessment: 100% Final Examination: 0%

COURSE INFORMATION

Faculty Courses

KIX1001: Matematik Kejuruteraan 1 / *Engineering Mathematics 1*

Kod Kursus *Course Code*	KIX1001
Tajuk Kursus *Course Title*	Matematik Kejuruteraan 1 *Engineering Mathematics 1*
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Rujukan Utama *Main Reference*	1. Glyn James, "Modern Engineering Mathematics", 5th Edition, 2015, Pearson. 2. K.A. Stroud and D.J. Booth, "Engineering Mathematics", 8th Edition, 2020, Red Globe Press. 3. Glyn James, "Advanced Modern Engineering Mathematics", 5th Edition, 2018, Pearson. 4. K.A. Stroud and D.J. Booth, "Advanced Engineering Mathematics", 6th Edition, 2020, Red Globe Press. 5. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition International Student Version, 2011, John Wiley & Sons Ltd.
Strategi Pembelajaran *Learning Strategies*	Kuliah, tutorial, tugasan *Lectures, tutorial, and assignment*
Masa Pembelajaran Pelajar *Student Learning Time*	Bersemuka / *Face to face* : 46 jam/*hours* Tidak Bersemuka / *Non Face to face*: 16 jam/*hour* Masa Persediaan Pelajar / *Student Preparation Time*: 58 jam/*hours*
Kemahiran Boleh Pindah Transferable Skills	Pengaturcaraan MATLAB *MATLAB Programming*
Pensyarah / *Lecturer* Bilik / *Room* Telefon/e-mel *Telephone/e-mail*	Rujuk jadual waktu fakulti *Refer to the faculty's timetable*
Sesi Kuliah / *Lecture Session:* Hari/Masa / *Day/Time* Tempat / *Venue*	Rujuk kepada myum.um.edu.my. *Refer to* myum.um.edu.my.
Sesi Tutorial/Amali: *Tutorial/Practical Session:* Hari/Masa / *Day/Time* Tempat / *Venue*	Rujuk jadual waktu fakulti *Refer to the faculty's timetable*
Perincian Pemberatan Penilaian *Detail of Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment* : 40% Peperiksaan Akhir / Final Examination : 60%

KIX1001: Matematik Kejuruteraan 1 / *Engineering Mathematics 1*

Week	Topic & Activities
1.	Fungsi: Had fungsi, had dan kesinambungan Derivatif: Konsep asas dan definisi, peraturan pembezaan, peraturan rantai, pembezaan parametrik dan tersirat, derivatif yang lebih tinggi. Aplikasi fungsi dan derivatif kejuruteraan: fungsi hampir, kecerunan garis lurus, kecekungan, gerakan dan derivatif kedua, kelengkungan satah lengkung. *Functions: Limit of a function, limits and continuity* *Derivatives: Basic ideas and definitions, rules of differentiations, chain rule, Parametric and implicit differentiation, Higher derivatives.* *Engineering Applications of Functions and Derivatives: Approximating functions, The gradient of a straight line, Concavity, motion and the second derivatives, Curvature of a plane curves.*
2.	Derivatif separa: Konsep asas dan definasi. Fungsi domain, pemboleh ubah bersandar dan pemboleh ubah tidak bersandar, derivatif separa peringkat lebih tinggi, pembezaan fungsi komposit dan fungsi tersirat. Derivatif separa menggunakan Jacobians, operasi pembezaan. Aplikasi kejuruteraan derivatif, satah tangen dan permukaan normal dalam tiga dimensi. *Partial Derivatives: Basic ideas and definitions. Domain of the functions, Dependent and independent variables, Higher order partial derivatives, Differentiation of composite functions and implicit functions.* *Partial Derivatives using Jacobians, Differential operators.* *Engineering Applications of Partial Derivatives, Tangent planes and normal to surface in three dimensions.*
3.	Vektor Algebra 1: Konsep asas, komponen kartesian, vektor dalam ruang, kecerunan, capahan, derivative arah curl. *Vector Algebra I: Basic concepts, Cartesian components, Vectors in space, Gradient, Divergence, Curl Directional derivatives.*
4.	Vektor Algebra II: Hasil darab skalaan dan hasil darab vektor, hasil darab trirangkap. *Vector Algebra II: Scalar Product and Vector Product, Triple Product.*
5.	Aplikasi kejuruteraan vektor algebra, Aplikasi kejuruteraan analisa vector. *Engineering Applications of Vector Algebra, Engineering Applications of Vector Analysis.*
6.	Algebra Matriks untuk Sistem Algebra Lelurus Tidak Homogen: Operasi Matriks Asas; Menyelesaikan Sistem Persamaan Lelurus Tidak Homogen; Penyongsangan Matriks; Kaedah Grafik; Peraturan Cramer; Kaedah Penghapusan; Penghapusan Gauss Naif; Penghapusan Gauss Secara Separa Pangsi; Bentuk Baris Eselon; Pengurangan Bentuk Baris Eselon; Pangkat; Pengantungan Lelurus; Aplikasi Kejuruteraan Sistem Persamaan Lelurus Tidak Homogen. *Matrix Algebra for Non-Homogeneous Linear Algebraic System: Basic Matrices Operations; Solving Non-Homogeneous System of Linear Equations; Matrix Inversion Approach; Graphical Method; Cramer's Rule; Method of Elimination; Naïve Gauss Elimination; Gauss Elimination with Partial Pivoting; Row Echelon Form, Reduced Row Echelon Form, Rank, & Linear Dependency; Engineering Application of Non-Homogeneous System of Linear Equations.*
7.	Algebra Matriks untuk Sistem Algebra Lelurus Homogen: Menyelesaikan Sistem Persamaan Lelurus Homogen; Masalah Nilai Eigen/ Vector Eigen; Aplikasi Kejuruteraan untuk Masalah Nilai Eigen/ Vector Eigen; Pepenjuruan dan Penyambungannya; Teorem Cayley-Hamilton; Aplikasi Kejuruteraan untuk Sistem Algebra Lelurus Homogen. *Matrix Algebra for Homogeneous Linear Algebraic System: Solving Non – Homogeneous System of Linear Equations; Eigenvalue/ Eigenvector Problem; Engineering Application of Eigenvalue/ Eigenvector Problem; Diagonalization & Its Extension; Cayley-Hamilton Theorem; Engineering Application of Solving Homogeneous System of Linear Equations.*

8.	Pengamilan: Konsep asas dan definisi, keedah pengamilan: kaedah penggantian, mengikut bahagian, pecahan separa. Kamiran wajar dan kamiran tidak wajar. *Integration: Basic ideas and definitions, Techniques of Integrations: the substitution method, by parts, by partial fractions.* *Proper and Improper Integrals.*
9.	Aplikasi pengamilan kejuruteraan: Kawasan pada satah, isipadu pepejal bagi keratan rentas yang diketahui, momen dan pusat jisim. *Engineering Applications of Integrals: Areas of regions in the plane, Volumes of solids with known cross sections, Moment and center of mass.*
10.	Pengamilan berganda: pengamilan ganda dua, pengamilan trirangkap. *Multiple Integrals: Double Integrals and triple Integrals.*
11.	Pengamilan berganda: pengamilan ganda dua, pengamilan trirangkap, kamiran isipadu. *Multiple Integrals: Double Integrals and triple Integrals, volume integrals.*
12.	Kamiran garisan dan kerja terlaku. Teorem Green dalam satu satah. *Line integral and work done. Green's theorem in a plane.*
13.	Kamiran permukaan. *Surface Integrals.*
14.	Teorem Stoke. *Stoke's Theorem.*

KIX1002: Matematik Kejuruteraan 2 / *Engineering Mathematics 2*

Kod Kursus Course Code	KIX1002
Tajuk Kursus Course Title	Matematik Kejuruteraan 2 Engineering Mathematics 2
Bahasa Pengantar Medium of Instruction	Bahasa Inggeris English
Rujukan Utama Main Reference	1. Glyn James, "Modern Engineering Mathematics", 5th Edition, 2015, Pearson. 2. K.A. Stroud and D.J. Booth, “Engineering Mathematics”, 8th Edition, 2020, Red Globe Press. 3. Glyn James, "Advanced Modern Engineering Mathematics", 5th Edition, 2018, Pearson. 4. K.A. Stroud and D.J. Booth, “Advanced Engineering Mathematics”, 6th Edition, 2020, Red Globe Press. 5. Erwin Kreyszig, “Advanced Engineering Mathematics”, 10th Edition International Student Version, 2011, John Wiley & Sons Ltd.
Strategi Pembelajaran Learning Strategies	Kuliah, Tutorial, dan Perbincangan Kumpulan Lectures, Tutorial and Group Discussion
Masa Pembelajaran Pelajar Student Learning Time	Bersemuka / Face to face : 46 jam/hours Tidak Bersemuka / Non Face to face: 12 jam/hour Masa Persediaan Pelajar / Student Preparation Time: 62 jam/hours
Kemahiran Boleh Pindah Transferable Skills	-
Pensyarah / Lecturer Bilik / Room Telefon/e-mel Telephone/e-mail	Rujuk jadual waktu fakulti Refer to the faculty’s timetable
Sesi Kuliah / Lecture Session: Hari/Masa / Day/Time Tempat / Venue	Rujuk kepada myum.um.edu.my. Refer to myum.um.edu.my.
Sesi Tutorial/Amali: Tutorial/Practical Session: Hari/Masa / Day/Time Tempat / Venue	Rujuk jadual waktu fakulti Refer to the faculty’s timetable
Perincian Pemberatan Penilaian Detail of Assessment Weightage	Penilaian Berterusan / Continuous Assessment : 40% Peperiksaan Akhir / Final Examination : 60%

KIX1002: Matematik Kejuruteraan 2 / *Engineering Mathematics 2*

Week	Topic & Activities
1.	Pengenalan: Definasi dan Konsep Asas dalam Persamaan Pembezaan Biasa (ODE). Persamaan Pembezaan Turutan Pertama. *Introduction. Definitions and fundamental concept in ODE First order Differential Equations.*
2.	Teknik untuk Menyelesaikan Persamaan Pembezaan Turutan Pertama. *Strategy to Solve First Order Differential Equations.*
3.	Penyelesaian untuk Persamaan Pembezaan Turutan Kedua Homogen dan Linear. *Solutions to Homogeneous Linear Second Order ODE.*
4.	Penyelesaian untuk Persamaan Pembezaan Turutan Kedua Tidak Homogen dan Linear. *Solutions to Non-homogeneous Linear Second Order ODE.*
5.	Aplikasi Kejuruteraan bagi Persamaan Pembezaan Biasa. *Engineering Applications of ODE.*
6.	Penyelesaian Siri Kuasa untuk Persamaan Pembezaan. *Power Series Solutions for Differential Equations.*
7.	Kaedah Frobenius. *Frobenius Method.*
8.	Jelmaan Laplace. *Laplace Transform.*
9.	Jelmaan Laplace: Penyelesaian untuk Persamaan Pembezaan. *Laplace Transform: Solutions for Differential Equations.*
10.	Siri Fourier. *Fourier Series.*
11.	Siri Fourier: Fungsi-fungsi berkala; Siri Trigonometri; Fungsi-fungsi Genap dan Ganjil, Siri Fourier, Pengembangan Separuh Julat. *Fourier Series: Periodic functions; Trigonometric Series; Odd and even functions, Fourier Series, Half-range Expansion.*
12.	Persamaan Pembezaan Separa: Penyelesaian Umum untuk Persamaan Pembezaan Separa (PDE). *Partial Differential Equations: Solving General Solution of PDE.*
13.	Persamaan Pembezaan Separa: Penyelesaian Tertentu untuk Persamaan Laplace. *Partial Differential Equations: Solving Particular Solution of Laplace Equation.*
14.	Persamaan Pembezaan Separa: Penyelesaian Tertentu untuk Persamaan Haba & Persamaan Gelombang. *Partial Differential Equations: Solving Particular Solution of Heat Equation & Wave Equation.*

KIX2005: Undang-undang, Etika dan Kemampanan untuk Jurutera / *Law, Ethics and Sustainability for Engineers*

Kod Kursus *Course Code*	KIX2005
Tajuk Kursus *Course Title*	Undang-undang, Etika dan Kemampanan untuk Jurutera *Law, Ethics and Sustainability for Engineers*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menghurai implikasi undang-undang, terhadap tingkah laku jurutera. 2. Menggunapakai keperluan praktikal kod-kod etika untuk mengawal selia amalan kejuruteraan. 3. Menilai implikasi kemampanan dalam kerja-kerja kejuruteraan. *At the end of the course, students are able to:* *1. Describe the implication of law for engineers' behaviour.* *2. Apply the practical needs of the codes of ethics to regulate engineering practices.* *3. Assess the implication of sustainability in engineering works.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi pengenalan kepada undang-undang dan fungsinya, prinsip asas undang-undang dan kod-kod etika yang berkaitan dengan bidang kejuruteraan. Tanggungjawab dan hak jurutera, implikasi kebajikan awam, dan peranan jurutera kepada pembangunan mampan dan globalisasi juga turut dititik beratkan di dalam kursus ini. *This course covers an introduction to law and functions, basic principles of law and the code of ethics related to the field of engineering. Responsibilities and rights of engineers, public welfare implications, and the role of engineers to sustainable development and globalization has also been emphasized in this course.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%

Rujukan Utama *Main Reference*	1. Martin Peterson, Ethics for Engineers, Oxford University Press, 2020. 2. Mitcham, C. Duval, R.S, Engineering Ethics, Prentice Hall, 2012. 3. Registration of Engineers Act 1967 (REA), 2016. 4. Code of Conduct of Registered Person, Board of Engineers Malaysia (BEM), 2016. 5. Law of torts in Malaysia, 2nd Ed., Norchaya Haji Talib, Petaling Jaya, Selangor, Sweet & Maxwell Asia, 2003. 6. Prinsip-prinsip asas tort, Norchaya Haji Talib, Petaling Jaya, Selangor, Sweet & Maxwell Asia, 2003. 7. Undang-undang kontrak di Malaysia, 2nd Ed., Salleh Buang, Kuala Lumpur, Central Law Book Co., 1995. 8. Robert Brinkmann, Introduction to Sustainability, Wiley, 2nd Edition 2020.

