



USM
UNIVERSITI SAINS MALAYSIA



2026/2027

SCHOOL OF CIVIL ENGINEERING

BACHELOR OF CIVIL ENGINEERING WITH HONOURS



Transforming Higher Education
for a Sustainable Tomorrow

SCHOOL OF CIVIL ENGINEERING

2026/2027

<https://www.usm.my>

USM Vision

Transforming Higher Education for a Sustainable Tomorrow

USM Mission

USM is a pioneering, transdisciplinary research-intensive university
that empowers future talents and enables the bottom billions
to transform their socio-economic well-being

STUDENT'S PERSONAL INFORMATION

Full Name	
Identity Card (IC)/Passport No.	
Current Address	
Permanent Address	
E-mail Address	
Telephone No. (Residence)	
Mobile Phone No. (if applicable)	
School	
Programme of Study	

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ACADEMIC CALENDAR - ACADEMIC SESSION 2026/2027

FOR ALL SCHOOLS (EXCEPT FOR SCHOOL OF MEDICAL SCIENCES AND SCHOOL OF DENTAL SCIENCES)

SEM	WEEKS	ACTIVITIES	DATES	REMARKS
1	1	Teaching & Learning (T&L 7 Weeks)	Monday, 28.09.2026 - Sunday, 04.10.2026	29 & 30.09.2026, Tuesday & Wednesday - Sultan of Kelantan's Birthday (Health Campus)
	2		Monday, 05.10.2026 - Sunday, 11.10.2026	
	3		Monday, 12.10.2026 - Sunday, 18.10.2026	
	4		Monday, 19.10.2026 - Sunday, 25.10.2026	
	5		Monday, 26.10.2026 - Sunday, 01.11.2026	
	6		Monday, 02.11.2026 - Sunday, 08.11.2026	08.11.2026, Sunday - Deepavali**
	7		Monday, 09.11.2026 - Sunday, 15.11.2026	
	8	Mid-Semester Break (Sem I) (1 Week)	Monday, 16.11.2026 - Sunday, 22.11.2026	
	9	Teaching & Learning (T&L 7 Weeks)	Monday, 23.11.2026 - Sunday, 29.11.2026	
	10		Monday, 30.11.2026 - Sunday, 06.12.2026	
	11		Monday, 07.12.2026 - Sunday, 13.12.2026	
	12		Monday, 14.12.2026 - Sunday, 20.12.2026	
	13		Monday, 21.12.2026 - Sunday, 27.12.2026	25.12.2026, Friday - Christmas Day
	14		Monday, 28.12.2026 - Sunday, 03.01.2027	01.01.2027, Friday - New Year 2027
	15		Monday, 04.01.2027 - Sunday, 10.01.2027	
	16	Revision Week (1 Week)	Monday, 11.01.2027 - Sunday, 17.01.2027	
	17	Examination (3 Weeks)	Monday, 18.01.2027 - Sunday, 24.01.2027	22.01.2027, Friday - Thaipusam
	18		Monday, 25.01.2027 - Sunday, 31.01.2027	
	19		Monday, 01.02.2027 - Sunday, 07.02.2027	06 & 07.02.2027, Saturday & Sunday - Chinese New Year
	20	Mid-Semester Break / Industrial Training (4 Weeks)	Monday, 08.02.2027 - Sunday, 14.02.2027	08.02.2027, Monday - First Day of Ramadan
	21		Monday, 15.02.2027 - Sunday, 21.02.2027	
	22		Monday, 22.02.2027 - Sunday, 28.02.2027	24.02.2027, Wednesday - Nuzul Al-Quran
	23		Monday, 01.03.2027 - Sunday, 07.03.2027	
	24/1		Monday, 08.03.2027 - Sunday, 14.03.2027	10 & 11.03.2027, Wednesday & Thursday - Eid al-Fitr**
2	25/2	Teaching & Learning (T&L 7 Weeks)	Monday, 15.03.2027 - Sunday, 21.03.2027	
	26/3		Monday, 22.03.2027 - Sunday, 28.03.2027	
	27/4		Monday, 29.03.2027 - Sunday, 04.04.2027	
	28/5		Monday, 05.04.2027 - Sunday, 11.04.2027	
	29/6		Monday, 12.04.2027 - Sunday, 18.04.2027	
	30/7		Monday, 19.4.2027 - Sunday, 25.04.2027	
	31/8	Mid-Semester Break (Sem II) (1 Week)	Monday, 26.04.2027 - Sunday, 02.05.2027	01.05.2027, Saturday - Labour Day 02.05.2027, Sunday - Substitute Holiday for Labour Day (Health Campus)
	32/9	Teaching & Learning (T&L 7 Weeks)	Monday, 03.05.2027 - Sunday, 09.05.2027	
	33/10		Monday, 10.05.2027 - Sunday, 16.05.2027	
	34/11		Monday, 17.05.2027 - Sunday, 23.05.2027	17.05.2027, Monday - Eid al-Adha** 18.05.2027, Tuesday - Substitute Holiday for Eid al-Adha** (Health Campus) 20.05.2027, Thursday - Wesak Day
	35/12		Monday, 24.05.2027 - Sunday, 30.05.2027	
	36/13		Monday, 31.05.2027 - Sunday, 06.06.2027	06.06.2027, Sunday - Islamic New Year
	37/14		Monday, 07.06.2027 - Sunday, 13.06.2027	07.06.2027, Monday - Substitute Holiday for Islamic New Year (Main Campus & Engineering Campus) 07.06.2027, Monday - Yang di-Pertuan Agong's Birthday
	38/15		Monday, 14.06.2027 - Sunday, 20.06.2027	
	39/16	Revision Week (1 Week)	Monday, 21.06.2027 - Sunday, 27.06.2027	
	40/17	**Examination (2 Week)	Monday, 28.06.2027 - Sunday, 04.07.2027	
	41/18		Monday, 05.07.2027 - Sunday, 11.07.2027	07.07.2027, Wednesday - Georgetown World Heritage City Day 10.07.2027, Saturday - Penang Governor's Birthday
	42/19		Monday, 12.07.2027 - Sunday, 18.07.2027	
	43/20	Semester II Break / Industrial Training (10-11 Weeks)	Monday, 19.07.2027 - Sunday, 25.07.2027	
	44/21		Monday, 26.07.2027 - Sunday, 01.08.2027	
	45/22		Monday, 02.08.2027 - Sunday, 08.08.2027	
	46/23		Monday, 09.08.2027 - Sunday, 15.08.2027	15.08.2027, Sunday - Prophet Muhammad's Birthday
	47/24		Monday, 16.08.2027 - Sunday, 22.08.2027	16.08.2027, Monday - Substitute Holiday for Prophet Muhammad's Birthday
	48/25		Monday, 23.08.2027 - Sunday, 29.08.2027	
	49/26		Monday, 30.08.2027 - Sunday, 05.09.2027	31.08.2027, Tuesday - National Day
	50/27	*T&L Examination	Monday, 06.09.2027 - Sunday, 12.09.2027	
	51/28		Monday, 13.09.2027 - Sunday, 19.09.2027	16.09.2027, Thursday - Malaysia Day
	52/29		Monday, 20.09.2027 - Sunday, 26.09.2027	

**This academic Calendar is subject to change

PINDAAN TARIKH PENDAFTARAN PELAJAR
SENAT KE-299 (21 MEI 2026)

1.0 INTRODUCTION

This Engineering Handbook is specially prepared for undergraduate engineering students of Universiti Sains Malaysia who will commence their first-year studies in the academic year of 2026/2027. This handbook contains concise information intended to help students understand the university's system as well as adapt oneself to university life.

The handbook covers various aspects, including the structure of the Bachelor of Engineering programmes, the academic system, types of courses, synopsis of the courses, student status, examination and evaluation system, information about the engineering schools, reference materials and the academic staff list. This information provides students with a comprehensive overview to help them plan their academic studies, understand their field of studies, and adapt themselves to the teaching and learning environment of the university.

Universiti Sains Malaysia offers Bachelor of Engineering (with Honours) programmes through the following six schools of engineering:

- School of Aerospace Engineering
- School of Chemical Engineering
- School of Civil Engineering
- School of Electrical and Electronic Engineering
- School of Materials and Mineral Resources Engineering
- School of Mechanical Engineering

1.1 History and Development

In 1972, Universiti Sains Malaysia established the School of Applied Science at its Main Campus in Penang and began offering fundamental fields of engineering studies. At the time, the fields of studies offered Electronic Technology, Polymer Technology, Food Technology, Materials Technology and Mineral Resources Technology.

In 1984, the School of Applied Science was restructured and renamed the School of Engineering Science and Industrial Technology. This restructuring was in line with the development of Malaysia's Industrial Master Plan, which reflected the country's human utilization needs. As a result, three new schools were established: the School of Industrial Technology, focusing on polymer and food technologies; the School of Electrical and Electronics Engineering and the School of Materials and Mineral Resources Engineering.

The expansion required more physical space. As the physical area of USM in Penang at the time was rather limited, a new area in the state of Perak was identified as the site for the development of a branch campus.

A decision was made to relocate all engineering programmes to Perak, while the School of Industrial Technology remained in Penang. In 1986, the School of Electrical and Electronics Engineering and the School of Materials and Mineral Resources Engineering moved to a temporary campus in the old Ipoh Town Council building while awaiting

completion of the permanent USM branch campus in Bandar Baru Seri Iskandar, Perak Tengah District, Perak to be completed. The temporary campus was named USM Perak Branch Campus (USMKCP – USM Kampus Cawangan Perak).

In 1987, construction began at the site of USM Perak Branch Campus in Bandar Baru Seri Iskandar. On 1st January 1989, the scope of engineering studies was expanded further with the establishment of two new schools of engineering: The School of Civil Engineering and the School of Mechanical Engineering.

By the end of November 1989, all four USM engineering schools began relocating to the new campus in stages, a process that concluded in April 1990. The Ipoh Town Council building, which had served as the USM's temporary campus, was handed back to the Town Council in a glorious ceremony graced by DYMM Seri Paduka Baginda Yang Dipertuan Agong, Sultan Azlan Shah.