KIX2005: Undang-undang, Etika dan Kemampanan untuk Jurutera / *Law, Ethics and Sustainability for Engineers*

Minggu ***Week***	**Topik** ***Topic***
1	Pengenalan kepada Lembaga Jurutera Malaysia (BEM) dan Institusi Jurutera Malaysia (IEM) *Introduction to the Board of Engineers, Malaysia (BEM) and the Institution of Engineers, Malaysia (IEM)*
2	Akta Pendaftaran Jurutera (REA) 1967 *Registration of Engineers Act 1967 (REA)*
3	Pembatalan, Pengguguran dan Pengembalian Semula *Cancellation, Removal and Reinstatement*
4	Jenis Tort, Liabiliti Tort dan Pembelaan terhadap Tort *Type of Tort, Tort Liability and Defence against Tort*
5	Pengenalan dan Isi Kandungan Kontrak Liabiliti, Pembatalan dan Penyelesaian Kontrak *Introduction and the Content of Contracts Liability, Cancellation and Settlement of Contracts*
6	Jenis-jenis Perkhidmatan Kejuruteraan *Type of Engineering Services*
7	Ujian Pertengahan Semester *Mid-Term Test*
8	Peranan Jurutera Peluang dalam profesion Etika di dalam kajian dan Penyelidikan *Roles of Engineers* *Opportunities in the Profession* *Ethics in Experiment and Research*
9	Profesionalisme, Moral dan Etika *Professionalism, Moral and Ethics*
10	Etika Kejuruteraan, Konflik dan Penyelesaian *Engineering Ethics, Conflict and Resolution*

11	Pengenalan kepada Kelestarian, Rukun Kelestarian, Keselamatan Makanan, Alam Sekitar (udara dan air), Kajian Kes Industri *Introduction to Sustainability, Pillars of Sustainability, Food Security, Environmental (air and water) Security, Industrial Case Studies*
12	Penilaian Kitaran Hayat (LCA) dan Matlamat Pembangunan Mampan (SDG) *Life Cycle Assessment (LCA) and Sustainable Development Goals (SDG)*
13	Kejuruteraan Hijau (proses, bahan, bangunan, dll.) *Green Engineering (processess, materials, buildings, etc.)*
14	Rumusan Kursus *The Course Wrap Up*

KIX2006: Ekonomi Kejuruteraan dan Pengurusan Projek / *Engineering Economics and Project Management*

Kod Kursus *Course Code*	KIX2006
Tajuk Kursus *Course Title*	Ekonomi Kejuruteraan dan Pengurusan Projek *Engineering Economics and Project Management*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menghurai prinsip-prinsip, konsep-konsep asas dan kaedah dalam analisa ekonomi kejuruteraan dan pengurusan projek. 2. Mengaplikasi kaedah-kaedah analisa ekonomi kejuruteraan dalam memilih rekabentuk penyelesaianyang bersaing. 3. Mengaplikasi kaedah-kaedah pengurusan projek dalam melaksanakan dan mencapai matlamat-matlamat strategik organisasi. 4. Menilai kesan keputusan-keputusan ekonomi kejuruteraan dan pengurusan projek ke atas organisasi dan masyarakat. *At the end of the course, students are able to:* *1. Decsribe the principles, basic concepts, and methodology of engineering economy analysis and project management.* *2. Apply engineering economics analysis methods on choosing competing design solutions.* *3. Apply project management methods in implementing and achieving strategic goals of the organization.* *4. Evaluate implications of both engineering economy and project management decisions on organisationand society.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menawarkan pelajar-pelajar dengan konsep-konsep projek kejuruteraan yang mampu terhasil secara fizikal dan yang berpatutan dari segi ekonomi. Kursus ini membincangkan analisis kos dalam membuat keputusaan kejuruteraan dan juga pengurusan dan pengawalan projek-projek yang kompleks. Topik-topik kejuruteraan ekonomi termasuklah konsep kos, kos kitaran hayat, rekabentuk ekonomik, kiraan setara, kiraan faedah, ukuran nilai pelaburan, analisa gantian dan analisa kos- manfaat. Topik-topik bagi pengurusan projek kejuruteraan pula termasuk kaedah-kaedah perancangan projek, organisasi, pengurusan risiko, anggaran kos dan bajet, penjadualan, laporan, penyeliaan dan perlaksanaan projek projek. *This course provides students with the concepts of physically realizable and economically affordable engineering project. This course deals with cost analysis in engineering decision making as well as the*

	management and control of complex projects. Engineering economics topics include cost concepts, life- cycle costing, design economics, equivalence calculations, interest considerations, measures of investment worth, replacement analyses and cost- benefit analysis. Engineering project management topics include methods for project planning, organization, risk management, cost estimating and budgeting, scheduling, reporting, monitoring, and implementation of projects.
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. William G. Sullivan, Elin M. Wicks and Patrick Koelling, Engineering Economy, 17th Ed., Prentice Hall, 2020 2. Leland Blank and Anthony Tarquin, Engineering Economy, 8th Ed., McGraw-Hill, 2018 3. Erik W Larson and Clifford F Gray, Project Management the Managerial Process, 2018, 7th Edition, McGraw-Hill.

KIX2006: Ekonomi Kejuruteraan dan Pengurusan Projek / *Engineering Economics and Project Management*

Minggu ***Week***	**Topik** ***Topic***
1	Pengenalan kepada Ekonomi Kejuruteraan dan Pengurusan Projek *Introductions to Engineering Economy and Modern Project Management*
2	Konsep-konsep Kos dan Ekonomik Rekabentuk *Cost Concepts and Design Economics*
3	Pentakrifan projek dan Penganggaran Kos *Defining the Project and Cost Estimations*
4	Faktor-faktor: Bagaimana masa dan kadar bunga memberi kesan kepada wang *Factors: How Time and Interest Affect Money*
5	Faktor-faktor bergabung: Kadar Bunga nominal dan Efektif *Combining Factors: Nominal and Effective Interest Rates*
6	Menilai Projek Tunggal *Evaluating a Single Project*
7	Perbandingan dan Pemilihan Antara Projek-Projek *Comparison and Selection Among Alternatives: Financial and non-financial criteria*
8	Analisa Penggantian *Replacement Analysis*
9	Menilai Projek Awam Mengunakan Kaedah Faedah-Kos *Evaluating Public Project Using Benefit-Cost Ratio Method*
10	Membangun Pelan Projek *Developing a Project Plan*
11	Mengurus Risiko *Managing Risk*
12	Pengagihan Sumber dan Penjadualan; Menjejak dan Mengawal Projek *Resource Allocation and Scheduling; Project Tracking and Control*
13	Pengkomputeran Pengurusan Projek dan Perancang Projek Microsoft *Project Management Computing and Microsoft Project Planner*
14	Pembentangan Projek Berkumpulan *Group Project Presentation*

COURSE INFORMATION

Department Courses

KIA1003: Bahan Kejuruteraan Awam / *Civil Engineering Materials*

Kod Kursus *Course Code*	KIA1003
Tajuk Kursus *Course Title*	Bahan Kejuruteraan Awam *Civil Engineering Materials*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan sifat-sifat bahan utama konkrit dan kesan terhadap sifat-sifat segar dan keras konkrit. 2. Menjalankan ujian-ujian piawaian untuk menilai sifat- sifat konkrit dan bahan-bahan utamanya. 3. Rekabentuk campuran konkrit dengan gred kekuatan yang berbeza dan keperluan kebolehkerjaan. 4. Mengenalpasti sifat-sifat utama batu dan blok, besi, kayu, asphalt dan bitumen untuk aplikasi kejuruteraan awam. 5. Menerangkan kelakuan dan sebab-sebab kegagalan bahan kejuruteraan awam. *At the end of the course, students are able to:* *1. Explain the properties of concrete constituent materials and influence on fresh and hardened properties of concrete.* *2. Perform standard tests to evaluate properties of concrete and the constituent materials.* *3. Design concrete mixtures with different strength grades and workability requirements.* *4. Identify the main properties of bricks and blocks, timber, steel, asphalt and bitumen for civilengineering application.* *5. Explain the behaviour and causes of failure of civil engineering materials.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan bahan kejuruteraan awambiasa seperti konkrit (dan setiap bahan utamanya – simen, agregat, air, bahan tambahan), batu dan blok, kayu, besi, asfalt dan bitumen. Sifat dan kelakuan setiap bahan serta kepentingan dalam aplikasi kejuruteraan

	awam diliputi dalam kursus ini. Kursus ini juga memperkenalkan ujian-ujian bahan konkrit dan rekabentuk campuran konkrit. *The course introduces common civil engineering materials such as concrete (and each of its constituent material – cement, aggregate, water, admixture), bricks and blocks, timber, steel, asphalt and bitumen. The properties and behaviour of each material as well as the importance for civil engineering application are covered in this course. The course also introduces tests on concrete materials and design of concrete mixtures.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Neville, A.M. Properties of Concrete, Fifth Edition, Pearson, 2012. 2. Michael S. Mamlouk and John P. Zaniewski, Materials for Civil and Construction Engineers, 2nd edition, Pearson Educational International, USA, 2009. 3. N. Jackson and R.K. Dhir, Civil Engineering Materials, 5th edition, Palgrave, New York, 1996. 4. P.A. Claisse, Civil Engineering Materials, Elsevier, 2016 5. N. Sivakugan, C.T. Gnanendran, R. Tuladhar, M.B. Kannan, Civil Engineering Materials, Cengage Learning, 2016 6. Arshad, A. K., Mechanistic Flexible Pavement Design for Malaysian Conditions, Penerbit Universiti Teknologi MARA, 2016. 7. Garber, N. J., Traffic and Highway Engineering, 5th edition, Cengage Learning, 2014.

KIA 1004: Mekanik Bahan / *Mechanics of Materials*

Kod Kursus *Course Code*	KIA 1004
Tajuk Kursus *Course Title*	Mekanik Bahan *Mechanics of Materials*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Mengenal pasti tegasan, terikan dan ubah bentuk rasuk dan tiang. 2. Mengenal pasti kilasan untuk anggota bulat dan bukan-bulat, pusat ricih dan aliran ricih untuk anggota rasuk dan berdinding nipis. 3. Menganalisa transformasi tegasan dan terikan dengan menggunakan kaedah pengiraan dan juga kaedah grafik (Bulatan Mohr). 4. Menganalisis rasuk dan kerangka dengan prinsip-prinsip analisis plastik. 5. Menunjukkan kemampuan mengatur dan melakukan ekperimen makmal/ maya pada tahap ketepatan tertentu. *At the end of this course, students are able to:* *1. Identify the stresses, strains and deformation of beams and columns.* *2. Identify torsional circular and non-circular members and shear flow of beams and thin-walled members.* *3. Analyse the stress and strain transformation using the computational as well as the graphical method (Mohr's Circle).* *4. Analyse beams and frames using the principles of plastic analysis.* *5. Demonstrate the ability to organise and conduct labarotory/ virtual experiments with a certain degree of precision.*
Sinopsis Kandungan Kursus	Kursus ini bermula dengan analisis tegasan, terikan dan ubah bentuk rasuk dan tiang. Ia diikuti dengan teori kilasandan formula untuk keratan bulat dan bukan bulat bersama-sama dengan aliran ricih bagi rasuk dan anggota berdinding nipis. Kemudian, ia meliputi analisis bagi

Synopsis of Course Contents	transformasi tegasan dan terikan. Kursus ini berakhir dengan kaedah analisis plastik. *This course starts off with analysis of stresses, strains and deformation of beams and columns. It follows with torsional theory and formula for circular and non- circular sections together with shear flow for beams and thin-walled members. Then, it covers the analysis of stress and strain transformations. The course ended with plastic analysis method.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Gere, J. M. and Goodno, B. J. "Mechanics of Materials", 9th. Edition, Cengage Learning, 2016. 2. Russell C. Hibbeler, 'Mechanics of Materials SI – 8th Edition', Prentice-Hall, 2012. (Latest edition). (ISBN13: 9789810690137) 3. H.W. Morrow, "Statics and Strength of Materials", Prentice Hall, 7th ed., 2010 4. Beer, Johnston and DeWolf. "Mechanics of Materials", McGraw Hill, 2011

KIA1005: Ukur Kejuruteraan / *Engineering Survey*

Kod Kursus *Course Code*	KIA1005
Tajuk Kursus *Course Title*	Ukur Kejuruteraan *Engineering Survey*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan konsep asas teknik asas ukur. 2. Menyelesaikan planimetric titik kawalan, ketinggian, luas dan isipadu dengan menggunakan konsep terabas, pengarasan dan kaedah-kaedah dan formula yang sesuai. 3. Menggunakan formula dalam pengiraan lengkungan mendatar dan menegak untuk menjadualkan nilai bagi menetapkan garisan tengah jalan raya yang dicadangkan. *At the end of the course, students are able to:* *1. Describe the fundamental concept of surveying technique.* *2. Solve the planimetric control points, heights, areas and volumes by applying the concept of traversing, levelling and appropriate methods and formulae.* *3. Employ the formulae in the computation of horizontal curves and vertical curves to tabulate the values for setting out the centre line of the proposed road.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kepentingan dan objektif kerja-kerja ukur kepada jurutera awam. Konsep asas pengukuran. Konsep ukur daripada keseluruhan kepada bahagian-bahagian. Ringkasansistem pemetaan di Malaysia. Elemen-elemen asas teodolit. Tatacara terabas oleh teodolit, peninjauan, pembukuan, pengurangan dan penyelarasan data.Sumber ralat dalam teodolit. Pengiraan kodinat dan luas oleh kaedah kodinat. Prinsip pengarasan dan peralatan untuk mengukur aras. Prosedur kerja pengarasan, pembacaan, pembukuan dan penyelarasan data. Sumber ralat dalam pengarasan dan kaedah untukmenghapuskannya. Teori

	dan prinsip kaedah stadia. Pengukuran oleh kaedah stadia untuk jarak penglihatan mendatar. Pengukuran oleh kaedah stadia untuk jarak penglihatan tidak mendatar. Kaedah substen bar, kaedah baji optic dan sistem pengurangan otomatik. Kontur dan pengambilan maklumat terperinci oleh takimetri. Ralat dalam kerja-kerja takimetri. Prinsip planimeter dan penggunaannya. Pengiraan keluasan bersisi lurus, kaedah kodinat, kaedah bearing dan jarak. Pengiraan luas bersisi tidak sekata. Trapezoid dan peraturan Simpson untuk pengiraan keluasan. Pengiraan kerja tanah oleh keratan rentas dan membujur. Isipadu dengan kaedah "purata keluasan" dan "kaedah keluasan hujung". Isipadu berdasarkan "prismoidal" formula. Kesan lengkungan dalam pengiraan isipadu kerja tanah berdasarkan Teorem Pappus. Isipadu daripada garisan kontur dan titik tinggi. Rekabentuk lengkungan bulat, lengkungan peralihan dan menegak. Pengiraan menetapkan lengkungan di padang. Persamaan lengkungan peralihan. Kaedah untuk menetapkan lengkungan; kaedah pita, kaedah dua teodolitdan kaedah menggunakan stesen kawalan jauh. Masalah dengan jarak penglihatan dipadang. *The importance and objective of survey works to civil engineers. Basic principles in measurement. Survey concept from whole to parts. Summary of mapping system in Malaysia. Basic elements of a theodolite. Test, use and correction of errors of a theodolite. Procedure of traversing by theodolite, observation, booking, reduction and adjustment of data. Sources of errors in theodolite traversing works and steps requiredto remove them. Computation of coordinates and area by coordinate method. Principles of levelling. Equipment of levelling. Test and adjustment of a level instrument. Work procedure on levelling, reading, booking and reduction of data. Sources of error in levelling and methods to eliminate them. The theory andprinciple of stadia method. Measurement by stadia method for horizontal sight distance. Measurement by stadia method for not horizontal sight distance. Substense Bar method, Optical Wedge and automatic reduction system. Contour and taking details by tacheometry. Errors in tacheometry works. Principles of planimeter and its usage. Area enclosed by straight lines, coordinate method, bearing method and distances. Computation of area of irregular figures. Trapezoidal and Simpson's rules for computation of area. Computation of earthwork by cross and longitudinal section. Volume by "mean areas" and "end areas,'. Volume based on "prismoidal" formulae. Effect of curvature in computation of earthwork volume basedon Pappus's Theorem. Volume from contour and spot levels. Design of circular curve, transition curve and vertical curve. Computation for setting out curve at field.Equation of transition curve. Methods for setting out curve; tape method, two theodolite method and methodusing control remote station. Problems with sighting distance at field.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama	1. A Bannister, S Raymond & R Baker, 'Surveying - 7th Edition', Prentice Hall, 1998

Main Reference	2. R Paul & W Whyte, 'Basic Surveying', 4th Edition, Routledge, 2012 3. B Kavanagh & T Mastin, 'Surveying: Principles & Applications', 9th Edition, Pearson, 2013 4. J Nathanson, M Lanzafama & P Kissam, 'Surveying Fundamentals and Practices', 7th Edition, 2017

KIA1006: Lukisan untuk Jurutera Awam dan CAD / *Civil Engineering Drawing and CAD*

Kod Kursus *Course Code*	KIA1006
Tajuk Kursus *Course Title*	Lukisan untuk Jurutera Awam dan CAD *Civil Engineering Drawing and CAD*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan komponen-komponen asas, konsep dan teknik-teknik lukisan kejuruteraan awam. 2. Melukis elemen-elemen asas grafik kejuruteraan awam melalui pengaplikasian pengetahuan di dalam pelbagai teknik lukisan kejuruteraan. 3. Menggunakan lukisan rekabentuk terbantu komputer (CAD) untuk menghasilkan pelbagai lukisan-lukisan teknikal kejuruteraan awam. 4. Mengaplikasikan pengetahuan tentang teknik- teknik lukisan kejuruteraan awam dan lukisan rekabentuk terbantu komputer (CAD) menyelesaikan masalah kejuruteraan awam. 5. Menunjukkan kemampuan menggunakan perisian untuk menjana keputusan. *At the end of the course, students are able to:* 1. *Describe the basic components, concepts, and techniques of civil engineering drawing.* 2. *Draw graphic basic civil engineering elements through the application of knowledge in various engineering drawing techniques.* 3. *Use computer-aided design drawing (CAD) to produce various technical civil engineering drawings.* 4. *Apply the knowledge of civil engineering drawing techniques and computer-aided design drawing to solve civil engineering problem.* 5. *Demonstrate the ability of using software to generate output.*

Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memberikan pengenalan kepada lukisan-lukisan kejuruteraan awam seperti bangunan, dinding, asas, lantai, tangga, bumbung, kekuda, pintu, tingkap dan sebagainya. Asas kepada lukisan kejuruteraan meggunakan lakaran tangan, dan lukisan terbantu komputer (AutoCad) diliputi. Prinsip asas pandangan keratan dan isometri dipelajari. Pelajar akan dapat menggunakan kemahiran lukisan kejuruteraan sebagai satu cara untuk menyampaikan idea, maklumat dan arahan secara tepat dan jelas. *This course gives introduction to civil engineering drawings such as buildings, walls, foundations, floors, staircases, roofs, trusses, doors, windows, etc. The basics of engineering drawing utilising free hand sketching, and computer aided drafting (Auto CAD) are covered. The fundamental principles of sectional views and isometric views are taught. The student will be able to use engineering drawing skills as a means of accurately and clearly communicating ideas, information and instructions.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100%
Rujukan Utama *Main Reference*	1. Frederick E. Giesecke, et al. (2010). Technical Drawing with Engineering Graphics, Prentice Hall (ISBN-10: 0135090490) 2. Kevin Lang (2013), AutoCAD® Tutor for Engineering Graphics: 2013 and Beyond, Cengage Learning (ISBN-10: 1133960391) 3. Yasmin, N. (2019), Introduction to AutoCAD 2020 for Civil Engineering Applications: Learning to use AutoCAD for Civil Engineering Projects, SDC Publication, ISBN 10: 1630572799

KIA1007: Pengaturcaraan dan Sistem Maklumat / *Programming and Information System*

Kod Kursus *Course Code*	KIA1007
Tajuk Kursus *Course Title*	Pengaturcaraan dan Sistem Maklumat *Programming and Information System*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menghuraikan konsep GIS termasuk aplikasi, komponen sistem dan kebolehfungsiannya. 2. Menunjukkan kebolehan mengaplikasikan perisian GIS untuk pemetaan/ ramalan/ pemodelan. 3. Menunjukkan kemampuan menggunakan perisianuntuk menjana keputusan. 4. Menterjemah masalah-masalah kejuruteraan ke dalam program computer-proses pembangunan. 5. Membangunkan kod program komputer untuk menyelesaikan masalah-masalah kejuruteraan. *At the end of the course, students are able to:* *1. Explain the GIS concepts including applications, system components and its functionality.* *2. Demonstrate capability of applying GIS software for mapping/prediction/modelling.* *3. Demonstrate the ability of using software to generate output.* *4. Translate engineering problems into computer program-development process.* *5. Develop computer programme code to solve engineering problems.*
Sinopsis Kandungan Kursus	Kursus ini dibahagikan kepada dua bahagian: GIS dan Program Komputer. Bahagian pertama memperkenalkan konsep sistem maklumat geografi (GIS) termasuk aplikasi, komponen sistem dan

Synopsis of Course Contents	kebolehfungsiannya. Ini diikuti dengan aplikasi praktikal perisian GIS untuk menjalankanprojek. Bahagian kedua adalah program computer. Bahagian ini memberikan pengenalan dalam pengaturcaraan komputer. Asas perkakas pengaturcaraan dan prosedur pengaturcaraan diliputi. Perkembangan kod komputer untuk menyelesaikan masalah matematik dan kejuruteraan dimasukkan. Ini diikuti dengan menjalankan kod program komputer yang lengkap dalam PC dan akhirnya menunjukkan betapa program terbentuk boleh digunakan untuk menyelesaikan masalah tertentu *This course is divided into two parts: GIS and Computer Programming. The first part introduces the geographical information systems (GIS) concepts including applications, system components and its functionality. This is followed by practical application of GIS software to carry out a project. The second part is the computer programming. This part introduces the process of computer programming. Basic programming tools and programming procedures are covered. Development of computer codes to solve mathematical and engineering problem are included. This is followed by running the complete computer program codes on PC and finally demonstrating how the developed program can be used to solve a particular problem.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100%
Rujukan Utama *Main Reference*	1. Kang-tsung Chang (2019), Introduction to Geographic Information Systems, 9th Edition, Mc Graw Hill 2. Paul A. Longley, Michael F. Goodchild, David J. Maguire, David W. Rhind (2005), Geographical Information Systems: Principles, Techniques, Management and Applications, 2nd Edition, Wiley 3. Online resources from Internet (GIS and sources of spatial data) 4. Siauw, Timmy, and Alexandre Bayen. An introduction to MATLAB® programming and numerical methods for engineers. Academic Press, 2014. Mikhailov, Eugeniy E. Programming with MATLAB for scientists: A beginner's introduction. CRC Press, 2018.

KIA2001: Teori Struktur / *Theory of Structures*

Kod Kursus *Course Code*	KIA2001
Tajuk Kursus *Course Title*	Teori Struktur *Theory of Structures*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA1002, KIA1004*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menentukan cerun dan pesongan rasuk, kerangka dan kekuda boleh tentu secara statik menggunakan kaedah- kaedah Kamiran Berganda (Macaulay), Momen Luas, Rasuk Konjugat dan Teorem Castigliano's 2. Menganalisa kekuda, rasuk dan kerangka tak boleh tentu secara statik menggunakan kaedah-kaedah cerun- pesongan, agihan momen dan kaedah fleksibiliti. 3. Menganalisa kesan menggunakan garis imbas bagi beban yang bergerak untuk struktur boleh tentu dan tak boleh tentu secara statik menggunakan prinsip analisis struktur. 4. Menggunakan teori garis alah untuk menganalisa papak konkrit bertetulang. 5. Menunjukkan kemampuan mengatur dan melakukan eksperimen makmal/maya pada tahap ketepatan tertentu. *At the end of the course, students are able to:* 1. *Determine the slope and deflection of statically determinate beams, frames and trusses using Double Integration's (Macaulay's), Moment-Area's, Conjugate Beam and Castigliano's Theorem Methods.* 2. *Analyse statically indeterminate trusses, beams and frames using the slope deflection, moment distribution and flexibility methods.* 3. *Analyse the effects of the influence lines due to moving loads for statically determinate and indeterminate structures using the principles of structural analysis.* 4. *Apply yield line theory for the analysis of reinforced concrete slabs.*

	5. *Demonstrate the ability to organise and conduct laboratory/virtual experiments with a certain degree of precision.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini dimulakan dengan topik cerun dan pesongan rasuk, kerangka dan kekuda bolehtentu statik menggunakan kaedah-kaedah Kamiran Berganda (Macaulay), Momen- Luas, Rasuk Konjugat dan Teorem Castigliano. Ianya diikuti dengan analisa kekuda, rasuk dan kerangka tidakbolehtentu statik menggunakan kaedah Cerun-Pesongan. Kaedah Agihan Momen dan kaedah kebolehlenturan. Topik selepas itu adalah beban bergerak dan Garis Imbas dan diikuti dengan Analisis Garis Alah bagi papak konkrit tetulang. *The course began with the topic of slope and deflection of statically determinate beams, frames and trusses using Double Integration's (Macaulay's), Moment-Area, Conjugate Beam and Castigliano's Theorem. It is followed by the analysis of statically indeterminate trusses, beams and frames using Slope-Deflection, Moment-Distribution and Flexibility methods. The next topics are moving loads and influence lines, followed by Yield Line Analysis of reinforce concrete slabs.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Russell C. Hibbeler, 'Structural Analysis - 10th Edition in SI Units', Pearson Education Limited, 2019. ISBN13: 9781292247137. (Latest edition). 2. Kenneth M. Leet, Chia-Ming Uang, and Joel Lanning, 'Fundamentals of Structural Analysis – 6th Edition', McGraw-Hill International, 2020. ISBN13: 978-1260570441. (Latest edition). 3. Aslam Kassimali, 'Structural Analysis, SI Edition, 6th Edition, Cengage Learning, 2019. ISBN-13: 9781337630948. (Latest Edition). 4. Prab Bhatt, Thomas J. MacGinley, and Ban Seng Choo, Reinforced Concrete Design to Eurocodes: Design Theory and Examples, Fourth Edition, CRC Press, 2014, ISBN-13: 978-1466552524 (Latest edition).

KIA2003: Mekanik Bendalir / *Fluid Mechanics*

Kod Kursus *Course Code*	KIA2003
Tajuk Kursus *Course Title*	Mekanik Bendalir *Fluid Mechanics*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menghuraikan konsep asas bendalir statik dan dinamik 2. Menyelesaikan tekanan hidrostatik dan daya serta kesinambungan, Bernoulli dan persamaan momentum untuk pelbagai masalah 3. Menggunakan persamaan untuk aliran lamina dan bergelora, lapisan sempadan, seretan, pam, paip, analisis dimensi dan persamaan 4. Menjalankan ujikaji, menganalisa dan menginterpretasi data untuk membuat kesimpulan 5. Mempamerkan kebolehan untuk menjalankan ujikaji mekanik bendalir. *At the end of the course, students are able to:* *1. Explain the fundamental concept of fluid statics and dynamics* *2. Solve the hydrostatic pressure and forces and the continuity, Bernoulli and momentum equations for various problems* *3. Apply equations for laminar and turbulent flows, boundary layer, drag, pumps, pipes, dimensional analysis and similitude* *4. Conduct experiment, analyse and interpret data to provide conclusions* *5. Demonstrate the ability to conduct fluid mechanic experiment.*
Sinopsis Kandungan Kursus	Kursus ini bertujuan memperkenalkan mekanik bendalir dan kepentingannya dalam kejuruteraan awam. Ia bermula dengan definasi bendalir, Hukum Pascal, dan pengukuran tekanan. Konsep asas bagi bendalir statik dan bergerak, persamaan yang berkaitan dan

Synopsis of Course Contents	applikasinya seterusnya dibincangkan. Kursus ini berakhir dengan analisa lapisan sempadan, aliran dalam paip dan analisis dimensi dan penyamaan. *This course aims to introduce fluid mechanics and establish its relevance in civil engineering. It starts with the definition of fluid properties, Pascal law and pressure measurement. The underlying concept of fluid statics and dynamics, the relevant equations and their applications are discussed. Ended with the analysis in boundary layer, flowing fluid in pipelines and dimensional analysis and similitude.* .
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Douglas, J.F., et al. (2011). “Fluid Mechanics – 6th edition”. Prentice-Hall 2. Dun, J.R. (2008). “Applied Fluid Mechanics: A Student Guide to Solving Problems”. Boston: McGraw-Hill Higher Education 3. Chadwick, A., Morfett, J. and Borthwick, M. (2013) “Hydraulics in Civil and Environmental Engineering – 5th edition”. CRC Press 4. Çengel, Yunus A. & Cimbala, John M. (2018) “Fluid mechanics : fundamentals and applications", New York, NY : McGraw-Hill Education 5. Amat Sairin Demun (2017), “Civil engineering fluid mechanics : problems and solutions”, Penerbit UTM Press