In 1992, USM established its fifth engineering school, the School of Chemical Engineering. Two years later, preparations began to offer a programme in Aerospace Engineering. On 17th of May 1998, the USM Aerospace Engineering Unit was established and on the 1st of March 1999, the unit was upgraded to the School of Aerospace Engineering.

In 1997, the government decided to relocate USMKCP back to Penang. The new campus site was located in Seri Ampangan, Nibong Tebal, Seberang Perai Selatan, Penang while USMKCP's campus site in Seri Iskandar was taken over by Universiti Teknologi Petronas (UTP).

The relocation of the Engineering Campus to Seri Iskandar was carried out in phases, with operations officially commencing at the new site in June 2001, for the 2001/2002 Academic Session.

In 2007, USM was selected by the Ministry of Higher Education [MoHE] as one of the four research universities through a rigorous evaluation process thus elevating its status among the top institutions out of more than 100 public and private universities and colleges in Malaysia. In the same year, USM was rated as the only “excellent” (or 5-Star) university in the Academic Reputation Survey conducted by the Malaysian Qualification Agency (MQA).

On 4th of September 2008, USM was granted with an APEX (the Accelerated Programme for Excellence) status by the Malaysian government. Under its transformation blueprint titled “Transforming Higher Education for a Sustainable Tomorrow” USM embarked on numerous transformational journeys, including revamping most of its activities pertaining to nurturing and learning, research and innovation, services, students and alumni and the management of the university as a whole.

The University transformation focuses on strengthening its three core pillars: [i] concentration of talent, [ii] resources and [iii] acculturation of supportive governance.

The USM Engineering Campus has now been officially proclaimed as the Tuanku Syed Sirajuddin Engineering Campus, USM on January 22, 2026. This proclamation reflects the role of the campus as a centre of educational excellence, research and high technological innovation. The proclamation was graced by the USM Chancellor, HRH Tuanku Syed Sirajuddin Ibni Almarhum Tuanku Syed Putra Jamalullail.

1.2 Philosophy and Objective

The philosophy and objective of the Bachelor of Engineering programme at Universiti Sains Malaysia is to produce competent engineering graduates across various disciplines who are capable of solving complex problem through innovative and analytical thinking.

The engineering programme at USM aims to nurture professional engineers who are responsible and proficient in areas such as research and development, project management, production planning and control and accreditation of equipment across various fields in the country.

To achieve this, all courses within the engineering programme integrate both theoretical and practical aspects of learning, tailored to meet the evolving needs of the industrial and public sectors. The fields of engineering studies in USM are continuously updated and remain intellectually challenging to align with national industrial development goals. In addition to core engineering competencies, students are also exposed to business practice such as finance, marketing and management as well as co-curricular activities. This holistic approach ensures that graduates are well-rounded and adaptable to the dynamic professional landscape.

1.3 Outcome Based Education

All Bachelor of Engineering Programmes at the Universiti Sains Malaysia have adopted the Outcome Based Education (OBE) since the academic year of 2006/2007. OBE emphasizes that graduates should possess professional attributes that meet both current and future needs of the nation and global market. To ensure this alignment, the programme educational objectives (PEOs) of each programme offered at the Engineering Schools are developed based on input from key stakeholders, including industry representatives, government agencies, parents, students, alumni and the university lecturers. This inclusive process ensures that USM's engineering programmes remain relevant to industrial needs, societal expectations, and the preparation of high-quality future talents.

With clearly defined PEOs, the curricular structure of each programme carefully designed to equip students with the desired graduate attributes as outlined by the Engineering Accreditation Council (EAC) and Board of Engineers Malaysia (BEM). The attributes include:

PO1 Engineering Knowledge: Ability to apply knowledge of mathematics, natural science, computing, engineering fundamentals, and an engineering

specialization to develop solutions to complex civil engineering problems (WK1 to WK4)

- PO2 Problem Analysis: Ability to identify, formulate, research literature, and analyze complex civil engineering problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences with holistic considerations for sustainable development (WK1 to WK4)
- PO3 Design / Development of Solutions: Ability to design creative solutions for complex civil engineering problems and design systems, components or processes to meet identified needs with appropriate consideration for public health and safety, whole life cost, net zero carbon, as well as resource, cultural, societal, and environmental considerations as required. (WK5)
- PO4 Investigation: Ability to conduct investigation of complex civil engineering problems using research methods including research-based knowledge, including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions. (WK8)
- PO5 Tool Usage: Ability to create, select, apply, and recognize the limitations of appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex civil engineering problems. (WK2 and WK6)
- PO6 The Engineer and the World: Ability to analyze and evaluate sustainable development impacts on society, the economy, sustainability, health and safety, legal frameworks, and the environment in solving complex civil engineering problems. (WK1, WK5, and WK7)
- PO7 Ethics: Ability to apply ethical principles and commit to professional ethics and norms of engineering practice while adhering to relevant national and international laws and demonstrating an understanding of the need for diversity and inclusion. (WK9)
- PO8 Individual and Collaborative Teamwork: Ability to function effectively as an individual and as a member or leader in diverse and inclusive teams and in multidisciplinary, face-to-face, remote and distributed settings. (WK9)
- PO9 Communication: Ability to communicate effectively and inclusively on complex civil engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, considering cultural, language, and learning differences
- PO10 Project Management and Finance: Ability to apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work as a member and leader in a team and manage projects in multidisciplinary environments

PO11 Lifelong Learning: Ability to recognise the need for and have the preparation and ability for independent and lifelong learning, adaptability to new and emerging technologies and critical thinking in the broadest context of technological change. (WK8)

1.4 Continuous Quality Improvement System

To support the implementation of Outcome Based Education, a few mechanisms have been integrated into the continuous quality improvement (CQI) system for the Bachelor of Engineering programmes. Feedback is obtained from industries through the Industrial Advisory Panels, which consist of at least five engineers or managers from relevant industrial sectors.

Feedback from students is gathered via the Lecturer-Student Committee and Interview Session with each student prior to their convocation. Feedback from the alumni is obtained through the USM Alumni Relations Unit and the School's alumni communities through various channels such as email, webpage and Facebook. All collected feedback are incorporated for deliberations and approval by the Curriculum Review Committee, which convenes regularly to identify courses or programmes that may require revamping or to minor/major modifications.

1.5 External Examiner

Universiti Sains Malaysia appoints external examiners to serve several or all of the followings:

- Advise the School/Centre concerned regarding matters pertaining to the structure and contents of its undergraduate programmes, research and administration related to examinations. Attention is also focused on post-graduate programmes where applicable.
- Scrutinise and evaluate all draft examination question papers prepared by Internal Examiners.
- Visit the university during the period of the examinations in order to be familiar with the work of the School/Centre, assess available physical facilities and participate in activities related directly to the conduct of the examinations.
- Scrutinise and evaluate answer scripts, as may be required by the Dean/Director of the School/Centre concerned and to ensure that the standards set by Internal Examiners (of the discipline to which he/she is appointed) are the same as those at other Universities of International standing.
- Ensure consistency in the evaluation of answer scripts by Internal Examiners, particularly in maintaining fairness across candidates of equivalent academic performance.
- Participate in the evaluation of oral components or viva voce, where required.
- Conduct seminars/meetings with the academic staff/students, if required.

1.6 Industry and Community Advisory Panel (ICAP)

The engineering schools have appointed an Industry / Community Advisory Panel (ICAP) for each engineering programme offered. Meetings with ICAP members are conducted periodically to support continuous programme enhancement. Each school appoints prominent individuals from the industry, community and relevant institutions to serve as ICAP members. The ICAP members provide valuable input on various aspects such as Industrial Training, Outcome Based Education (OBE) implementation, curriculum development, the requirement of soft skills and other relevant issues to the Schools. Their feedback plays a vital role in improving the quality of the programmes and enhancing the employability of graduates.

1.7 Division of Industry and Community Network

To foster closer, effective, meaningful and sustainable linkages and partnership with the industry and the community, i.e. the world outside Universiti Sains Malaysia, a new division, the Division of Industry & Community Network, was established within the Chancellery in September 2007. This new division is presently headed by the Deputy Vice Chancellor (Research and Innovation). The function of this division is to match between the knowledge/expertise, facilities and resources of the university to the needs, aspirations and expectations of the industry and the community to result in a win-win situation. This aspiration is also reflected in the initiatives and the activities undertaken at school level.

1.8 Stakeholder

In line with the Engineering Accreditation Council (EAC) requirements regarding stakeholder involvement in the formulation of PEOs, inputs have been continuously gathered through surveys and direct engagement. The University has identified following groups as key stakeholders:

- Academic Staff (University)
- Employers (industry and government)
- Alumni
- Student
- Parents of students