KIA 2005: Sumber Air / *Water Resources*

Kod Kursus *Course Code*	KIA 2005
Tajuk Kursus *Course Title*	Sumber Air *Water Resources*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Mengenalpasti prinsip asas mengenai kitaran hidrologi dan aspek asas terhadap sistem air permukaan dan. bawah tanah. 2. Menganalisa data-data hujan, kehilangan air dan aliran sungai. 3. Tunjukkan kebolehan untuk membuat penyiasatan untuk masalah hidrologi yang berkaitan dengan hujan dan aliran air 4. Dapat menganalisa data/ maklumat untuk masalah hidrologi yang berkaitan dengan hujan dan aliran air 5. Menganalisa hidrograf banjir, dan pengalihan banjir. 6. Mengintegrasi garis panduan dan prosedur dalam praktis hidrologi perbandaran di Malaysia. *At the end of the course, students are able to:* *1. Identify the basic principles of hydrologic cycle and fundamental aspects of surface water and groundwater systems.* *2. Analyze precipitation, water losses and stream flow data.* *3. Demonstrate the ability to conduct investigation for hydrological problem related to rainfall-runoff* *4. Able to analyse data/ information for hydrological problem related to rainfall-runoff* *5. Analyze flood hydrograph, and reservoir routing.* *6. Integrate the Malaysia guideline and procedures in the practices of urban hydrology.*
Sinopsis Kandungan Kursus	Pengenalan kepada kitaran hidrologi, keseimbangan air, system air permukaan dan bawah tanah. Penggunaan statistik

Synopsis of Course Contents	dan 'probability'dalam bidang hidrolgi dan sumber air. Pengenalan kepada Hidrologi perbandaran dan applikasi kepada sistem di Malaysia *Introduction to hydrological cycle, water balance, surface water and groundwater flow. Application of statistic and probability in hydrology and water resources management. Introduction to urban hydrology and application to Malaysian systems*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Subramanya K. Engineering Hydrology. 4th Edition, McGraw Hill International Edition, 2013. 2. Urban Storm water Management Manual for Malaysia, Jabatan Pengairan dan Saliran, 2012. 3. Linsley R. K. Water Resources Engineering. Fourth edition, McGraw-Hill International Edition, 1992. 4. Chow, V. T., ed., Handbook of Applied Hydrology, McGraw-Hill International Edition, 1964. 5. Chin, D.A.. Water Resources Engineering. Third Edition, Prentice Hall, 2012

KIA2010: Mekanik Tanah I / *Soil Mechanics I*

Kod Kursus *Course Code*	KIA2010
Tajuk Kursus *Course Title*	Mekanik Tanah I *Soil Mechanics I*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menjelaskan perbezaan jenis tanah dengan mengunakan sistem pengkelasan British dan "unified". 2. Menjelaskan teori mampatan tanah untuk tujuan kejuruteraan. 3. Menganalisis konsep resapan dan kebolehtelapan dalam konteks kejuruteraan. 4. Menganalisis konsep tegasan berkesan dalam konteks kejuruteraan. 5. Menunjukkan kemampuan mengatur dan melakukan ekperimen makmal/maya pada tahap ketepatan tertentu. *At the end of the course, students are able to:* *1. Explain the difference types of soil using the British and unified soil classification systems.* *2. Explain the theory of soil compaction for engineering purposes.* *3. Analyse the concept of seepage and permeability in engineering context.* *4. Analyse the concepts of the effective stress principle in relation to engineering context.* *5. Demonstrate the ability to organise and conduct laboratory/virtual experiments with a certain degree of precision.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan tanah sebagai bahan kejuruteraan. Ianya mengandungi pengenalan ringkas tentang kejadian tanah dan sifat-sifat fizikalnya. Pengenalan, pengelasan dan perihalan tanah juga dimasukkan didalam kandungan kursus. Kursus ini juga merangkumi penggunaan

	konsep mekanik kepada tanah seperti kehubungan fasa, pemadatan, kebolehtelapan dan resipan, tegasan dan tegasan berkesan *The course introduces soil as engineering material. It includes an introduction on soil formation and its physical characteristics. Also, includes identification, classification and description of soil for engineering purposes. Application of mechanics on soil such as compaction, permeability and seepage, stresses and effective stresses are also covered.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. B.M. Das, 2018, Principles of Foundation Engineering, 9th ed., Cengage Learning. 2. R. Salgado, 2008, The Engineering of Foundations, McGraw Hill. 3. M. J. Tomlinson, 2001, Foundation Design & Construction, 7th ed., Pearson-Prentice Hall 4. M. Budhu, 2015, Soil Mechanics Fundamental, Wiley Blackwell 5. C. Liu & J. B. Evett, 2008, Soils & Foundations, 7th ed., Pearson 6. R. W. Day, 2006, Foundation Engineering Handbook, McGraw Hill. 7. J. Bowles, 1996, Foundation Analysis and Design, 5th ed., McGraw Hill.

KIA2011: Kejuruteraan Turapan / *Pavement Engineering*

Kod Kursus *Course Code*	KIA2011
Tajuk Kursus *Course Title*	Kejuruteraan Turapan *Pavement Engineering*
Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan ciri-ciri bahan, jenis-jenis ujian dan sifat-sifat fizikal turapan jalan raya. 2. Menganalisa jenis campuran asfalt yang sesuai menggunakan kaedah rekabentuk piawai turapan jalanraya. 3. Menjelaskan proses pembinaan turapan mudah lentur dan tegar, serta masalah-masalah kerosakan turapan. 4. Mengaplikasi kaedah rekabentuk turapan mudah lentur dan tegar untuk kondisi jalan raya yang berbeza. *At the end of the course, students are able to:* *1. Describe the characteristics of materials, type of tests and the physical properties of roadpavement.* *2. Analyze an appropriate asphalt mix type using the standard design method for road pavement.* *3. Explain the construction process of flexible and rigid pavement and pavement distress problems.* *4. Apply flexible and rigid pavement design methods for different road conditions.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kandungan kursus ini ialah Pengenalan kepada turapan mudah lentur dan turapan tegar, Lapisan permukaan dan penyebaran beban untuk turapan mudah lentur dan turapan tegar, Bahan turapan jalan raya: aggregat, simen, bitumen, bitumen terubahsuai, Jenis ujian, sifat-sifat fizikal turapan mudah lentur dan turapan tegar, Campuran berbitumen, jenis-jenis ujian, ciri-ciri, prestasi, Rekabentuk campuran berbitumen, Rekabentuk campuran Marshall, Proses pembinaan jalan raya mudah

	lentur, jenis, struktur, ciri-ciri, kegagalan dan kemorosotan turapan, Proses pembinaan jalan raya tegar, Jenis, struktur, ciri-ciri, kegagalan dan kemorosotan turapan tegar, Rekabentuk “chip seals”, Rekabentuk turapan jalan raya mudah lentur, Rekabentuk turapan jalan raya tegar, Rekabentuk turapan mudah lentur menggunakan perisian, Bahan asfalt alternatif, Pembangunan pengikat alternatif untuk penggantian penuh dan penggantian separa, Reka bentuk turapan lestari dan pemulihan dan pengurusan turapan, dan kitar semula. *Introduction to asphalt and rigid pavement, Surface later dan load distribution of flexible and rigid pavement, Road pavement materials: aggregate, cement, bitumen and modified bitumen, Type of tests, physical characteristics of flexible and rigid pavement, Bituminous* mixture, type of tests, characteristics, performance, Bituminous mix design, Marshall mix design, Construction process of flexible pavement, types, structures, characteristics, pavement failure and distress, Construction process of rigid pavement, Types, structures, characteristics, pavement failure and distress, Design of chip seals, Flexible pavement design, Rigid pavement design, Flexible pavement design using software, Alternative asphalt materials, Alternative binders developed for full replacement and partial replacement, Sustainable and rehabilitation pavement design, pavement management, and recycling
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Mannering,F.L. and Kilareski,W.P., (2012), Principles of highway engineering and traffic analysis, John Wiley & Sons 2. Nicholas J. Garber, Lester A. Hoel (2015), Traffic and Highway Engineering 5th ed., Cengage 3. Shin-Che Huang Hervé Di Benedetto (2015), Advances in Asphalt Materials, 1st Edition Road and Pavement Construction, Elsevier. 4. Athanassios Nikolaides (2017), Highway Engineering, Pavement, Materias and Control of Quality, 1st Edition, CRC Press

KIA 2012: Rekabentuk Konkrit Bertetulang I / *Reinforced Concrete Design I*

Kod Kursus *Course Code*	KIA 2012
Tajuk Kursus *Course Title*	Rekabentuk Konkrit Bertetulang I *Reinforced Concrete Design I*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan rasuk konkrit bertetulang dan Prinsip-prinsip Limit State. 2. Merekabentuk rasuk, papak, tiang, tapak asas konkrit bertetulang mengunakan kaedah Limit State. 3. Menyediakan kiraan rekabentuk dan lukisan lengkap untuk kegunaan pembinaan. *At the end of the course, students are able to:* *1. Explain the structural design concepts, materials behaviour and principles of Limit State design.* *2. Design simple reinforced concrete beams, slabs, columns and pad foundations using the Limit State Method.* *3. Prepare a complete design calculations and working drawings for construction purpose.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi asas konsep reka bentuk dan reka bentuk konkrit bertetulang (RC), kaedah Limit State, analisis keratan dan reka bentuk rasuk RC untuk lenturan dan ricih, pengurangan dan perincian, penyemakan pesongan dan keretakan, reka bentuk papak RC satu hala dan dua hala, reka bentuk tiang pendek RC untuk beban paksi dan lenturan, dan reka bentuk penapak pad RC. *The course covers the fundamentals of reinforced concrete (RC) design and design concept, limit state method, section analysis and*

	design of RC beams for flexure and shear, curtailment and detailing, deflection and cracking checks, design of one-way and two-way spanning RC slabs, design of RC short columns for axial load and bending, and the design of RC pad footings.
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%

Rujukan Utama *Main Reference*	1. WH. Mosley, JH. Bungey and R. Hulse, 'Reinforced concrete design to Eurocode 2', 7 th Edition, 2012. 2. C. Arya, 'Design of Structural Elements', Spon Press, 3rd Edition, 2010. 3. W.M.C. McKenzie, 'Design of Structural Elements to Eurocodes', SI Edition, 2015. 4. EN1990 - Eurocode: Basis of Structural design 5. EN1991- Eurocode 1: Actions on Structures 6. EN1992 - Eurocode 2: Design of Concrete Structure

KIA 2013: Prinsip-prinsip Kejuruteraan Alam Sekitar / *Principles of Environmental Engineering*

Kod Kursus *Course Code*	KIA 2013
Tajuk Kursus *Course Title*	Prinsip-prinsip Kejuruteraan Alam Sekitar *Principles of Environmental Engineering*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Tunjukkan komponen sisa pencemaran, anggaran beban dan kesan-kesan menurut keperluan pengawalseliaan dan amalan terbaik terkini. 2. Aplikasikan teori-teori perawatan fizikal, kimia dan biologi semasa menyediakan objektif rekabentuk yang disyaratkan bagi proses perawatan air dan airsisa. 3. Rekabentuk sistem perawatan air dan airsisa yang akan memberikan prestasi keseluruhan terbaik. 4. Jelaskan ciri-ciri, sumber, kesan dan teknologi kawalan pencemaran udara. *At the end of the course, students are able to:* *1. Demonstrate the polluting waste components, load estimation and impacts according to regulatory requirements and current best practices.* *2. Apply the theories of physical, chemical and biological treatments when providing the requisite design objectives of water and wastewater treatment processes.* *3. Design water and wastewater treatment system that will give best overall performances.* *4. Explain the characteristics, sources, impacts and control technology of air pollution.*
Sinopsis Kandungan Kursus	Kursus ini akan memperkenalkan prinsip kejuruteraan alam sekitar yang turut termasuk pengenalan kepada komponen sisa pencemar dan keperluan pengawalseliaannya berdasarkan kepada piawaian dan

Synopsis of Course Contents	perundangan Malaysia. Aspek asas dan rekabentuk proses perawatan air dan airsisa akan turut diperkenalkan. Sebagai tambahan, konsep pencemaran udara dan teknologi kawalannya akan turut dimasukkan ke dalam kursus ini. *This course will introduce the principles of environmental engineering which include the introduction of polluting waste components and its regulatory requirements in accordance to Malaysia's standards and legislations. The fundamental and design aspects of water and wastewater treatment processes will also be introduced. Additionally, the concept of air pollution and its control technology will also be included in the course.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Sawyer, C.N., Mc Carty, P.L. Parkin, G.F., "Chemistry for Environmental Engineering and Science", 5th edition, McGraw Hill, 2003. 2. APHA. "Standard Methods for the Examination of Water and Wastewater". American Public Health Association, 23rd edition, 2017. 3. Viessman Jr., W., Hammer, M.J., Perez, E.M., Chadik, P.A. "Water Supply and Pollution Control". Pearson Prentice Hall, International Edition, 2009. 4. Metcalf & Eddy, Inc., "Wastewater Engineering: Treatment, Disposal and Reuse". McGraw Hill, 4th edition, 2002. 5. Riffat, R., "Fundamentals of Wastewater Treatment and Engineering". IWA Publishing, 2012. 6. Nevers, N., "Air Pollution Control Engineering", 3rd edition, McGraw Hill, 2017.

KIA2014: Mekanik Tanah II / *Soil Mechanics II*

Kod Kursus *Course Code*	KIA2014
Tajuk Kursus *Course Title*	Mekanik Tanah II *Soil Mechanics II*
Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Terangkan konsep kaedah Boussinesq (teori anjal), kaedah menggunakan jadual, graf dan carta untuk menentukan pengagihan tegasan dalam tanah yangdisebabkan oleh pelbagai jenis muatan 2. Menganalisis magnitud dan kadar enapan pengukuhan 3. Menganalisis sifat kekuatan ricih untuk pelbagai jenis tanah, beban dan saliran yang berbeza *At the end of the course, students are able to:* *1. Explain the concepts of Boussinesq method (elastic theory), methods using tables, graphs and charts for the determination of stress distribution in soils due to different types of* *2. Analyze the magnitude and rate ofconsolidation settlement* *3. Analyze shear strength behaviour for differentsoil types, loading and drainage conditions.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini meliputi topik-topik berikut: Agihan tegasan dalam tanah, kaedah Boussinesq (teori keanjalan), kaedah-kaedah yang menggunakan jadual, geraf dan carta. Kebolehmampatan dan pengukuhan tanah, teori danciri-ciri pengukuhan satu dimensi, ujian-ujian pengukuhan, penganggaran magnitud dan kadar enapan pengukuhan. Kekuatan ricih tanah, ciri-ciri kekuatan ricih, jenis-jenis ujian kekuatan ricih, kekuatan ricih baki.