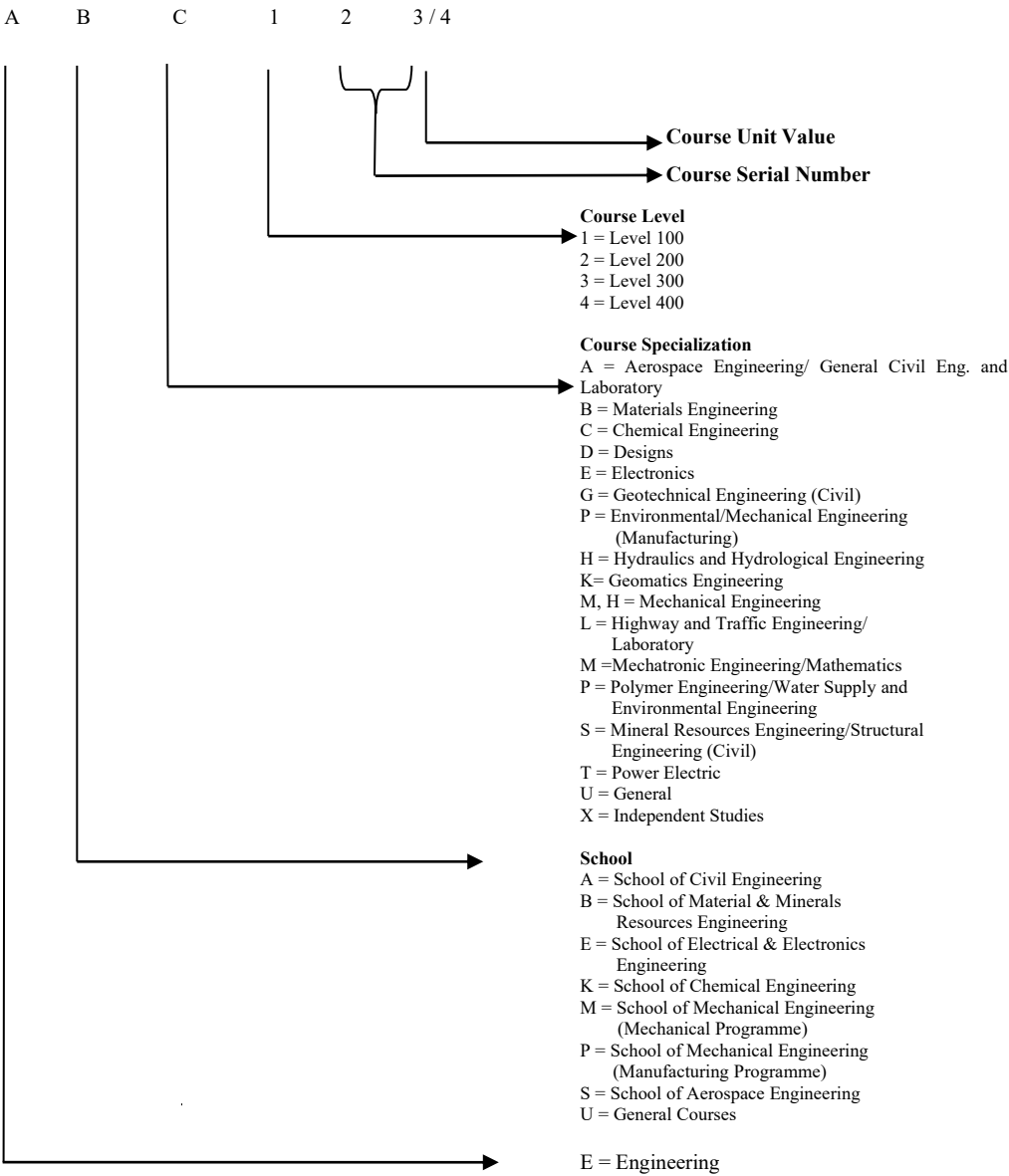
1.9 Teaching Delivery Method

Other components contributing to the curriculum, such as a variety of teaching and learning (delivery) modes, assessment and evaluation methods are designed, planned and incorporated within the curriculum to enable students to effectively develop the range of intellectual and practical skills, as well as positive attitudes. Assessments are conducted at both the programme and course levels to evaluate the extent to which students have achieved the Programme Outcomes. The teaching and learning methods are also

designed to encourage students to take full responsibility for their own learning and to prepare them for lifelong learning and continuous knowledge acquisition.

1.10 Course Code

Each course offered by the respective School is denoted by the following code of ABC 123/4. The alphabets and numbers represent:-



1.11 Programme Structure

The Structure of the Engineering Degree Programme is as follows: -

Course	Units	Remarks
(i) CORE	108	
(ii) ELECTIVE	12	Students may select these courses from the list as determined by the respective school.
(iii) UNIVERSITY REQUIREMENTS (LOCAL)	15	
<u>Compulsory (14 units)</u>		
a) Bahasa Malaysia	2	
b) English Language	2	
c) Philosophy and Current Challenges	2	
d) Aspirasi Negara Bangsa	2	
e) Core Entrepreneurship	2	
f) Integrity and Anti-Corruption	2	
g) Co-curriculum	2	
<u>Optional Course (1 Units)</u>		
(a) Co-curriculum/Skill/Language subject	1	
(iii) UNIVERSITY REQUIREMENTS (INTERNATIONAL)	15	
<u>Compulsory (12 units)</u>		
a) Bahasa Malaysia	2	
b) English Language	2	
c) Malaysian Citra 1	2	
d) Malaysian Citra 2	2	
e) Integrity and Anti-Corruption	2	
f) Co-curriculum	2	
<u>Optional Course (3 Units)</u>		
a) Co-curriculum/Skill/Language subject	3	

Note: For graduation, students are required to complete at least 135 units, with 'pass' grade for all the courses.

1.12 Courses Offering

Students are required to register for undergraduate courses in two semesters each academic session, namely Semester 1 and Semester 2. Courses are offered and assessed within the same semester. These courses are categorised into four levels—100, 200, 300, and 400—corresponding to the progressive structure of a four-year study programme.

Students are required to register for undergraduate courses in two semesters each academic session, namely Semester 1 and Semester 2. Courses are offered and examined within the same semester. Courses offered are categorized into four levels, levels 100, 200, 300 and 400, corresponding to the progressive structure of a four-year study programme.

Core Courses

A core course is a compulsory course package designed to provide in-depth knowledge of an area of specialization/major. Students are required to accumulate 108 units of core courses, as determined by respective schools.

Elective Courses

Students are required to accumulate no fewer than 12 units from the list of courses recommended and approved by the school.

Optional Courses

Optional courses are courses chosen by the students from outside their main programmes of study.

The main objective of an optional course is to serve as substitute courses for students who do not enrol in Co-curricular or Skill/Analysis courses.

Audit Courses

In principle, the university allows students to register for any courses on an audit basis for the purpose of enhancing the students' knowledge in specific fields during the duration of their study. However, the units of any such audit courses will not be taken into consideration for graduation requirements.

The registration procedures for courses on an audit basis are as follows: -

- (a) Students may register for courses on an audit basis for the purpose of enhancing his/her knowledge in specific fields. Registration for the course must be within the course registration week.
- (b) Only students with active status are eligible to register for courses on an audit basis.

- (c) Courses registered on an audit basis are designated with the code 'Y'. This designation will be reflected in the relevant academic transcript, with a dedicated section at the bottom of the transcript listing all audited courses.
- (d) Courses registered on an audit basis will not be considered when calculating the minimum and maximum units of courses for the semester.
- (e) Students must fulfil all course requirements. However, they are not required to sit for the final examination. Regardless of whether the student sits for the examination, a grade of 'R' will be awarded for the audited course. Students must fulfil all course requirements. However, students who register for courses on an audit basis, are not required to sit for examinations pertaining to that course. A grade of 'R' will be awarded regardless of whether the student sits for the examination or not.

Laboratory Work/Practical, Engineering Practice and Industrial Training

Programmes at the School of Engineering place a great emphasis on laboratory work/practical. Laboratory work/practical is an important and essential component in most courses. There are also courses where the assessment is based on 100% laboratory/practical marks. These components are designed to provide students with a better understanding of the subject matter delivered through lectures. Students are required to submit laboratory/practical reports as part of their coursework assessment for courses that include both lectures and laboratory/practical component. Attendance is compulsory for all levels of study and students with unsatisfactory attendance may be barred from sitting for the written examination. In addition to attending classes (lectures and laboratory/practical), students must also complete the Engineering Practice Course and Industrial Training.

The Engineering Practice Course focuses on civil engineering practices. The course includes an introduction to civil engineering practices, understanding civil engineering and constructions drawings, contract documents, health and safety in civil engineering and project management. Site visits to construction sites are also organized to enhance practical exposure.

Industrial Training is conducted over 10-weeks during the long break after Semester II of Level 300. Students are exposed to the actual operations of industries, locally and abroad. The objective is for students to acquire practical knowledge and skills that complement their academic learning, laying a strong foundation for future professional practice. This is a 5-unit course, and students will be awarded a Pass/Fail grade upon successful completion of the training.

1.13 Graduation Requirements

Students must fulfil the following requirements to graduate;

- a) Fulfil all the credit requirements of the course and the required units for each component (Core, Elective, Option and University Courses).
- b) Obtain a CGPA of 2.00 and above for the programmes.
- c) Achieve a minimum grade of C or a grade point of 2.00 for all courses.

2.0 ACADEMIC SYSTEM AND GENERAL INFORMATION

2.1 Course Registration Activity

Registration of courses is an important activity during the period of study at the university. It is the first step for the students to sit for the examination at the end of each semester. Signing up for the right courses each semester will help to facilitate the graduation process based on the stipulated duration of study.

2.1.1 Course Registration Secretariat for the Bachelor's Degree and Diploma Programmes

Student Data and Records Unit
Academic Management Division
Registry
Level 1, Chancellery Building

Tel. No.	:	04-653 2925/2924
E-Mail	:	sdrp@usm.my
Website	:	http://bpa.usm.my/index.php

2.1.2 Course Registration Platform

1. E-Registration

E-Registration is a platform for online course registration. The registration is done directly through <https://campusonline.usm.my>. Course registration for both semesters begins after the release of the official examination results of each semester.

The online registration for Long Vacation Semester (KSCP) begins officially after the release of the 2nd semester examination results.

The dates for E-Registration will be announced to the students via Campus Online during the revision week of every semester and details of the activity will be displayed on the USM's official website.

All courses are allowed to be registered through E-Registration, except for co-curricular courses. The registration of co-curriculum courses is managed by the Director of the Centre for Co-Curriculum Programme at the Main Campus or the Coordinator of the Co-Curriculum Programme at the

Engineering Campus and the Coordinator of the Co-Curriculum Programme at the Health Campus.

Students are required to pre-register for their co-curricular courses before the actual E-Registration activity. They are allowed to attend the respective course once the preregistration is approved. The list of co-curricular courses taken will be included in their course registration data.

Access to E-Daftar System

- a. The E-Daftar System can be accessed through the Campus Online portal (<https://campusonline.usm.my>).
- b. Students need to use their USM Identity to access the profile website that contains the E-Daftar menu.
- c. Students can print the course registration confirmation slip upon completion of the registration process or after updating the course registration list (add/ drop) within the E-Daftar period.

2. Course Registration Activity at the School

Registration activities conducted at the Schools/Centres are applicable to students who are academically active. Students who encounter difficulties in registering their courses during the E-Registration period are allowed to register the courses at their respective school/centre during the official period of course registration.

The official period for registration is as follows:

Period	Description	Notes
1 st week to 3 rd week	Course registration at the School/Centre level	No penalty is imposed.
4 th to 6 th week	Course registration at the Student Records Unit	For each late registration, a fine of RM50 will be imposed on students unless a fine exemption is granted.
Week 7 onward	Course registration at the Examination and Graduation Unit level	

2.1.3 Course Registration General Information

1. Information that students can access related to the registration activity:
 - a) The website of the respective School, for the updated information of the courses offered or course registration procedure.
 - b) List of courses to be registered and the number of units (unit value) for each course (refer to the Student Handbook for Study Programme).

Academic Status	PNG	Minimum Units	Maximum Units
Active	2.00 & Above	9	20
P1	1.99 & Below	9	12
P2		9	10

- c. Students with arrears are not allowed to register any courses. They may only register courses after paying off their arrears.
2. Types of course codes during registration:

T= Core courses	}	Grades and units obtained from these courses are considered for graduation
E= Elective/ Open Elective courses		
U= University courses		

Two (2) other course codes are:

Y = audit courses	}	Grades and units obtained from these courses are not considered for graduation
Z = prerequisite courses		

3. Academic Advisor's advice and approval are necessary.
4. Students are not allowed to register or repeat any course with a grade of 'C' and above.
5. Medical, Dentistry and Pharmacy students are not allowed to register or resit any course with a grade of 'B-' and above.

2.1.4 Information/Documents Given to All Students through Campus Online Portal (<https://campusonline.usm.my>)

1. The information of the Academic Advisor.
2. Academic information such as academic status, GPA value, CGPA value and year of study.
3. Cangred and Course Registration Form.
4. List of courses offered by all Schools/Centres.
5. Teaching and Learning Timetable for all Schools/Centres/Units from the three campuses.
6. List of pre-registered courses which have been added to the students' course registration records (if any).
7. Reminders about the University course registration policies/general requirements.

2.1.5 Registration of Language and Co-Curricular Courses

1. Registration of Language courses through E-Daftar is allowed.
 - a) However, if any problems arise, registration for language courses can still be carried out/updated during the official period of OCR at the office of the School of Languages, Literacies and Translation.
 - b) All approvals, registrations, dropping and adding of language courses are under the responsibility and administration of the School of Languages, Literacies and Translation.
 - c) Any problems related to the registration of language courses can be referred to the School of Languages, Literacies and Translation. The contact details are as follows:

General Office	: 04-653 4542	} for Main Campus students
Malay Language Programme Chairperson	: 04-653 4214	
English Language Programme Chairperson	: 04-653 3153	
Foreign Language Programme Chairperson	: 04-653 3150	

Engineering Campus Programme Chairperson: 04-599 5400/5430

: 04-599 5402/5407

Health Campus Programme Chairperson : 09-767 1262

2. Registration of **co-curricular courses through E-Daftar** is not allowed.
 - a. Registration for co-curricular courses is either done through pre-registration before the semester begins or during the first/second week of the semester. Co-curricular courses will be included in the students' course registration account prior to the E-Daftar activity if their pre-registration application is successful.
 - b. All approvals, registrations, dropping and adding of co-curricular courses are under the responsibility and administration of:

Director of the Centre for Co-Curricular Programme, Main Campus (04-653 5242/5248)

Deputy Director of the Centre for Co-Curricular Programme, Engineering Campus (04-599 5097/5094)

Deputy Director of the Centre for Co-Curricular Programme, Health Campus (09-767 2371/6625)
3. **Dropping of Language and Co-Curricular courses, if necessary, must be made within the first week.** After the first week, a fine of RM50.00 will be imposed for each course.

2.1.6 Registration of 'Audit' Courses (Y code)

Registration for 'Audit' course (Y code) **is not allowed through E-Daftar**. It can be done during the official period of OCR at the School or Centre involved.

Students who are interested must complete the course registration form which can be printed from the Campus Online Portal or obtained directly from the School. Approvals from the course lecturer and the Dean/ Deputy Dean (Academic) of the respective school are required.

Registration of 'Audit' courses (Y code) is not included in the calculation of the total registered workload units. Grades obtained from 'Audit' courses are not considered in the calculation of CGPA and total units for graduation.

2.1.7 Registration of Prerequisite Courses (Z code)

Registration of Prerequisite courses (Z code) is included in the total registered workload (units). Grades obtained from the Prerequisite courses are not considered in the calculation of CGPA and units for graduation.

2.1.8 Late Course Registration and Late Course Addition

Course registration or addition is only allowed **until the third week** of the semester. Application to add a course after the third week will not be considered, except for special cases approved by the University. An RM50.00 fine will be imposed on students if the reasons given for late registration are not accepted by the University or School.

2.1.9 Dropping of Courses

Dropping of courses is allowed until the **end of the sixth week**.

For this purpose, students must meet the requirements set by the University as follows:

1. Students who intend to drop any course are required to fill in the dropping of course form. The form needs to be signed by the lecturer of the course involved and the Dean/Deputy Dean (Academic, Career and International Affairs) of the School. The form must be submitted to the general office of the School/Centre which offers that particular course.
2. Students who wish to drop language courses must obtain the approval of the Programme Chairperson/Course Coordinator of the School of Languages, Literacies and Translation.
3. Students who wish to drop the Co-Curricular courses must obtain the approval of the Director/Coordinator of the Co-Curricular Programme.
4. The option to drop courses must not be misused. Lecturers have the right not to approve the dropping of the course that the student wishes to drop if the student is not serious about the course, such as having a poor attendance record for lectures, tutorials and practical sessions, as well as poor performance in coursework. The student will be barred from sitting for the examination and will be given a grade of 'X' and is not allowed to repeat the course during the *Courses during the Long Vacation (KSCP)* period.

2.1.10 Course Registration Confirmation Slip

The course registration confirmation slip printed/obtained after course registration should be checked carefully to ensure there are no errors, especially the code type of the registered courses.

Any errors in course registration data must be corrected immediately whether during the period of E-Daftar (for students with active status only) or during the registration period at the Schools.

2.1.11 Revising and Updating Data/Information of Students' Personal and Academic Records

Students may check their personal and academic information through the Campus Online portal.

Students are advised to regularly check the information displayed on this website.

1. Students may update their correspondence address, telephone number and personal email through the Campus Online portal.
2. Students must notify the Student Data and Records Unit of any application to update personal data, such as the **spelling of names, identification card number, passport number and address (permanent address and correspondence address)**.
3. The office of the Student Data and Records Unit must be notified of any application for correction of academic data such as information on major, minor, MUET result and the course code (besides data on the examination results).

2.1.12 Academic Advisor

Each School will appoint an Academic Advisor for every student. Academic Advisors will advise the students under their responsibility on academic matters.

2.2 Interpretation of Unit/Credit/Course

2.2.1 Unit

Each course is given a value, which is called a **UNIT**. The unit is determined by the scope of its syllabus and the workload for the students. In general, a unit is defined as follows:

Type of Course	Definition of Unit
Theory	1 unit is equivalent to 1 contact hour per week for 13 – 14 weeks in one semester
Practical/Laboratory/ Language Proficiency	1 unit is equivalent to 1.5 contact hours per week for 13 – 14 hours in one semester
Industrial Training/ Teaching Practice	1 unit is equivalent to 2 weeks of training

Based on the requirements of the Malaysian Qualifications Framework (MQF):

One unit is equivalent to 40 hours of student learning time

[1 unit = 40 hours of Student Learning Time (SLT)]

2.2.2 Accumulated Credit Unit

Units registered and passed are known as credits. To graduate, students must accumulate the total number of credits stipulated for the programme concerned.

2.3 Examination System

Examinations are held at the end of every semester. Students must sit for the examination of the courses they have registered for except for courses with 100% coursework. Students are required to settle all due fees and fulfil the standing requirements for lectures/tutorials/practical and other requirements before being allowed to sit for the examinations for the courses they have registered for.

Course evaluation will be based on the two components – coursework and final examinations. Coursework evaluation includes tests, essays, projects, assignments and participation in tutorials. Examinations may be held face-to-face or online.

2.3.1 Duration of Examination

Evaluated Courses	Examination Duration
2 units	1 hour for coursework of more than 40%
2 units	2 hours for coursework of 40% and below
3 units or more	2 hours for coursework of more than 40%
3 units or more	3 hours for coursework of 40% and below

2.3.2 Barring from Examination

Students will be barred from sitting for the final examination if they do not fulfil at least 70% of the course requirements, such as absence from lectures and tutorials, and have not completed/fulfilled the required components of coursework. A grade of 'X' will be awarded for a course for which a student is barred. Students will not be allowed to repeat the course during the *Courses During the Long Vacation* (KSCP) period.

2.3.3 Special Examination Needs

Students with disabilities (OKU) who require special arrangements for examinations can inform the School to get special permission to sit for examinations in the Quarantine Room at the Examination Operations Office.

If a student falls ill during the examination, the student is only allowed to continue the examination in the examination hall or quarantine room or Pusat Sejahtera (subject to the approval of the Pusat Sejahtera Director).

The student who falls ill on the day of the examination and does not attend the examination must submit a medical certificate (from a government hospital/clinic or panel clinic/USM clinic) to the exam secretariat via email exam@usm.my within 48 hours after the end of the examination.

2.3.4 Grade Point Average System

Students' academic achievement for registered courses will be graded as follows:

Alphabetic Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Grade Points	4.00	3.67	3.33	3.00	2.67	2.33	2.00	1.67	1.33	1.00	0.67	0

Students who obtain a grade of 'C-' and below for a particular course will be given a chance to improve their grades by repeating the course either during KSCP or a normal semester. Students who obtain a grade of 'C' and above for a particular course are not allowed to repeat the course either during KSCP or a normal semester.