	The course covers the following topics: Stress distribution in soils, Boussinesq method (elastic theory), and methods using tables, graphs and charts. Compressibility and consolidation of soils,one-dimensional consolidation theory and characteristics, consolidation tests, estimation of themagnitude and rate of consolidation settlement. Shear strength of soils, shear strength characteristics, types of shear strength tests, residualshear strength.
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. B.M. Das, 2018, Principles of Foundation Engineering, 9th ed., Cengage Learning. 2. R. Salgado, 2008, The Engineering of Foundations, McGraw Hill. 3. M. J. Tomlinson, 2001, Foundation Design & Construction, 7th ed., Pearson-Prentice Hall 4. M. Budhu, 2015, Soil Mechanics Fundamental, Wiley Blackwell 5. C. Liu & J. B. Evett, 2008, Soils & Foundations, 7th ed., Pearson 6. R. W. Day, 2006, Foundation Engineering Handbook, McGraw Hill. 7. J. Bowles, 1996, Foundation Analysis and Design, 5th ed., McGraw Hill. 8. B.M. Das, 2010, Principles of Geotechnical Engineering, 7th ed., Cengage.

KIA2015: Ukur Lapangan/ *Surveying Fieldwork*

Kod Kursus *Course Code*	KIA2015
Tajuk Kursus *Course Title*	Ukur Lapangan *Surveying Fieldwork*
Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA1005*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Mengingat kembali konsep asas ukur sebelum menjalankan kerja ukur lapangan. 2. Menjalankan kerja ukur lapangan, menganalisa dan menginterpretasi data untuk membuat kesimpulan. 3. Mempamerkan kebolehan untuk menjalankan kerja ukur lapangan menggunakan teknik dan peralatan yang sesuai. 4. Pembentangan hasil projek secara pembentangan berlisan. 5. Menjalankan tugas secara berkesan sebagai ahli pasukan atau ketua kumpulan. *At the end of the course, students are able to:* *1. Recall the fundamental surveying concept before conducting surveying fieldwork.* *2. Conduct surveying fieldwork, analyse and interpret data to provide conclusion.* *3. Demonstrate ability to perform surveying fieldwork using appropriate technique and equipment.* *4. Present project outcomes through oral presentation.* *5. Perform task effectively as a team member or group leader.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini terdiri daripada dua bahagian: (1) ukur praktikaldan (2) ukur projek. Taklimat tentang konsep asas ukur diberikan sebelum menjalankan ukur praktikal. Kerja lapangan meliputi trabas, ukur aras, takeometer dan plot. Kumpulan yang terdiri daripada lima orang akan dibentuk untuk melaksanakan kerja lapangan ini. Pelajar-pelajar dikehendaki

	menggunakan 'Total Station' untuk menubuhkan kawalan 'Planimetric' dan pengumpulan data, dan menggunakan 'Digital Level' untuk kawalan ketingian. Komputer yang dilengkapi dengan perisian digunakan untuk tujuan pemprosesan data, merekabentuk dan memplot. *This course consists of two part: (1) practical surveying and (2) surveying project. Briefing on the fundemental surveying concept is given before carrying out surveying practical. The fieldwork covers traversing, levelling, tacheometry and plotting. In the surveying project, students are required to conduct the project without a guidance.* *Group consists of five members to be formed to carry out the fieldwork. Students are required to use Total Station for establishment of Planimetric Controls and data collection, and using Digital Levels for Height Controls. Computers equipped with software is used for data processing, designing and plotting.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100% Peperiksaan Akhir / *Final Examination*: 0%
Rujukan Utama *Main Reference*	1. A Bannister & R Baker, 'Solving Problems in SURVEYING - 2nd Edition', Longman Scientific & Technical, Essex, England, 1994 2. R. Subramanian, 'Fundamentals of Surveying and Levelling' Oxford University Press, 2014 3. A Bannister, S Raymond & R Baker, 'Surveying - 7th Edition', Prentice Hall, 1998 4. R Paul & W Whyte, 'Basic Surveying', 4th Edition, Routledge, 2012 5. B Kavanagh & T Mastin, 'Surveying: Principles & Applications', 9th Edition, Pearson, 2014 6. J Nathanson, M Lanzafama & P Kissam, 'Surveying Fundamentals and Practices', 7th Edition, 2017

KIA 2016: Kejuruteraan Jalan Raya / *Highway Engineering*

Kod Kursus *Course Code*	KIA 2016
Tajuk Kursus *Course Title*	Kejuruteraan Jalan Raya *Highway Engineering*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan perancangan dan pentadbiran sistem jalan dan lebuhraya di negara ini dan asas rekabentuk piawai yang digunakan. 2. Merekabentuk jajaran ufuk jalanraya berserta merekabentuk kelebihan ketinggian berdasarkan keperluan geometrik. 3. Merekabentuk jajaran pugak dan keratan rentas jalan raya berdasarkan keperluan geometrik. 4. Mengenalpasti ciri-ciri, kriteria susunatur, dan penggunaan perabut jalan raya yang berbeza. *At the end of the course, students are able to:* *1. Explain the planning and administration system for roads and highways in the country and the basics of design standards used.* *2. Design horizontal road alignment and superelevation based on the geometric requirements.* *3. Design vertical road alignment and road cross section based on geometric requirements.* *4. Identify the characteristics, appropriate layout criteria and application of different type road furnitures.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Perancangan dan pentadbiran jalan dan lebuhraya, rekabentuk geometri jalan dan persimpangan termasuk perabot jalan raya.

	Planning and administration of roads and highways, geometric design of roads and junctions including road furnitures.
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. C.J Khisty, B.K Lall, Transportation Engineering 2001 2. James H. Banks, Introduction to Transportation Engineering, McGraw Hill 2004 3. Nicholas J. Garber, Traffic and Highway Engineering 5th ed., 2014. 4. Mannering,F.L. and Kilareski,W.P., Principles of Highway Engineering and Traffic Analysis, 7th Edition, John Wiley & Sons, 2020. 5. ATJ 8/86, A Guide on Geometric Design of Roads 6. ATJ 11/87, A Guide to the Design of at Grade Intersections

KIA3001: Statistik dan Teknik Berangka / *Statistics and Numerical Techniques*

Kod Kursus *Course Code*	KIA3001
Tajuk Kursus *Course Title*	Statistik dan Teknik Berangka *Statistics and Numerical Techniques*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Mengkaji membuat keputusan statistik bagi sampel dan populasi. 2. Menganalisa konsep membuat keputusan dan modelempirik. 3. Menggunakan rumus yang sesuai untuk menyelesaikan masalah kalkulus secara berangka. 4. Menentukan rumus yang sesuai dalam menyelesaikan persamaan pembeza secara berangka. *At the end of the course, students are able to:* *1. Examine statistical decision making for samplesand populations.* *2. Analyse the concept of decision making andempirical models.* *3. Employ suitable formulae in solving calculus problems numerically.* *4. Determine suitable formulae in solving differential equations numerically.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Bahagian pertama pengenalan kepada statistik kejuruteraan yang mana merangkumi kedua–dua huraian dan teknik beranalisis untuk mengendalikan kepelbagaiandata. Cara mengaplikasi analisis statistik menggunakan perisian komputer juga akan diberikan. Dalam bahagian kedua, kursus ini akan memberikan pelajar pengenalan kepada teknik berangka dan statistik taabir dalam menyelesaikan masalah kejuruteraan. Pelajar akan didedahkan kepada proses menghasilkan program yang ringkas dan teratur dalam pakej perisian komputer untuk menghasilkan penyelesaian secara berangka.

	The first part introduces to engineering statistics which includes both descriptive and analytical methods for dealing with variability in observed data. Also, included are guided applications to simple statistical analysis using software. In the second part, this course provides students with sound introduction to numerical methods and inferential statistics in solving engineering problems. Students will be exposed to developing simple, well-structured programs in chosen software packages to find solution numerically
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Naiman, A., Rosenfeld, R., and Zirkel, G. "Understanding Statistics." The McGraw-Hill Companies, Inc., New York, London, Tokyo, Singapore. 2. Smith, G. "Introduction to Statistical Reasoning." WCB McGraw-Hill, Boston, New York, San Francisco. 3. Dougherty,E.R. "Probability and Statistics For The Engineering, Computing, and Physical Sciences." Prentice-Hall International, Inc., Englewood Cliffs, New Jersey. 4. Lind, D., Marchal W.G. and Mason R.D. “Statistical Techniques in Business and Economics” The McGraw-Hill Companies, Inc.

KIA3002: Rekabentuk Struktur Keluli / *Structural Steel Design*

Kod Kursus *Course Code*	KIA3002
Tajuk Kursus *Course Title*	Rekabentuk Struktur Keluli *Structural Steel Design*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA1002, KIA1004*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan kelakuan dan mod kegagalan anggota struktur keluli. 2. Merekabentuk anggota struktur bagi menahan momen lenturan, tegangan, ricih dan mampatan pada keadaan had khidmat dan had muktamad. 3. Merekabentuk sambungan di antara anggota struktur. 4. Menggabungkan rekebentuk elemen kepada rekabentuk bangunan keluli secara integrasi. *At the end of the course, students are able to:* *1. Describe the behaviour and failure modes of structural steel members.* *2. Design structural members to resist bending, tension, shear and compression at serviceability and ultimate limit states.* *3. Design the connections between structural elements.* *4. Assemble the elementary design into integrated steel building design.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pengenalan kepada struktur keluli, Prinsip rekabentukkeadaan had, Pengiraan beban, Rekabentuk anggotalenturan, Rekabentuk anggota tegangan, Rekabentukanggota mampatan, Rekabentuk sambungan, Rekabentuk penapak tiang *Introduction to the Steel Structures, Principles of Limit State Design, Load calculation, Design of Flexural members, Design of Tension*

	members, Design of Compression members, Design of Connections, Design of Column Bases
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*:60%
Rujukan Utama *Main Reference*	1. N.S. Trahair, M.A. Bradford , D.A. Nethercot, L. Gardner; "The Behaviour and Design of Steel Structures to EC3, Taylor & Francis; 4 edition (2007). 2. Dennis Lam, Thien Cheong Ang, Sing-Ping Chiew, "Structural Steelwork: Design to Limit State Theory, Fourth Edition", CRC Press, 2013. 3. Design of steel structures: Eurocode 3 design of steel structures Part1-1: General rules and rules for buildings, Edited by ECCS-European Convention, Wiley, 2014. 4. MS EN 1993-1-1 : 2010 Design of steel structures - Part 1-1 : General rules and rules for buildings 5. BS EN 1993-1-8 : 2005 Design of steel structures - Part 1-8 : Design of Joints. 6. Simões da Silva, L, Simoes R, and Gervasio, H. Eurocode 3: Design of Steel Structures, Part 1-1: General Rules and Rules for Buildings, 1st Edition, ECCS. 2010. 7. BSI Standards: Extracts from the Structural Eurocodes for Students of Structural Design: PP 1990 2010. ISBN 978 0 580 69454 7

KIA3003: Kejuruteraan Trafik / *Traffic Engineering*

Kod Kursus *Course Code*	KIA3003
Tajuk Kursus *Course Title*	Kejuruteraan Trafik *Traffic Engineering*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. menggunakan persamaan pergerakan dan model aliran kenderaan dalam merekabentuk jalan. 2. menganalisa scenario trafik rumit dengan cara pengukuran aliran, persamaan aliran kenderaan dan persamaan gelombang kejutan 3. menganalisa tahap perkhidmatan jalanraya dan juga jalan bandar dan kampung dengan menggunakan kaedah analisa kapasiti. 4. merekabentuk isyarat masa untuk persimpangan berisyarat dengan menggunakan garis panduan rekabentuk Malaysia dan antarabangsa. 5. menjalankan penyiasatan ke atas masalah kompleks kejuruteraan trafik dengan menggunakan kaedah yang bersesuaian. *At the end of the course, students are able to:* 1. *apply equations of motion and vehicular stream models in roadway design.* 2. *analyse complex traffic scenarios using stream measurement methods, vehicular stream equation and shock wave equation.* 3. *analyse the Level of Service of multilane highways and also rural and urban expressways using capacity analysis methods.* 4. *the signal timing for a signalised intersection and sustainable parking demand and supply system for an area using Malaysia and international design guideline.* 5. *conduct an investigation on complex traffic engineering problems using appropriate methods.*

Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pengenalan kepada sistem pengangkutan, teori aliran trafik, pembolehubah aliran trafik dan ciri-cirinya, kajian aliran trafik, muatan jalan, pengurusan dan kawalan trafik, rekabentuk pemasaan isyarat trafik, kajian meletak kenderaan, keselamatan jalanraya. *Introduction to the transportation system, traffic flow theory, traffic flow variables and characteristics, traffic flow studies, road capacity, traffic control and management, traffic signal timing design, parking studies and road safety.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Pande A., Wolshon B., Traffic Engineering Handbook Seventh Edition, Institute of Transportation Engineers, 2016 2. Papacostas, Transportation Engineering, 2001 3. Kadiyali, Transportation Engineering, 2019 4. Kadiyali, Traffic Engineering and Transport Planning, 2005

KIA3006: Kejuruteraan Asas / *Foundation Engineering*

Kod Kursus *Course Code*	KIA3006
Tajuk Kursus *Course Title*	Kejuruteraan Asas *Foundation Engineering*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan konsep dan klasifikasi elemen-elemen struktur yang menghubungkan struktur kepada tanah dan juga permukaan bersebelahan tanah. 2. Mengenal pasti prinsip fizik dan sains kejuruteraan untuk mengukur mekanisma kepelbagaian asas dan struktur penahan bumi 3. Menganalisis masalah berkait dengan asas danstruktur penahan bumi berdasarkan kelakuan asas dan dasar serta limitasi kaedah analisis. *At the end of the course, students are able to:* *1. Explain the concept and classification of structural elements that connect a structure to the ground and also adjacent ground surfaces.* *2. Identify the principles of physics and engineering science to quantify the mechanism of different types of foundation and earth retaining structures.* *3. Analyze foundation and earth retaining structures related problems based on the behaviour of foundations and the basis and limitations of the analysis method.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menekankan konsep kejuruteraan asas yang merangkumi kepelbagaian dalam jenis-jenis rekabentuk asas dalam struktur awam dan struktur pebahan bumi. Kandungan kursus juga tertumpu kepada penilaian kestabilan dalam sesuatu rekabentuk asas dan penilaian

	terhadap masalah - masalah dalam kegagalan sesuatu struktur asas dan struktur penahan bumi *This course focuses on the concept of foundation engineering which includes the varieties of types of foundations and earth retaining structures. It further includes the evaluation of stability and failure problems in both foundation and also earth retaining structures..*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
ujukan Utama *Main Reference*	1. Donald P. Coduto, William A. Kitch, Man-chu Ronald Yeung, 2016. Foundation Design, Principles and Practices. Prentice Hall 2. C. Liu & J. B. Evett, 2008, Soils & Foundations, 7th ed., Pearson 3. M. J. Tomlinson, 2001, Foundation Design & Construction, 7th ed., Pearson-Prentice Hall

KIA3008: Latihan Industri / *Industrial Training*

Kod Kursus *Course Code*	KIA3008
Tajuk Kursus *Course Title*	Latihan Industri *Industrial Training*
Kredit *Credit*	5
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Mengamalkan etika dan amalan professional kejuruteraan dalam persekitaran kerja. 2. Menyiasati isu-isu kejuruteraan dalam bidang yang berkaitan ke arah pembelajaran sepanjanghayat. 3. Memaparkan semangat kerja berpasukan dalam persekitaran kerja. 4. Menunjukkan kemahiran komunikasi dan penyampaian berkaitan dengan industri. 5. Merumuskan penyelesaian yang praktikal untuk masalah berkaitan dengan industri. *At the end of the course, students are able to:* *1. Adopt ethics and professional engineering practice in working environment.* *2. Investigate engineering issues in related field towards lifelong learning.* *3. Display team working spirit in working environment.* *4. Demonstrate industrial related communication and presentation skills.* *5. Formulate practical solutions for industrial related problems.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memberi pelajar peluang untuk mengaplikasikan dan mempraktikkan pengetahuan yang dipelajari dalam teori untuk membangunkan kemahiran mereka untuk bekerja secara berdikari. Dalam tempoh latihan pelajar dapat mempelajari pengkhususan

	bidangalternatif. Latihan meningkatkan pengetahuan pelajar, melatih mereka untuk tugas-tugas profesional dan melengkapi pembelajaran.. *This course gives the student a possibility to apply and practice the knowledge learnt and theory to develop their skills in working independently. During the training period the student gets familiar with a specific area of the specialisation alternatives of the degree programme. The training deepends student's knowledge, trains them for the professional tasks and complements the studies.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100%
Rujukan Utama *Main Reference*	1. Riordan, D. (2013). *Technical report writing today*. USA: Cengage Learning. 2. Manuele, F. A. (2013). *On the practice of safety*. USA: John Wiley & Sons. 3. Goetsch, David L. (2011). *Occupational Safety and Health for Technologists, Engineers, and Managers,* 7th eds. N.J.: Pearson Prentice Hall.

KIA3010: Kejuruteraan Geoteknikal / *Geotechnical Engineering*

Kod Kursus *Course Code*	KIA3010
Tajuk Kursus *Course Title*	Kejuruteraan Geoteknikal *Geotechnical Engineering*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA2010*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menerangkan mekanisme kegagalan cerun dan faktor yang mempengaruhi kegagalan cerun bagi jenis tanah dan keadaan airbumi yang berbeza. 2. Menilai masalah geoteknik berdasarkan kaedah penyiasatan tapak (SI) sebagai kaedah rekabentuk geoteknikal. 3. Menyelidik kemungkinan bahaya-geo di pelbagai bidang geoteknik dan kaedah penyelesaikannya. *At the end of the course, students are able to:* *1. Explain the mechanisms of slope failure and factors affecting slope stability for various soil types and groundwater conditions.* *2. Evaluate geotechnical problems considering the site investigation (SI) methods as a tool for geotechnical design purposes.* *3. Investigate the possibility of geo-hazard in different areas of geotechnics and the ways to solve them.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi topik berikut: Kestabilan cerun, mod kegagalan cerun, analisis cerun tak terhingga, analisis kegagalan permukaan bulatan, kaedah Fellenius atau Sweden, kaedah Bishop, carta kestabilan, permukaan kegagalan tidak bulat. Masalah kejuruteraan geoteknik dan amalan penyiasatan tapak. Pengenalan am untuk dinamik tanah & asas mesin. Pengenalan umum mengenai teknik penambahbaikan tanah yang ada dalam praktiknya. Kejadian tanah runtuh dan cara mengurangkannya. Kemungkinan risiko yang berkaitan dengan saluran paip dan peningkatannya. Bahaya geo kerana pencairan tanah

	The course covers the following topics: Slope stability, modes of slope failure, analysis of infinite slope, analysis of circular failure surface, Fellenius or Swedish method, Bishop method, stability charts, non-circular failure surface. Geotechnical engineering problem and site investigation practice. General introduction to soil dynamic & machine foundation. General introduction to available ground improvement techniques in practice. Landslide occurrence and how to minimize it. Possible risks associated with pipelines and their uplift loading. Geo-hazard due to soil liquefaction.
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. B.M. Das, 2010, Principles of Geotechnical Engineering, 7th ed., Cengage. 2. R. F. Craig, 2004, Craig's Soil Mechanics, 7th ed., Taylor & Francis. 3. M. Budhu, 2007, Soil Mechanics & Foundations, 2nd ed., Wiley 4. C. Liu & J. B. Evett, 2008, Soils & Foundations, 7th ed., Pearson. 5. R.D. Holtz, W.D. Kovacs & T.C. Sheahan, 2011, An Introduction to Geotechnical Engineering, 2nd ed., Pearson. 6. D.P. Coduto, M.R. Yeung & W.A. Kitch, 2011, Geotechnical Engineering: Principles & Practices, 2nd ed., Pearson. 7. A.S. CAKMAK, 1987, Soil Dynamics and Liquefaction. Academic Press, Elsevier, NY, USA. 8. Rizkalla, M., 2008. Pipeline geo-environmental design and geohazard management. ASME. New York, NY 10016, USA

KIA 3011: Hidraulik Saluran Terbuka / *Open Channel Hydraulics*

Kod Kursus *Course Code*	KIA 3011
Tajuk Kursus *Course Title*	Hidraulik saluran terbuka *Open Channel Hydraulics*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA2003*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menghuraikan pengkelasan dan ciri-ciri aliran yang berbeza dalam saluran. 2. Menganalisa jenis-jenis aliran, rekabentuk saluran dan gelombang banjir didalam saluran terbuka. 3. Mempamerkan kebolehan untuk menjalankan uji kaji. hidraulik saluran terbuka. 4. Menilai ciri-ciri mendapan dan beban pengangkutan mendapan 5. Memulakan konsep permodelan hidraulik. *At the end of the course, students are able to:* *1. Explain different flow classification and characteristic in open channels.* *2. Analyze the types of flow, channel design and flood propagation in open channels.* *3. Demonstrate the ability to conduct open channel hydraulics experiment.* *4. Evaluate the characteristics of sediment and sediment transport load.* *5. Initiate the concept of hydraulic modelling.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini bermula adenagn meeperkenalakna jenis dan ciri-ciri aliran air dalam saluran terbuka. Ianya diikuti dengan analisa/pengiraan bagi aliran yang berbeza, kepentingan dan applikasinya. dan kegunaannya. Rekabentuk saluran, kekasaran permukaan, dinamik dataran banjir, gelombang banjir, dan juga pengangkutan mendapan

	dalam sungai juga diperkenalkan. Ditutup dengan membincangkan konsep permodelan hidraulik. *This course starts with the introduction of the types and characteristics of different flow conditions in open channels. It follows with the analysis/calculation for different types of flow conditions, its significant. and applications. The design of channel, surface roughness, floodplain dynamics and flood propagation, as well as the transport of sediment in rivers and streams are also covered. Finally, the concept of hydraulic modelling is being discussed.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Chadwick, A., Morfett, J. and Borthwick, M. (2021) “Hydraulics in Civil and Environmental Engineering”. CRC Press 2. Featherstone, R. E. and Nalluri, C. (latest edition) “Civil Engineering Hydraulics: Essential Theory with Worked Examples”. Malden MA: Blackwell Science 3. Subramanya, K. (2019) “Flow in open channels”. Mc-Graw Hill India 4. Moglen, G.E. (2015) “Fundamentals of Open Channel Flow”. CRC Press

KIA 3012: Rekabentuk Konkrit Bertetulang II / *Reinforced Concrete Design II*

Kod Kursus *Course Code*	KIA 3012
Tajuk Kursus *Course Title*	Rekabentuk Konkrit Bertetulang II *Reinforced Concrete Design II*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA2012*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Mengenalpasti dan pilih sistem struktur untuk bangunan konkrit bertetulang yang biasa. 2. Menganalisa struktur sinar dan struktur sub-kerangka di bawah beban menegak dan sisi dengan menggunakan tindakan pengedaran semula masa di ULS. 3. Rekabentuk pelbagai jenis papak lantai, lajur, dinding penjaga cantilever dan tapak. 4. Terangkan keperluan keadaan had khidmat untuk struktur konkrit. 5. Menyediakan lukisan terperinci yang lengkap untuk balok, papak, tiang dan tapak. *At the end of the course, students are able to:* *1. Identify and select structural systems for normalreinforced concrete building.* *2. Analyse continuous beams and sub-frame structures under vertical and lateral loads with utilising the action of moment re-distribution at ULS.* *3. Identify and design the different types of floor slabs, columns, cantilever retaining walls and foundation systems.* *4. Explain the requirements of serviceability limit states in concrete structure.* *5. Prepare complete detailed drawings for beams, slabs, columns and foundation structures.*
Sinopsis Kandungan Kursus	Sistem Struktur dan aplikasinya – Konsep Rekabentuk; Analisis rasuk dan bingkai berterusan di bawah beban menegak dan sisi; Pengedaran Semula Momen, Rekabentuk papak lantai-pepejal, papak ribut dan

Synopsis of Course Contents	rata; Rekabentuk Lajur; Rekabentuk Struktur Yayasan - mudah, jalur dan tapak gabungan, Pilecaps; Rekabentuk Penstabilan Struktur; Had Perkhidmatan- pesongan dan keretakan jangka pendek dan panjang; Penebangan dan perincian rasuk, lajur, papak dan tapak. *Structural System and its applications - Conceptual Design; Analysis of continuous beams and sub-frames under vertical and lateral loading; Moment Re- distribution, Design of floor slabs –ribbed and flat slabs; Design of Columns; Design of foundation structures - simple, strip and combined footings, Pilecaps; Design of Retaining Structures; Servicebility Limit States – short- and long-term Deflections and crackings; Curtailment and Detailings of beams, columns, slabs and footings*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Main Reference 1. B.S. Choo, T.J. MacGinley. Reinforced Concrete: Design theory and examples, Spon Press, New York, 2018. 2. W.H. Mosley, Ray Hulse, J.H Bungey. Reinforced Concrete Design to Eurocode2 ,Palgrave Macmillan ,New York ,2012 3. Eurocode - Basis of structural design (BS EN 1990:2002) 4. Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings (BS EN 1992-1-1:2004)

KIA 3013: Bekalan Air dan Pembetungan / *Water Supply and Sewerage*

Kod Kursus *Course Code*	KIA 3013
Tajuk Kursus *Course Title*	Bekalan Air dan Pembetungan *Water Supply and Sewerage*
Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA2003*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menentukan permintaan (kuantiti) air dan kriteria kualiti air. 2. Merekabentuk rangkaian pengumpulan dan pengagihan sistem bekalan air. 3. Menilai ciri-ciri dan proses sistem pembetungan *At the end of the course, students are able to:* *1. Determine the water demand (quantity) andwater quality criteria.* *2. Design the collection and distribution of watersupply* *3. Appraise the characteristics and processes of the sewerage system.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pengenalan kepada kerja-kerja kejuruteraan bekalan air dan pembetungan – sumber air, kualiti dan kuantiti air, permintaan, keperluan sistem pengumpulan dan agihan air, ciri-ciri dan proses sistem pembetungan. *Introduction to water supply and sewerage engineering works – sources, quality and quantity of water- demand and supply, water collection and distribution systems, characteristics and processes of the sewerage system.*
Pemberatan Penilaian	Penilaian Berterusan / *Continuous Assessment*: 40%

Assessment Weightage	Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. McGhee, T.J. (2007) “Water Supply and Sewerage – 6th edition. McGraw Hill International Edition. 2. Hammer, M.J. (2012) “Water and Wastewater Technology - 7th edition”. Pearson Prentice-Hall. 3. (URL-http://civilengineering-notes.weebly.com/water-supply-engineering.html). 4. Nathanson, J.A. and Schneider R.A. (2015) “Basic Environmental Technology: Water Supply, Waste Management and Pollution Control – 6th Edition”. Prentice Hall. 5. Paul N. Cheremisinoff (2019). “Handbook of Water and Wastewater Treatment Technology”. CRC Press, USA.

KIA3014: Asas Kelestarian dalam Kejuruteraan Awam /*Fundamentals of Sustainability in Civil Engineering*

Kod Kursus *Course Code*	KIA3014
Tajuk Kursus *Course Title*	Asas Kelestarian dalam Kejuruteraan Awam *Fundamentals of Sustainability in Civil Engineering*
Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Memahami kepentingan kelestarian ke arah mencapai pembangunan mampan. 2. Memasukkan prinsip kelestarian ke dalam projek kejuruteraan awam. 3. Melakukan pengukuran prestasi kelestarian ke atas projek kejuruteraan awam yang berkaitan. 4. Bincangkan prestasi kelestarian projek kejuruteraan awam yang berkaitan. *At the end of the course, students are able to:* *1. Understand the importance of sustainabilitytoward achieving sustainable development.* *2. Incorporate sustainability principles into civilengineering projects.* *3. Conduct measurement on the sustainability performance of related civil engineering projects.* *4. Discuss the sustainability performance of related civil engineering projects.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Subjek ini memperkenalkan konsep kelestarian, pengembangannya dalam disiplin kejuruteraan awam dan alat untuk menangani tiga tonggak kelestarian: ekonomi, persekitaran, dan sosial. Ia merangkumi kajian kes di berbagai bidang kejuruteraan awam dan bagaimana ia dapat menyumbang ke arah pembangunan lestari.