The achievement of students in any semester is based on Grade Point Average (GPA) achieved from all the registered courses in a

particular semester. GPA is the indicator to determine the academic performance of students in any semester.

CGPA is the Cumulative Grade Point Average accumulated by a student from one semester to another during the years of study.

The formula to compute GPA and CGPA is as follows:

$$\text{Grade Point Average} = \frac{\sum_{i=1}^n U_i M_i}{\sum_{i=1}^n U_i}$$

where:

n = Number of courses taken
 U_i = Course units for course i
 M_i = Grade point for course i

Example of calculation for GPA and CGPA:

	Course	Unit	Grade Point (GP)	Grade (G)	Total GP
Semester I	ABC XX1	4	3.00	B	12.00
	ABC XX2	4	2.33	C+	9.32
	BCD XX3	3	1.67	C-	5.01
	CDE XX4	4	2.00	C	8.00
	EFG XX5	3	1.33	D+	3.99
	EFG XX6	2	2.67	B-	5.34
		20			43.66

$$\text{GPA} = \frac{43.66}{20} = 2.18$$

	Course	Unit	Grade Point (GP)	Grade (G)	Total GP
Semester II	ABC XX7	3	1.00	D	3.00
	ABB XX8	4	2.33	C+	9.32
	BBC XX9	4	2.00	C	8.00
	BCB X10	4	2.67	B-	10.68
	XYZ XX1	3	3.33	B+	9.99
		18			40.99

$$\text{GPA} = \frac{40.99}{18} = 2.28$$

$$\text{CGPA} = \frac{\text{Total Accumulated GP}}{\text{Total Accumulated Unit}} = \frac{43.66 + 40.99}{20 + 18} = \frac{84.65}{38} = 2.23$$

From the above examples, the CGPA is calculated as the total grade point accumulated for all the registered courses and divided by the total number of the registered units.

2.3.5 Condition for Passing Courses (CPC)

A new regulation on conditions for passing courses will be implemented starting from the academic session 2024/2025 duly upon USM senate approval (Vol. 288 on 25 July 2024). According to the EAC Standard 2024, the Condition for Passing Courses (CPC) stated:

“The IHLs must ensure that no students shall pass a course if they fail in their final examination of that course, unless the continuous assessment approach adopted can demonstrate the attainment of the depth of knowledge.”

Therefore, the University has approved the implementation of CPC for core and elective courses in all engineering programs as follows:

- 1) For students who FAIL the final exam (obtaining a grade F in the final exam), if the overall grade (Coursework (CW) + Examination (EW)) is C and above, the CPC condition will be implemented. The final grade remains but will be marked as (W). The student MUST retake the course.
- 2) For students who FAIL the final exam (obtaining a grade F in the final exam), if the overall grade (Coursework (CW) + Examination (EW)) is C-, D+, D, D-, or F, the existing grading requirement will be used. The student MUST retake the course.
- 3) Students can retake the course in two situations:
 - a) Retake during semester: new coursework marks will be used.
 - b) Retake during KSCP: existing coursework marks will be used.

Example of Implementation:

CW (40%)			EW (60%)			Total	Final Grade	Remark
Mark (100)	Grade	Mark 40%	Mark (100)	Grade	Mark 60%			
70.5	A-	28.2	24.0	F	14.4	42.6	C (EW)	Must Retake
65	B+	26	22.1	F	13.26	39.3	C-	Must Retake
60.0	B	24	30.0	D	18	42.00	C	Pass the course

2.3.6 Courses During the Long Vacation (*Kursus Semasa Cuti Panjang*) (KSCP)

KSCP is offered to students who have previously taken a course and obtained a grade of 'C-', 'D+', 'D', 'D-', 'F' and 'DK' only. Students who obtained a grade 'X' or 'F*' are not allowed to take the course during KSCP.

The purpose of KSCP is to:

1. Give an opportunity to students who are facing time constraints in graduating.
2. Assist students who need to accumulate a few more credits for graduation.
3. Assist probationary students to improve their academic status.
4. Assist students who need to repeat a prerequisite course, which is not offered in the following semester.

However, this opportunity is only given to students who are taking courses that they have previously attempted and in which they achieved a grade as stipulated above, provided that the course is being offered. Priority is given to final year students. Usually, formal lectures are not held, and teaching is via tutorials.

The duration of KSCP is 3 weeks, i.e. 2 weeks of tutorials and 1 week of examination, all held during the long vacation. The KSCP schedule is available on the University's Academic Calendar.

The Implementation of KSCP

1. Students are allowed to register for a maximum of 3 courses and the total number of units registered must not exceed 10.
2. Marks/grades for coursework are taken from the highest marks/the best grades obtained in a particular course in the normal semester before KSCP. The final overall grade is determined as follows:

**Final Grade = The best coursework marks or grade +
Marks or grade for KSCP examination**

3. GPA calculation involves the **LATEST** grades (obtained in KSCP) and also includes courses taken in the second semester and those repeated in KSCP. If the GPA during KSCP as calculated above is 2.00 or better, the academic status will be active, even though the academic status for the second semester was probation status. However, if the GPA for KSCP (as calculated above) is 1.99 or below, the academic status will remain under probation status for the second semester.
4. Graduating students (those who have fulfilled the graduation requirements) in the second semester are not allowed to register for KSCP.

2.3.7 Academic Status

Active Status: Any student who achieves a GPA of 2.00 and above for any examination in a semester will be recognised as ACTIVE and be allowed to pursue his/her studies for the following semester.

Probation Status: Probation status is given to any student who achieves a GPA of 1.99 and below. A student who is under probationary status for three consecutive semesters (P1, P2, FO) will not be allowed to pursue his/her studies at the university. On the other hand, if the CGPA is 2.00 and above, the student concerned will be allowed to pursue his/her studies and will retain P2 as the academic status.

2.3.8 Penalty for Not Attending an Examination

Students who do not attend the examination for any of the courses they have registered for must provide Medical Certificates to the Principal Assistant Registrar, Examination and Graduation Unit, Academic Management Division via email to exam@usm.my within 48 hours (for full-time students) and 7 days (for Distance Learning

Education programme students) after the examination is held. The reasons provided will be considered by the Examination Board of the School/Centre and endorsed by the University Examination Board as below:

1. Students will be granted a DK grade (with permission) for reasons accepted by the University Examination Board. A DK grade will be granted to students who submit Medical Certificates (from hospital/government clinic or panel clinic/USM clinic) or submit any reason that can be accepted by the University Examination Board. DK grades will be excluded from the student's GPA/CGPA calculations.
2. Candidates who fail to sit for the examination without any valid reason will be granted an F* grade.

2.3.9 Termination of Candidature

Without prejudice to the above regulations, **the University Examination Council has the absolute right to terminate any student's studies if he/she does not fulfil the accumulated minimum credits.**

The University Examination Council has the right to terminate any student's studies for certain reasons such as failure to register for courses, failure to attend examinations without valid reasons, or medical reasons.

2.3.10 Examination Results

Full results (with grade) will be announced by the University through the Campus Online portal (campusonline.usm.my) after the School Examination Council meeting which is one month after the final examination.

Students can print the official semester results document through the Campus Online portal (campusonline.usm.my) on the same day of the results announcement.

Examination results for students with outstanding debts will be withheld until the student clears the outstanding debts.

2.3.11 Re-checking of Examination Results

Students can apply for the rechecking of their examination results for the course(s) taken during the semester. The application form can be

obtained from BPA official website. The appeal form must be submitted along with a copy of the official receipt / e-payment statement amounting to RM50.00 for each examination paper. The appeal period is two (2) weeks after the official result is announced.

The rechecking process is only to ensure that all answers in the scripts have been marked and consistently graded, and the calculation of marks awarded is correct. The answer script of the course will not be re-evaluated.

The school will confirm any changes in the students' examination results. If there are any changes in the grades, the rechecking fee will be refunded. The Examination and Graduation Unit will make amendments to the results of the course and students can check their updated status in the respective Campus Online portals.

2.4 Unit Exemption

2.4.1 Unit Exemption

Unit exemption refers to the number of units from which students are exempted from during their studies at USM. Students only need to accumulate the remaining units for graduation purposes. Only passes or course grades accumulated or acquired at USM will be included in the calculation of the Cumulative Grade Point Average (CGPA) for graduation purposes.

2.4.2 Regulations and Implementation of Unit Exemption

1. Diploma holders from recognised Public and Private Institutions of Higher Learning:

- a. Unit exemption may only be granted for courses taken at the diploma level including courses under the General Studies Component (MPU) such as Philosophy and Current Issues and Appreciation of Ethics and Civilisations.

However, unit exemptions are not permitted for Language courses under the U1/U2 Group of the General Studies Component (MPU).

- b. Courses for unit exemption may be combined (in two or more combinations) in order to obtain exemption for one course at degree level. However, if the School would like to

approve only one course at the diploma level for unit exemption of one course at degree level, the course at diploma level must be equivalent to the degree course and have the same or a greater number of units.

- c. Courses taken during employment (in-service) for diploma holders cannot be considered for unit exemption.
- d. The minimum achievement at the diploma level that can be considered for unit exemption is a minimum grade 'C' or 2.0 or equivalent.
- e. The total number of semesters exempted should not exceed two semesters.
- f. **To obtain unit exemption for industrial training**, a student must have continuous work experience for at least two years in the relevant field. If a student has undergone industrial training during their diploma-level study, the student must have work experience for at least one year.

Students are also required to produce a report on the level and type of work performed. Industrial training unit exemption cannot be considered for semester exemption as the industrial training is carried out during the long vacation in USM.

2. USM Supervised IPTS (Private Institutions of Higher Learning) /External Diploma Graduates:

- a. Students from USM-supervised IPTS/External Diploma graduates are given unit exemption as stipulated by the specific programme of study. **Normally, unit exemption in this category is given as a block according to the agreement** between USM (through the School that offers the programme) and the IPTS.
- b. **Students from recognised local or foreign IPTA** (Public Institutions of Higher Learning)/IPTS who are studying at the bachelor's degree level may apply to study at this university and if successful, may be considered for unit exemption, subject to the following conditions:

[1] Courses taken in the previous IPT are equivalent (at least 80% of the course must be the same) to the courses offered in USM.

[2] Students taking courses at the Advanced Diploma level in IPT that are recognised as equivalent to the bachelor's degree course in USM may be considered for unit exemption as in Section 2.5.

[3] The total maximum unit exemption allowed should not exceed 30% of the total unit requirement for graduation.

2.4.3 Total Number of Exempted Semesters

Semester exemption is based on the total units exempted as below:

Total Units Exempted	Total Semesters Exempted
8 and below	None
9 – 32	1
33 to 1/3 of the total units for graduation	2

2.4.4 Application Procedure for Unit Exemption

Any student who would like to apply for unit exemption is required to complete the Unit Exemption Application Form which can be obtained from the Examination and Graduation Section or the respective Schools.

The form must be approved by the Dean of the School prior to submission to the Examination and Graduation Section for consideration and approval.

2.5 Credit Transfer

Credit transfer is defined as the recognition of the total number of credits obtained by USM students from courses taken at other IPTAs (Public Institution of Higher Learning) and are combined with credits obtained at USM to fulfil the unit requirements for his/her programme of study. The transferred examination results or grades obtained in courses taken at other IPTAs will be taken into consideration in the Cumulative Grade Point Average (CGPA) calculation.

1. Category of Students Who Can Be Considered for Credit Transfer

USM full-time bachelor's degree level students who would like to attend specific bachelor's degree level courses at other IPTAs.

USM full-time diploma level students who would like to attend specific diploma level courses at other IPTAs.

2. Specific Conditions

a. Basic and Core Courses

Credit transfer can only be considered for credits obtained from other courses in other IPTAs that are equivalent (at least 80% of the content is the same) to the courses offered by the programme.

Courses that can be transferred are only courses that have the same number of units or more. For equivalent courses but with fewer units, credit transfers can be approved by combining a few courses. Credits transferred are the same as the course units offered at USM. The average grade of the combined courses will be considered in the CGPA calculation.

b. Elective or Option Courses

Students may take any appropriate courses in other IPTAs subject to permission from the School as well as the approval of the IPTA concerned.

The transferred credits are credits obtained from courses at other IPTAs. No course equivalence condition is required.

c. Minor Courses

For credit transfer of minor courses, the School should adhere to either condition (i) or (ii) and take into account the programme requirement.

3. General Conditions

- a. The total maximum units transferred should not exceed one-third of the total number of units for the programme.
- b. Credit transfer from other IPTAs can be considered only once for each IPTA.

- c. The examination results obtained by a student who has taken courses at other IPTAs will be taken into account for graduation purposes. Grades obtained for each course will be combined with the grades obtained at USM for CGPA calculation.
- d. Students who have applied and are approved for credit transfer are not allowed to cancel the approval after the examination result is obtained.
- e. Students are required to register for courses at other IPTAs with not fewer than the minimum number of units and not more than the maximum number of units as stipulated in their programme of study. However, for specific cases (e.g. students on an extended semester and only require a few units for graduation), the Dean may allow such students to register for fewer than the minimum number of units and the semester will not be considered for the residential requirement. In this case, the CGPA calculation will be similar to that for KSCP.
- f. USM students attending courses at other IPTAs who fail any course will be allowed to re-sit the examinations for the courses if there is such a provision in that IPTA.
- g. If the method of calculation of examination marks in the other IPTAs is not the same as in USM, grade conversions will be carried out according to the existing scales.
- h. USM students who have registered for courses at other IPTAs but have decided to return to study in USM must adhere to the existing course registration conditions of USM.

2.5.1 Application Procedure for Attending Courses/Credit Transfer

USM students who would like to apply to attend courses/credit transfer at other IPTAs should apply using the Credit Transfer Application Form.

The application form should be submitted to the Dean of the School for approval for the programme of study at least three months before the application is submitted to other IPTAs for consideration.

2.6 Academic Integrity

“Integrity without knowledge is weak and useless. Knowledge without integrity is dangerous and dreadful.” - Samuel Johnson

Academic honesty is important because it is the main pillar in ensuring that manners and ethics with regards to higher education integrity are preserved.

Universiti Sains Malaysia encourages its students to respect and ensure that any matter relating to academic integrity are well-preserved. Universiti Sains Malaysia always encourages its students to ensure that manners, ethics and integrity are essential in academic work while focusing on their studies in Universiti Sains Malaysia.

The following are practices or acts that are considered as acts that demonstrates a lack of academic integrity:

1. Cheating

Cheating in the academic context includes copying during examination, use of information without authorization or in a dishonest manner. There are numerous ways and methods of cheating which include, among others:

- a. Copying answers from others during a test or examination.
- b. Any suspicious action that can be described as cheating or an attempt to cheat in an exam.
- c. Using unauthorized materials or devices without authorization such as hand-written notes or any smart electronic device during a test or examination.
- d. Asking or allowing another student to take a test or examination on another student's behalf, and vice-versa.
- e. Sharing answers in assignments or projects.
- f. Purposely tampering with the marks/grade given in any coursework and then re-submit it for remarking/regrading.
- g. Instructing, forcing, persuading, deceiving or threatening others to conduct research, writing, programming or any task for a student's personal gain.
- h. Submitting any identical or similar work in more than one course without consulting or prior permission from the lecturers concerned.

2. Plagiarism

The reputation of an academic institution depends on the ability to achieve and sustain academic excellence through the exercise of academic integrity. Academic integrity is based on honesty, trust, fairness, respect, and responsibility, which form the basis of academic work.

One form of academic misconduct is plagiarism, which is the act of presenting published and unpublished ideas, writings, works or inventions of others in written or other media, as one's own original intellectual endeavours without any clear acknowledgement of or reference to the author of the source.

UNIVERSITI SAINS MALAYSIA POLICY ON PLAGIARISM

University Sains Malaysia Policy on Plagiarism describes the University's strong commitment to uphold academic integrity in relation to plagiarism. It will come into effect when there is an infringement of academic conduct relating to plagiarism.

This policy acts as a guideline to educate and prevent plagiarism and can be used as the guideline if the University's staff and students violate any rules and regulations of the University.

The policy applies to all students, former students, staff and former staff, including fellows, post-doctorates, visiting scholars, as well as academic, non-academic, research, contract and temporary staff who study, serve or have served, or have graduated from the University.

Plagiarism is defined as the act of presenting, quoting, copying, paraphrasing or passing off ideas, images, processes, works, data, own words or those of other people or sources without proper acknowledgement of, reference to or quotation from the original source(s). The acts of plagiarism include, but are not limited to, the following:

- a. Quoting verbatim (word-for-word replication of) works of other people.
- b. Paraphrasing another person's work by changing some of the words, or the order of the words, without due acknowledgement of the source(s).
- c. Submitting another person's work in whole or part as one's own.
- d. Auto-plagiarising or self-plagiarising (one's own work or previous work) that has already been submitted for assessment or for any other

academic award and passing it off as new work without citing the original content.

- e. Insufficient or misleading referencing of the source(s) that would enable the reader to check whether any particular work has indeed been cited accurately and/or fairly and thus to identify the original writer's particular contribution in the work submitted.

The University will take action on every report and offence relating to plagiarism and if a student is found guilty, the student can be charged under the University's Students Disciplinary Rules.

3. Fabrication

Fabrication refers to a process of invention, adaptation or copying with the intention of cheating. This is an act of deceiving other people. Fabrication is somewhat related to matters which have been 'created' or altered.

Invention or task outcome or academic work without acknowledgement, alteration, falsification or misleading use of data, information or citation in any academic work constitutes fabrication. Fabricated information neither represents the student's own effort nor the truth concerning a particular investigation or study and thus violates the principle of truth in knowledge. Some examples are:

- a. Creating or exchanging data or results, or using someone else's results, in an experiment, assignment or research.
- b. Citing sources that are not actually used or referred to.
- c. Intentionally listing incorrect or fictitious references.
- d. Forging signatures of authorization in any academic record or other university documents.
- e. Developing a set of false data.

4. Collusion

Collusion refers to the cooperation in committing, attempting to commit or doing work with dishonest intentions. Some examples of collusion include:

- a. Paying, bribing or allowing someone else to do an assignment, test/exam, project or research for you.

- b. Doing or assisting others in an assignment, test/exam, project or research in return for something.
 - c. Permitting your work to be submitted as the work of others.
 - d. Providing material, information or sources to others knowing that such aids could be used in any dishonest act.
5. Other violations relating to academic integrity
- a. Being late to a lecture, tutorial, class or other modes of teaching with regards to their courses.
 - b. Sending or submitting late any assignment relating to their courses.
 - c. Hiring someone else to do the assignment or thesis.
 - d. Carrying out business by providing service to write students' assignments or theses.
 - e. Any other violations that USM deems to violate academic integrity.

2.6.1 Consequences of Violating Academic Integrity

Students are responsible for protecting and upholding academic integrity in USM.

If in any specific event a student or students encounter any incident that indicates academic dishonesty, the student(s) need to submit a report to the relevant lecturer. The lecturer is then responsible for investigating and substantiate the violation and report the matter to the Dean of the School.

1. If any violation of academic integrity is considered as not of a serious nature, the Dean of the School may take administrative action against the students.
2. However, if the violation is deemed serious by the School, this matter shall be brought to the attention of the Secretariat of University Student Disciplinary Committee (Academic Cases) at Legal Office, Level 2, Building E42, Chancellory II, Universiti Sains Malaysia for further disciplinary action as specified in the disciplinary procedures
3. If a student is caught copying or cheating during an examination, the Investigation Committee of *Copying/Cheating in Examination* will pursue the matter according to the University's

procedures. If the investigation finds that there is a case, the student(s) will be brought to the Student's Disciplinary Committee of the University. In this matter, the rule on conduct during the examination shall be applied.