	The subject is intended to introduce the broad concept of sustainability, its development in civil engineering discipline and tools to address the three pillars of sustainability: economics, environment, and society. It includes case studies across various civil engineering area and how it may contribute toward sustainable development
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Sachs, J. D. (2014). The Age of Sustainable Development. Columbia University Press, New York 2. Robertson, M. (2014). Sustainability principles and practice. Routledge. 3. Braham., A. (2017). Fundamentals of Sustainability in Civil Engineering. 1st ED. CRC Press. *4.* Sivakumar Babu, G.L., Saride,S., Munwar Basha, B. (2017). Sustainability Issues in Civil Engineering. Springer.

KIA3015: Pengurusan dan Teknologi Pembinaan / *Construction Management and Technology*

Kod Kursus *Course Code*	KIA3015
Tajuk Kursus *Course Title*	Pengurusan Dan Teknologi Pembinaan *Construction Management And Technology*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Memahami proses pembinaan dan individu yangterlibat dalam menguruskan proses tersebut. 2. Memasukkan budaya ke arah keputusan yang. cemerlang dalam pelaksanaan tugasan–tugasan di tapak pembinaan berdasarkan prinsip terbaik dari awal projek sehingga tamat projek 3. Menilai pengurusan projek yang melibatkan organisasi, penyelarasan dan penerapan usaha strategik dalam aktiviti pembinaan dan kepelbagaian sumber yang diperlukan untuk mencapai objektif pembinaan. *At the end of the course, students are able to:* *1. Understand the construction process and those individuals who manage that process.* *2. Instil a culture in tendering excellent results in the implementation of construction site tasks via principles of best practice from project commencement to completion.* *3. Appraise the construction management involving the organization, coordination, and strategic effort applied to the construction activities and the numerous resources needed to achieve the building objective.*
Sinopsis Kandungan Kursus	Kursus ini menekankan aspek pengurusan dalam projek pembinaan yang melibatkan perkembangan, perubahan dan inovasi dalam kerja operasi yang melibatkan aktiviti keseluruhan perancangan,

Synopsis of Course Contents	penyelarasan dan pengawalan keseluruhan projek pembinaan dari awal hingga siap. *This content focuses in management that involves development, change and innovation in operational works that encompass activities such as overall planning, coordination and control of construction projects from commencement to completion.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Construction Management Jumpstart: The Best First Step Toward A Career In Construction Management, 3rd Edition By Babbara J. Jackson, Wiley Publishing, Inc 2. Construction Project Management: A Practical Guide To Field Construction Management 5th Edition By S. Keoki Sears, Glenn A. Sears And Richard H. Clough, Wiley Publishing, Inc. 3. Green Bim: Successful Sustainable Design With Building Information Modeling By Eddy Krygiel And Bradley Nies, Wiley Publishing, Inc

KIA3016: Analisis Struktur / *Structural Analysis*

Kod Kursus *Course Code*	KIA3016
Tajuk Kursus *Course Title*	Analisis Struktur *Structural Analysis*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA2001*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menggunakan teori keanjalan dan penggunaan kaedah matriks untuk menakrifkan tensor tegasan dan terikan; hukum Hooke bentuk umum dan persamaan 'constitutive' tegasan dan terikan dalam sistem dimensi. 2. Menganalisa daya-daya and momen-momen lentur untuk kerangka dan rasuk dalam. 3. Membuat model unsur terhingga dengan menggunakan perisian analisis unsur terhingga. 4. Menganalisa kestabilan anggota rangka yang dibebankan secara paksi. 5. Menggunakan ungkapan-ungkapan sistem dinamik untuk sistem struktur. 6. Menunjukkan kemampuan mengatur dan melakukan eksperimen makmal pada tahap ketepatan tertentu. *At the end of the course, students are able to:* 1. *Apply the elasticity theory, matrix approach for stress and strain tensors, general form of Hooke's Law and Constitutive equation of stress and strain in three dimensional structural system.* 2. *Analyse the forces and bending moments for frame and deep beam.* 3. *Create the finite element model for structural member using finite element analysis software.* 4. *Analyse the stability of axially loaded frame members.* 5. *Apply the dynamic equilibrium equations for structural systems* 6. *Demonstrate the ability to organise and conduct laboratory experiments with a certain degree of precision.*

Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini dimulakan dengan pengenalan kepada teori keanjalan dan kaedah Matriks Kekakuan. Di ikuti dengan analisis bagi rasuk dalam menggunakan kaedah topang dan ikat. Seterusnya, pengenalan kepada analisis unsur terhingga dan kestabilan anjal struktur rangka dan diakhiridengan pengenalan kepada struktur dinamik *The course begins with an introduction to the theory of elasticity and Stiffness Matrix's method. This is followed by analysis of deep beam using strut and ties. Afterwards, the introduction to finite element analysis and elastic stability of structural framework and ended with an introduction to structural dynamics.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Russell C. Hibbeler, 'Structural Analysis - 10th Edition in SI Units', Pearson Education Limited, 2019. ISBN13: 9781292247137. (Latest edition). 2. Kenneth M. Leet, Chia-Ming Uang, and Joel Lanning, 'Fundamentals of Structural Analysis – 6th Edition', McGraw-Hill International, 2020. ISBN13: 978-1260570441. (Latest edition). 3. Aslam Kassimali, 'Structural Analysis, SI Edition, 6th Edition, Cengage Learning, 2019. ISBN-13: 9781337630948. (Latest Edition). 4. Chajes A., "Principle of Structural Stability Theory", Civil Engineering and Engineering Mechanics Series

KIA 4001: Projek Tahun Akhir / *Final Year Project*

Kod Kursus *Course Code*	KIA 4001
Tajuk Kursus *Course Title*	Projek Tahun Akhir *Final Year Project*
Kredit *Credit*	6
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Mereka bentuk ujikaji, analisis atau pelan pemerhatian bagi memenuhi objektif-objektif kajian. 2. Mengenalpasti teknik makmal dan/atau perisian yang sesuai, sumber dan kejuruteraan dan peralatan IT yang moden, termasuk ramalan dan pemodelan untuk analisis dan simulasi data. 3. Menunjukkan analisis sains dan kejuruteraan yang mendalam dengan penilaian isu-isu kemampanan social, dan persekitaran yang berkaitan dengan topik penyelidikan. 4. Berupaya mengkaji pelbagai pilihan penyiasatan yang berterusan untuk pendekatan dalam persoalan penyelidikan seperti eksperimen, analisis, simulasi dan pengoptimuman 5. Memuktamadkan penyiasatan untuk mentafsir teori, dapatan dan/atau data dengan kajian dengan pengetahuandan kaedah-kaedah yang bersesuaian. 6. Berupaya membina kemahiran pembentangan yang diperlukan untuk menyampaikan secara berkesan tujuan, skop, penemuan dan kesimpulan penyelidikan. *At the end of the course, students are able to:* *1. Design experiments, analysis or observation plan to fulfil objectives of the research.* *2. Specify appropriate laboratory and/or software techniques, resources, and modern engineering and IT tools, including prediction and modelling for data analysis and simulation.* *3. Demonstrate in depth science or engineering analysis with examination of societal and environmental sustainability issues related to the research topic.*

	4. *Synthetize a range of continuous investigative options for approaching the research questions, such as experimentations, analysis, simulations and optimizations.* 5. *Conclude investigation to interpret the theory, finding and/or data with appropriate research knowledge and methods.* 6. *Demonstrate presentation skills needed to effectively communicate for the purpose, scope and conclusion of the research.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memerlukan pelajar untuk menjalankan projek penyelidikan dalam satu topik Kejuruteraan Awam yang terpilih di bawah penyeliaan seorang kakitangan akademik. Penyelidikan boleh dilaksanakan dalam bentuk kajian literatur, kajian eksperiman, permodelan, simulasi, pengiraan, kajian kes, soal-selidik, dll. Hasil penyelidikan perlu dilaporkan dalam bentuk pengenalan, objektif penyelidikan, skop kajian, kajian literature, metodologi penyelidikan, pengumpulan data/kerja eksperimen, analisis data, keputusan dan perbincangan, kesimpulan dan cadangan, dan rujukan. Satu laporan saintifik dalam bentuk tesis perlu dihantar pada akhir penyelidikan dan pelajar perlu menyampaikan hasil penyelidikan tersebut melalui satu persembahan lisan. *This course requires students to undertake a research project on a chosen topic in Civil Engineering under the supervision of an academic staff. Research can be conducted in the form of literature review, experimental study, modelling, simulation, computational, case study, survey, etc. Research findings should be reported in the form of introduction, objectives of research, scope of study, literature review, research methodology, data collection/experimental work, data analysis, results and discussions, conclusions and recommendations, and references. A scientific report in the form of a thesis should be submitted at the end of the research and the student is required to communicate the findings of the research through an oral presentation.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100%
Rujukan Utama *Main Reference*	1. Guidelines on Thesis Writing, Version 4, September 2017, English Edition, Civil Engineering Department, Engineering Faculty, University of Malaya. 2. Related reference materials and articles in Books, Journals, Conference Proceedings, Monographs, Manuals, Standards, etc. 3. How to write your first thesis: A practical guide for the entire process of producing a thesis for the first time by Gruba, Paul, Zobel, Justin ISBN: 9783319618548 Publication Date: 2017.

KIA 4018: Projek Rekabentuk Bersepadu I / *Integrated Design Project I*

Kod Kursus *Course Code*	KIA 4018
Tajuk Kursus *Course Title*	Projek Rekabentuk Bersepadu I *Integrated Design Project I*
Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menganalisa konsep asas sesuatu projek kejuruteraan awam yang rumit dalam memenuhi spesifikasi dalam piawaian dan kod amalan. 2. Menunjukkan pengetahuan kejuruteraan dalam penyelesaian yang dicadangkan berkaitan dengan masalah sosial, kesihatan, keselamatan, undang – undang dan budaya. 3. Menerapkan prinsip etika dalam konsep yang dicadangkan menggunakan fakta dan kod etika kejuruteraan professional. 4. Menunjukkan penggunaan istilah teknikal kejuruteraan awam dan penghasilan laporan konsep yang tepat. 5. Menggabungkan input dari semua ahli pasukan dan keputusan kolektif ke arah pasukan yang berjaya. 6. Mensintesiskan maklumat dalam konsep yang dicadangkan menggunakan pelbagai sumber dalam konteks teknologi terkini. 7. Menilai kesan pengurusan projek kejuruteraan, ekonomi dan kewangan projek dalam membuat keputusan yang berkaitan dengan konsep yang dicadangkan. *At the end of the course, students are able to:* 1. *Analyze the basic concept of a complex civil engineering project that meets specifications in standards and code of practices.* 2. *Demonstrate the engineering knowledge in proposed solution with regards to societal, health, safety, legal dan cultural issues.* 3. *Apply ethical principles in proposed concept using facts and professional engineering code of ethics.*

	4. *Demonstrate proper use of civil engineering technical terms and proper technical write up of conceptual report.* 5. *Integrate inputs from all team members and collective decisions towards successful team.* 6. *Synthesize information in concept proposed using various sources in the broadest context of recent technology.* 7. *Evaluate the impact of engineering project management, economic and project finance in decision making related to the proposed concept.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus projek rekabentuk berintegrasi I ialah kursus rekabentuk projek peringkat tinggi yang memerlukan pelajar menggunakan kepelbagaian pengetahuan kejuruteraan untuk menyelesaikan masalah kejuruteraan dan membangunkan rekabentuk konsep dengan mengambil kira faktor-faktor kemampanan dan sosial. *The integrated design project I course are high-level project design courses that require students to use diverse engineering knowledge to solve engineering problem and develop a conceptual design with consideration of sustainability and social factors*.
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100%
Rujukan Utama *Main Reference*	1. Introduction to Design for Civil Engineers by A.W. Beeby and R.S. Narayanan, Taylor & Francis Ltd 2. Principles of Applied Civil Engineering Design: Producing Drawings, Specifications and Cost Estimates for Heavy Civil Projects by Ying-Kit Choi, ASCE Press 3. Integarted Design and Cost Management for Civil Engineers by Andrew Whyte, CRC Press 4. Sustainability in Engineering Design and Constriction by J.K Yates and Daniel Castro-Lacouture, CRC Press 5. Fundamentals of Sustainability in Civil Engineering, 2nd edition by Andrew Braham and Sadie Casillas, CRC Press

KIA 4019: Projek Rekabentuk Bersepadu II / *Integrated Design Project II*

Kod Kursus *Course Code*	KIA 4019
Tajuk Kursus *Course Title*	Projek Rekabentuk Bersepadu II *Integrated Design Project II*
Kredit *Credit*	3
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA4018*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menilai konsep asas sesuatu projek kejuruteraan awam yang rumit dalam memenuhi spesifikasi dalam piawaian dan kod amalan. 2. Menunjukkan pengetahuan kejuruteraan dalam penyelesaian yang dicadangkan berkaitan dengan masalah sosial, kesihatan, keselamatan, undang – undang dan budaya. 3. Menerapkan prinsip etika dalam rekabentuk yang dicadangkan menggunakan fakta dan kod etika kejuruteraan professional. 4. Menunjukkan penggunaan istilah teknikal kejuruteraan awam dan penghasilan laporan konsep yang tepat. 5. Menggabungkan input dari semua ahli pasukan dan keputusan kolektif ke arah pasukan yang berjaya. 6. Mensintesiskan maklumat dalam rekabentuk menggunakan pelbagai sumber dalam konteks teknologi terkini, 7. Menilai kesan pengurusan projek kejuruteraan, ekonomi dan kewangan projek dalam membuat keputusan yang berkaitan dengan rekabentuk. *At the end of the course, students are able to:* 1. *Evaluate the basic concept of a complex civil engineering project that meets specifications in standards and code of practices* 2. *Demonstrate the engineering knowledge in proposed solution with regards to societal, health, safety, legal dan cultural issues* 3. *Apply ethical principles in design using facts and professional engineering code of ethics*