4. Any student who has been found guilty by the Student's Disciplinary Committee (Academic Cases) may be given a failing grade 'F', in the subject concerned.
5. Universiti Sains Malaysia (Discipline of Students) (Amendment) Rules 2024 provides that a student who commits a disciplinary offence and is found guilty of the offence shall be liable to any one or any appropriate combination of two or more of the following punishments as follows:
 - a. a warning;
 - b. community service in accordance with the regulations made by the Board which shall not exceed 24 hours;
 - c. a fine not exceeding Ringgit Malaysia Five Hundred (RM500.00);
 - d. exclusion from being in any part of the Campus for a period as may be determined by the disciplinary authority;
 - e. expulsion or exclusion from staying in the *desasiswa*;
 - f. for disciplinary offence relating to the academic matters, suspension from sitting any examination as may be determined by the University;
 - g. suspension from being a student of the University for a period as may be determined by the disciplinary authority; or
 - h. expulsion from the University.

2.7 USM Mentor Programme

The Mentor Programme acts as a support aid that involves staff who have undergone special training as consultants and guides to the USM community who would like to share their feelings and any psychosocial issues that could affect their social activities. This programme helps individuals to manage psychosocial issues more effectively, which will eventually improve their well-being in order to achieve a better quality of life.

Objectives

1. To serve as a co-operation and mutual assistance mechanism for dealing with stress, psychosocial problems and related issues in order to ensure the well-being of the USM community.
2. To inculcate the spirit of unity and the concept of helping one another by appointing a well-trained mentor as a social agent who promotes a caring society for USM.
3. To produce more volunteers to assist those who need help.
4. To prevent psychosocial problems from reaching a critical stage.

2.8 Student Exchange Programme

2.8.1 Study Abroad Scheme

The student exchange programme is an opportunity for USM students to study for one or two semesters abroad at any USM partner institutions. Ideally, students are encouraged to participate in the exchange programme within their third to fifth semester (3-year degree programme) and within the third to seventh semester (4-year degree programme).

USM students who wish to participate in the SBLN programme must discuss their academic plans with the Dean or Deputy Dean of their respective Schools and also with the International Office (IO) (to ensure that credits obtained from the external higher education institution can be transferred as part of the credit accumulation for graduation).

Any student who follows the SBLN programme and commits any disciplinary offence in the external higher education institution, can be penalised in accordance with the University (Discipline of Students) Rules if the matter is referred to USM.

For further information, please visit www.io.usm.my or contact the International Office (IO) at +604 – 653 2777/2774.

2.8.2 Student Exchange Programme in Local Higher Education Institutions (RPPIPT)

This is a programme that allows students of Higher Learning Institutions to participate in an exchange programme for a semester

among higher education institutions. Students can choose any relevant courses and apply for credit transfers.

USM students who want to participate in RPPIPT have to discuss their academic plans with the Dean or Deputy Dean of their respective Schools and the Academic and International Division (to ensure that credits obtained from the higher education institution in Malaysia can be transferred as part of the credit accumulation for graduation).

Any student who participates in RPPIPT and violates any of the institution's disciplinary rules can be penalised according to the University (Discipline of Students) Rules if the matter is referred to USM.

For further information, please contact the Academic & International Division at +604 – 653 3126.

2.9 Ownership of Students' Dissertation/Research Project/Thesis and University's Intellectual Property

The copyright of a dissertation/research project/thesis belongs to the student. However, as a condition for the conferment of a degree, the student grants the University this right unconditionally, directly but not exclusively, and royalty-free to use the contents of the work/thesis for teaching, research and promotion purposes. In addition, the student grants non-exclusive rights to the University to keep, use, reproduce, display and distribute copies of the original thesis with the rights to publish it for future research and archival purposes.

2.10 Teaching Assessment

Since Semester 1, Academic Session 2015/2016, USM has implemented the Teaching Assessment System as a medium for students to evaluate the teaching in their courses.

Every student is **REQUIRED** to complete the assessment form for both the course and the lecturer. The teaching assessment system will be open from Week 7 of each semester until the last day of the revision week and can be accessed through the **eLearning Portal**. Students who fail to complete this evaluation will have their examination results for that semester withheld.

3.0 UNIVERSITY COURSE REQUIREMENTS

3.1 Summary of University Course Requirements

Students are required to take 15-22 credits for the following University courses/options for University needs:

UNIVERSITY COURSE REQUIREMENTS			CREDIT TOTAL	
			Local Students	International Students
General Studies (MPU)				
U1	<u>Local Students</u> - HFF226 (Philosophy and Current Challenges) (2 credits) - SHE102 (Malaysian Nation -State Aspiration) (2 credits) - WAR122 (Integrity and Anti-Corruption) (2 credits) <u>International Students of Science and Technology</u> - SHE103E (Malaysian Citra 1) (2 credits) - Malay Language course (2 credits) - WAR123E (Integrity and Anti-Corruption) (2 credits) <u>International Students of Arts</u> <i>(program with Malay Language as the medium of instruction)</i> - SHE103E (Malaysian Citra 1) (2 credits) - LKM100 (Malay Language I) (Z) - LKM200 (Malay Language II) (U) (2 credits) - WAR123E (Integrity and Anti-Corruption) (2 credits) <u>International Students of Arts</u> <i>(program with English Language as the medium of instruction)</i> - SHE103E (Malaysian Citra 1) (2 credits) - LKM100 (Malay Language I) (U) (2 credits) - WAR123E (Integrity and Anti-Corruption) (2 credits)		6	6
U2	<u>Local Students</u> - LKM400 (Malay Language IV) (2 credits) - English Language Course (2 credits)* <u>International Students</u> - English Language Course (2 credits)*		4	2
U3	<u>Local Students</u> - WUS101 (Core Entrepreneurship) (2 credits) <u>International Students</u> - SHE104E (Malaysian Citra 2) (2 credits)		2	2
U4	<u>Local Students</u> Co-Curricular Courses* <u>International Students</u> Co-Curricular Courses*	2	2	
Options	Students can/have to choose any of the following: - Co-curricular courses - Skill courses/Foreign Language Courses/ Other courses offered by other schools		1-8	3-10
CREDIT TOTAL			15-22	15-22

- * Students are required to take the Prerequisite English Language Course (Z) – 2 credits.
- * Students of the School of Educational Studies are required to refer to the Study Plan Handbook for further information regarding the registration requirements for the Packaged Co-curricular Courses (Uniformed Bodies).
- * Students from the School of Dental Sciences are required to register for three (3) credits of courses in the U4 group. Further information can be obtained from the Academic Office, School of Dental Sciences.

3.2 General Studies Components (MPU) (15 credits)

General Studies Subjects (MPU) constitute a compulsory component of the higher education curriculum aimed at developing holistic graduates who possess a strong national identity, ethical values, resilience, soft skills, and future-ready competencies. In line with the aspirations of the Malaysia Higher Education Plan (RPTM) 2026–2035, MPU plays a vital role in strengthening human capital development based on the values of humanity, sustainability, responsible citizenship, lifelong learning, and the ability to adapt to an increasingly complex and technology-driven world.

General studies are divided into four groups as follows:

1. U1: appreciation of philosophy, values and history;
2. U2: the mastery of soft skills;
3. U3: expansion of the knowledge of Malaysia and its history; and
4. U4: practical community management skills such as community service and co-curriculum.

A. U1 Group

Local Students

All Malaysian students are required to take and pass the following courses. In order to graduate, the minimum passing grade required is Grade C.

(i) HFF226 (Philosophy and Current Challenges) (2 credits)

The course synopsis is as follows:

This course examines the philosophical foundations underlying the development of an inclusive and harmonious Malaysian society through concepts such as the Rukun Negara, National Education Philosophy, Sejahtera Philosophy and MADANI Philosophy. Students are introduced to the major components of philosophy to understand, analyse and address contemporary issues and future challenges critically and reflectively.

(ii) SHE102 (Malaysian Nation-State Aspiration) (2 credits)

The course synopsis is as follows:

This course aims to provide students with an understanding of the formation and development of the Malaysian nation-state through the appreciation of statehood elements, the history of ethnic interactions, and the diversity of society. The course also seeks to cultivate awareness of the importance of unity, harmony, and shared values among Malaysians. In addition, this course exposes students to contemporary challenges such as regional sentiments, technological developments, and sustainability issues that influence the aspirations of nation-state development. Through this course, students are expected to appreciate Malaysia's aspirations as a progressive, inclusive nation founded upon the values of goodwill, tolerance, and harmony.

(iii) Integrity and Anti-Corruption Course (WAR122)

Local students are required to register the Integrity and Anti-Corruption Course during their studies to complete the minimum requirement of two (2) credits in the MPU4 structure as a graduation requirement. The minimum passing grade required is Grade C.

International Students

(iv) Malay Language Course (2 credits)

All international students are required to take and pass the Malay Language course. In order to graduate, the minimum passing grade required is Grade C. Malay Language course requirements by academic programme are as follows:

- a) International students pursuing a Bachelor's Degree in Arts (*program with Malay Language as the medium of instruction*) are required to take the following courses:

Code	Type	Credit
LKM100	Z	2
LKM200	U	2

- b) International students pursuing a Bachelor's Degree in Arts (*program with English Language as the medium of instruction*) are required to take the following course:

Code	Type	Credit
LKM100	U	2

- c) International students pursuing Bachelor's Degrees in Science and Technology are required to take the following course:

Code	Type	Credit
LKM100	U	2

(i) **SHE103E (Malaysian Citra 1) (2 credits)**

The course synopsis is as follows:

This course offers a comprehensive introduction to Malaysia's historical evolution, geographical diversity, cultural richness, and socio-political development. Students will explore modern Malaysia formation, its multicultural society, linguistic diversity, and unique traditions rooted in various ethnicities and religions. The course also emphasizes Malaysia's traditional arts and heritage, including elements recognized by UNESCO.