	4. *Demonstrate proper use of civil engineering technical terms and proper technical write up of conceptual report* 5. *Integrate inputs from all team members and collective decisions towards successful team* 6. *Synthesize information in design using various sources in the broadest context of recent technology* 7. *Evaluate the impact of engineering project management, economic and project finance in decision making related to design*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Projek meliputi bidang yang berbeza dalam kejuruteraan awam dan alam sekitar dan dipilih mengikut penekanan terhadap setiap pelajar semasa mendaftar kursus ini. Projek diperolehi daripada agensi-agensi kerajaan, firma perunding dan sumber berkait yang lain. Sekiranya diperlukan,jurutera yang bertauliah akan menjadi perunding atau klien. *Projects covering the different options in civil and environmental engineering and selected according to emphasis areas of each student when registering for course. Actual projects are used which are obtained from government agencies, consulting firms, and other sources. When possible, engineers engaged in professional practice are involved as consultants or clients.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100%
Rujukan Utama *Main Reference*	1. Introduction to Design for Civil Engineers by A.W. Beeby and R.S. Narayanan, Taylor & Francis Ltd 2. Principles of Applied Civil Engineering Design: Producing Drawings, Specifications and Cost Estimates for Heavy Civil Projects by Ying-Kit Choi, ASCE Press 3. Integarted Design and Cost Management for Civil Engineers by Andrew Whyte, CRC Press 4. Sustainability in Engineering Design and Constriction by J.K Yates and Daniel Castro-Lacouture, CRC Press 5. Fundamentals of Sustainability in Civil Engineering, 2nd edition by Andrew Braham and Sadie Casillas, CRC Press

KIA 4020: Jurutera dan Masyarakat / *Engineers and Society*

Kod Kursus *Course Code*	KIA 4020
Tajuk Kursus *Course Title*	Jurutera dan Masyarakat *Engineers and Society*
Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	Tiada *No*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menyatukan dengan masyarakat sebagai prospektif jurutera awam dalam menyelesaikan masalah yang melibatkan kejuruteraan awam. 2. Menunjukkan tingkah laku dan kelakuan profesional yang membimbing amalan profesional dan perkhidmatan jurutera awam kepada masyarakat. 3. Menyusun sumber dan input secara sistematik daripada semua ahli pasukan dan membuat keputusan kolektif untuk memastikan kejayaan pasukan melalui projek *At the end of the course, students are able to:* *1. Integrate with the community as a prospective civil engineer in solving problems involving the civil engineering profession.* *2. Demonstrate the ethical and professional conduct that guide a civil engineer's professional practice and service to the community* *3. Organise resources and inputs systematically from all team members and make collective discussion to ensure team success through a project.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Objektif utama kursus ini adalah untuk membolehkan pelajar menyumbang kepada masyarakat dengan menerapkan pengetahuan dan kemahiran yang dipelajari di dalam kelas untuk membantu menyelesaikan masalah tempatan. Ini adalah salah satu agenda penting di Kementerian Pengajian Tinggi untuk diterjemahkan di peringkat universiti dan boleh dianggap sebagai usaha mulia oleh universiti dalam melahirkan graduan yang holistik dengan melibatkan mereka dalam membantu masyarakat setempat. Di samping itu, pelajar mesti dapat memahami peranan etika kejuruteraan dan tanggungjawab profesional jurutera terhadap keselamatan awam; kesan

	aktiviti kejuruteraan: ekonomi, sosial, budaya, persekitaran dan kelestarian. Penilaian berterusan untuk kursus ini terbahagi kepada dua bahagian iaitu: (1) Satu Kajian Kes (Laporan dan Pembentangan Interim) dan (2) Projek Masyarakat Bersepadu (ISP) (Laporan Akhir & Montaj Video). ISP adalah projek berkumpulan yang tidak melebihi 5 pelajar setiap kumpulan. *The main objective of this course is to enable students to contribute to the community by applying knowledge and skills learned in the classroom to help solve local problems. It is one of the important agendas in the Ministry of Higher Education to be translated at the university level and can be considered as a noble effort by the university in producing holistic graduates by engaging them in helping the local community. In addition, students must be able to comprehend the role of engineering ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability. The continuous assessment for this course is divided into two parts namely: (1) A Case Study (Interim Report & Presentation) and (2) Integrated Society Project (ISP) (Final Report & Video Montage). The ISP is a group project of not more than 5 students per group.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 100%
Rujukan Utama *Main Reference*	1. Lina D. Dostilio, 2017. The Community Engagement Professional in Higher Education: A Competency Model for an Emerging Field, Campus Compact. 2. Julia Preece, 2017. University Community Engagement and Lifelong Learning: The Porous University, Springer. 3. Benneworth, Paul. editor. 2013. University Engagement With Socially Excluded Communities, Dordrecht : Springer Netherlands : Imprint: Springer. *4.* A. Hoy, M. Johnson, 2013. Deepening Community Engagement in Higher Education: Forging New Pathways, Springer

KIA4035: Rekabentuk Konkrit Prategasan / *Prestressed Concrete Design*

Kod Kursus *Course Code*	KIA4035
Tajuk Kursus *Course Title*	Rekabentuk Konkrit Prategasan *Prestressed Concrete Design*
Kredit *Credit*	2
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/ Minimum Requirement(s)*	*KIA2001, KIA2012*
Hasil Pembelajaran Kursus *Course Learning Outcomes*	Di akhir kursus ini, pelajar dapat: 1. Menentukan daya prategasan dan kesipian yang sesuai untuk rekabentuk anggota lenturan yang disokong mudah. 2. Membina konsep teras keratan dan garis tekanan bagi susuk kabel yang sesuai. 3. Analyze the influence of prestress losses and its effects on the design of prestressed members. 4. Menilai kekuatan muktamad keratan prategasan bagi semakan rekabentuk. 5. Menyediakan penghitungan dan lakaran rekabentuk bagi pembinaan struktur prategasan yang disokong mudah. *At the end of the course, students are able to:* *1. Determine suitable prestressing force and eccentricity for design of simply supported flexural members.* *2. Establish the concepts of kern of section and pressure line for a suitable cable profile.* *3. Analyze the influence of prestress losses and its effects on the design of prestressed members.* *4. Determine the ultimate strength of prestressed sections for design check.* *5. Prepare complete set of design calculations and working drawings for construction of a simply supported prestressed structure.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus bermula dengan pengenalan kepada konsep prategasan dan aplikasi struktur. Keperluan bahan, kaedah serta sistem prategasan dihuraikan dan berikan penekanan. Syor-syor kod bagi rekabentuk keadaan had,

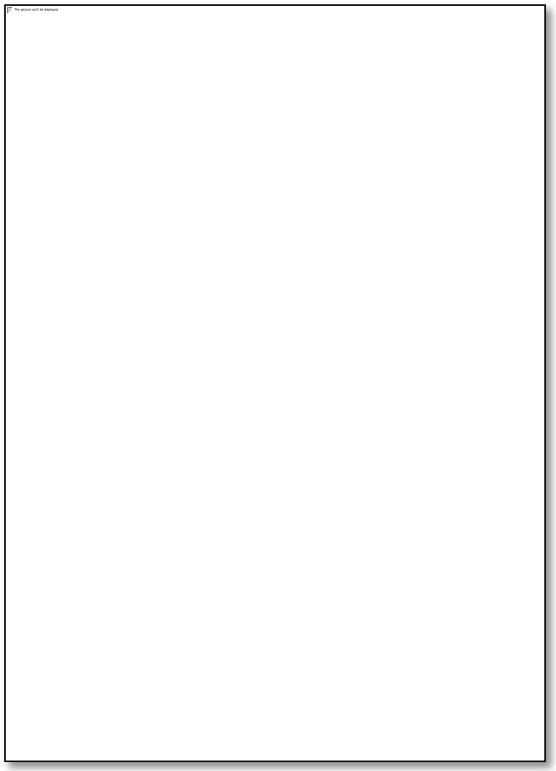
	pengkelasan perkhidmatan dan had-had tegasan dibincangkan. Pendekatan dan kaedah bagi rekabentuk prategasan diperincikan, merangkumi penentuan daya dan kesipian prategasan, susunan keluli prategasan dan susuk kabel, kehilangan prategasan dan semakan kekuatan muktamad. Kuliah dibantu dengan contoh-contoh kerja bagi setiap aspek fasa rekabentuk *The course begins with the introduction of prestressing concepts and structural applications. Material requirements, prestressing methods and systems are next presented and highlighted. Code recommendations on limit state design, serviceability classifications and stress limitations are discussed. The approach and method for the design of prestressed beam are detailed which include determination of the prestressing force and eccentricity, arrangement of prestressing steel and cable profile, prestress losses and ultimate limit strength check. The lectures will be enhanced with worked examples of each aspect of the design phase.*
Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment*: 40% Peperiksaan Akhir / *Final Examination*: 60%
Rujukan Utama *Main Reference*	1. Limit State Design of Prestressed Concrete. Y. Guyon, Elsevier Applied Science Publishers, Limited ed., 1974. 2. Design of Prestressed Concrete. A. H. Nilson, Wiley, 1978. 3. Modern Prestressed Concrete Design. G.S. Ramaswamy, Pitman, 1976. 4. Eugene, O., Andrew, D., and Emma, S. Reinforced and Prestressed Concrete Design to EC2: the Complete Process. 2012. (ISBN13: 9780415571951) 5. Gilbert, R. I., Mickleborough, N.C., and Ranzi, G. Design of Prestressed Concrete to Eurocode 2, Second edition. 2017. (ISBN13: 9781466573109

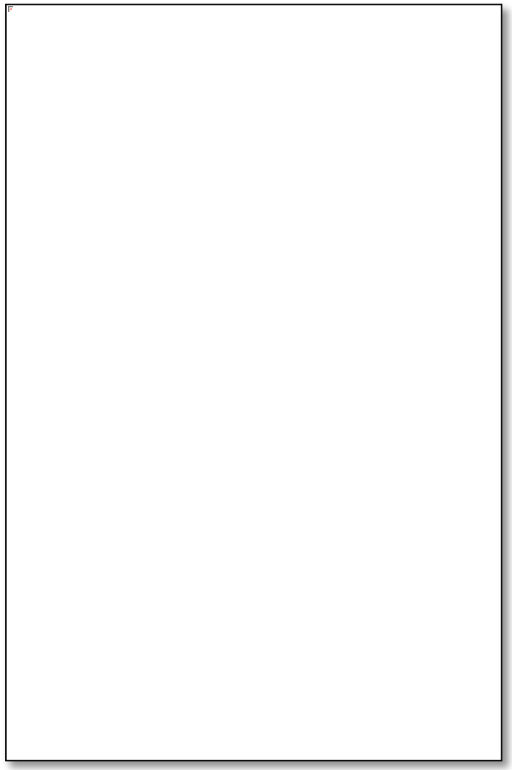
FACILITIES

Vehicle Parking for Students

Students are only allowed to park in designated student parking areas which is at parking Block T. If you park outside the designated areas, you may be fine and clamp. For any inquiries, please e-mail/contact:

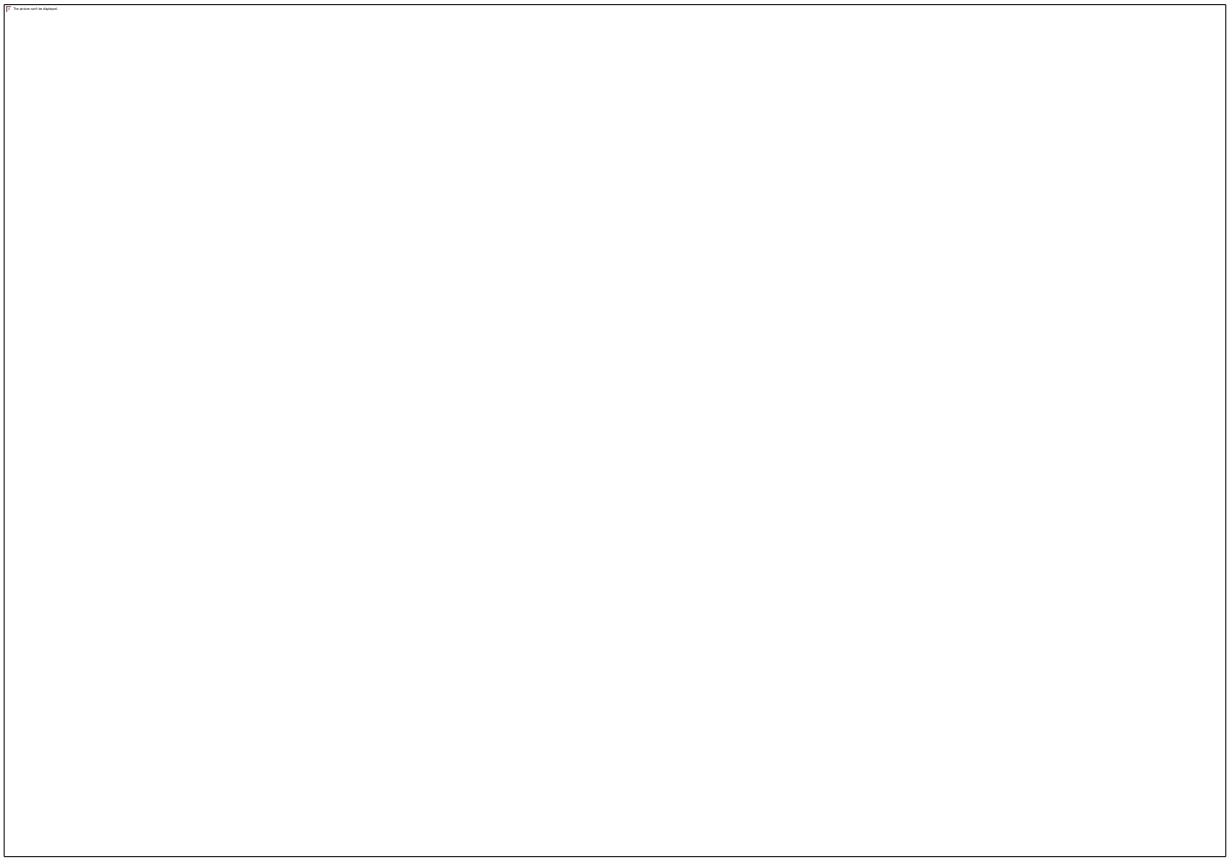
Deputy Dean (Development) Office
Email: fk_tdp@um.edu.my
Tel: +603 7967 7621





CAMPUS MAP

FACULTY MAP



A	Department of Biomedical Engineering	M	Engineering Tower (Research Wing)
B	Lecturer Hall 1 (DK1)	N	Hydraulic Lab (Mechanical)
C	Industry and Research Labs	P	Public Health Engineering Lab (Civil)
D	Lecture Rooms and IR Cube	Q	Metallurgy Lab (Mechanical)
E	Research Labs	R	Mechanical and Electrical Engineering Labs
F	Civil Engineering Labs	T	Multiple Storey Parking Block
G	Advanced Structured Labs (Civil)	U	Lecture Halls
J	Department of Mechanical Engineering	V	Department of Chemical Engineering
K	Department of Mechanical Engineering	W	Department of Chemical Engineering
L	Engineering Tower (Administration Wing)	Y	Department of Electrical Engineering

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