B. U2 Group

(i) **LKM400/2 (Malay Language IV)**

In order to graduate, the minimum passing grade required is Grade C. Entry requirements for Malay Language are as follows:

No	Qualification	Grade	Entry Level	Type	Credit	Status
1	(a) SPM/MCE/SC (or equivalent qualification)	1 - 6	LKM400	U	2	Graduation Requirement
	(b) STPM/HSC (or equivalent qualification)	P/S				

Note:

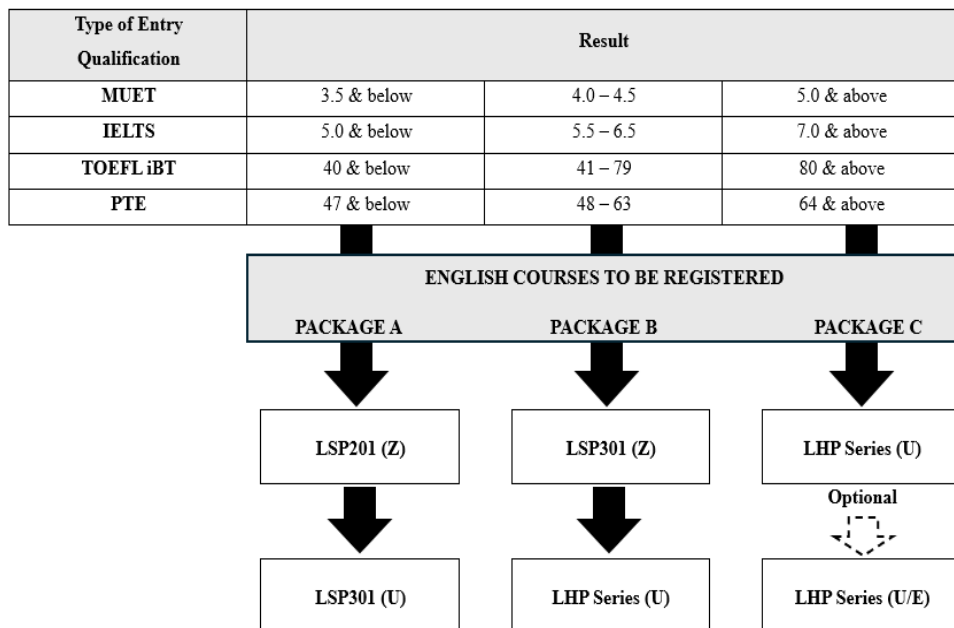
To obtain credits for **Malay Language** courses, a minimum of Grade C is required. Students may seek advice from the School of Languages, Literacies and Translation if they have a different Bahasa Malaysia qualification from the above.

(ii) **English Language Course**

Local and International Students

All bachelor's degree students must accumulate two (2) units of type U from the English Language courses to fulfil the University requirement for graduation. However, students may be required to take an English Language course as a prerequisite (Z) first based on their English Language qualification and the determined package.

The following chart shows the English Language registration packages for students with MUET, IELTS, TOEFL iBT or PTE:



Notes:

- Students shall refer to the list of English language courses prescribed by their respective schools, particularly for advanced-level courses that may be required by certain schools.
- Students with qualifications not listed in the chart above will take courses under Package A.
- To obtain units in English Language courses, students have to obtain a minimum grade 'C'.

English Language Course

English courses offered as University (U) courses are as follows:

No.	Code/Unit	Course Title
1.	LSP201/2	General English I
2.	LSP301/2	General English II
3.	LHP410/2	Effective Reading
4.	LHP411/2	Effective Writing
5.	LHP412/2	Effective Oral Presentation
6.	LHP458/2	English for Translation (offered in Semester 2 only)
7.	LHP459/2	English for Interpretation (offered in Semester 1 only)

C. U3 Group

Local Students

WUS101 (Core Entrepreneurship) (2 credits)

All students are required to take and pass WUS101/2 (Core Entrepreneurship). In order to graduate, the minimum passing grade required is Grade C. The following is the synopsis of the course:

This course provides basic exposure to students on entrepreneurship and business fields, with emphasis on the implementation of the learning aspects while experiencing the process of executing business projects on campus. The main learning outcome is the assimilation of culture and entrepreneurship work ethics in their everyday life. This initiative is made to open the minds and arouse the spirit of entrepreneurship among target groups that possess the potential to become successful entrepreneurs.

For more information, please refer to the Centre for Co-Curricular Programme website.

International Students

SHE104E (Malaysian Citra 2) (2 credits)

All international students are required to take and pass the SHE104E/2 (Malaysian Citra 2) course. To graduate, the minimum passing grade is Grade C. The following is the synopsis of the course:

This course discusses Malaysia's political-administrative system, federal structure, and Constitutional Monarchy. It examines Malaysia's economic transformation, industrial sectors, and current challenges within the context of digital and sustainable development. Emphasis is also placed on Malaysia's position as an international tourism hub and its global achievements in diplomacy, sports, and trade.

D. U4 Group

Co-Curricular Packaged Course (Uniformed Body)

Students of the School of Educational Studies shall refer to the School of Educational Studies Study Plan Handbook (BPRP) for their respective academic programmes for further information regarding the registration requirements for the Packaged Co-curricular Courses (Uniformed Bodies). Students who register for the PALAPES, SUKSIS, or SISPA Uniformed Bodies Co-curricular Courses are required to complete the entire prescribed course package. The minimum passing grade for these courses is Grade C.

3.3 Options (1 – 8 credits)

A. Co-curricular course

Students can choose Co-Curricular Courses as an Option to complete the total number of University Course credits according to the requirements of their respective schools.

Co-curriculum courses are grouped by Core and are available in packages and without packages. Students are required to complete all phases of the course package if they register for the Co-Curricular Packaged Course. The minimum passing grade required is Grade C.

The details of the list of Co-Curricular Courses offered are as follows:

(i) Core of Volunteerism (6 - 10 credits)

All courses offered under this core are the uniform courses offered in the following packages:

PALAPES Army	PALAPES Navy	PALAPES Air Force	SUKSIS (Students' Police Volunteers)
WTD103/3	WTL103/3	WTU103/3	WPD101/2
WTD203/3	WTL203/3	WTU203/3	WPD201/2
WTD304/4	WTL304/4	WTU304/4	WPD301/2

SISPA (Siswa Siswi Pertahanan Awam Malaysia)	St John Ambulance	Red Crescent Emergency Aid Team	Kelanasiswa Malaysia
WPA103/2	WJA102/2	WBM102/2	WLK102/2
WPA203/2	WJA202/2	WBM202/2	WLK202/2
WPA303/2	WJA302/2	WBM302/2	WLK302/2

For more information, please refer to the Centre for Co-Curricular Programme website.

(ii) Core of Sports (1 - 3 credits)

The courses offered are as follows:

Packaged Courses (3 Credits, 3 Semesters) (Students are required to complete all levels)	
Karate	Taekwondo
WSC108/1	WSC115/1
WSC208/1	WSC215/1
WSC308/1	WSC315/1
Non Packaged Courses (1 Credit)	
WSC105/1 – Volley Ball	WSC119/1 - Badminton
WSC110/1 - Archery	WSC124/1 - Sepak Takraw
WSC111/1 - Table Tennis	WSC 126/1 - Netball
WSC112/1 - Swimming	WSC128/1 - Petanque
WSC113/1 - Aerobics	WSC130/1 - Orienteering
WSC114/1 - Squash	WSC131/1 - Woodball
WSC116/1 - Tennis	
Non Packaged Courses (2 Credits)	
WSC127/2 – Event Management 1	WSC 125/2- Futsal
WSC127/2 – Event Management 2	

For more information, please refer to the Centre for Co-Curricular Programme website.

(iii) Core of Culture (1 – 6 credits)

The courses offered are as follows:

Packaged Courses (6 Credits, 3 Academic Sessions) (Students are required to complete all levels)	
Jazz Band	Seni Silat Cekak Malaysia
WCC108/2	WCC123/2
WCC208/2	WCC223/2
WCC308/2	WCC323/2
Non-Packaged Courses (1 Credit)	
WCC103/1 - Painting	WCC121/1 - Calligraphic Art
WCC105/1 - Gamelan	WCC122/1 - Culinary Arts
WCC107/1 - Guitar	WCC124/1 - Musical Kompang
WCC109/1 - Choir	WCC125/1 - Traditional of Kite Art
WCC110/1 - Handcrafting	CC128/1 - Embroidery and Beads Sequin Art
WCC115/1 - Modern Dance	WCC130/1 - Digital SLR Photography Art
WCC116/1 - Traditional Dance	WCC 131/1 - Editing Digital Photography Art
WCC117/1 - Modern Theatre	WCC132/1 - The Art of Ceramics
WCC118/1 - Malay Shadow Play	WCC133/1 - Decoupage Arts
WCC120/1 - Canting Batik	

For more information, please refer to the Centre for Co-Curricular Programme website.

(iv) Core of Innovation and Initiative (1 - 2 credits)

The courses offered are as follows:

Non-Packaged Courses (2 Credits)	
WLF103 - Climate Change Resilience	WMU102/2 - Makers@USM Level 1
WLF104 - Digital Financial Literacy	WMU112/2 – Artificial Intelligence Literacy
WLF105 - Grit in You	WMU122/2 - Data Science Literacy

For more information, please refer to the Centre for Co-Curricular Programme website.

(v) Core of Community Service (4 credits)

The courses offered are as follows:

Packaged Courses (4-6Credits) (Students are required to complete all levels)	
WKM102/2 - Community Service 1	WKM202/4 - Community Service 2
Non-Packaged Courses (2 Credits)	
WSK102/2 - Volunteerism Science	

For more information, please refer to the Centre for Co-Curricular Programme website.

(vi) Core of Public Speaking (2 credits)

The courses offered are as follows:

Non-Packaged Courses (2 Credits)
WEC102/2 - Public Speaking in Malay Language
WEC103E/2 - Public Speaking in English Language

For more information, please refer to the Centre for Co-Curricular Programme website.

(vii) Core of Sustainability (2 credits)

The courses offered are as follows:

Non-Packaged Courses (2 Credits)
WSU101/2 - Sustainability of Issues, Challenges and Prospects

For more information, please refer to the Centre for Co-Curricular Programme website.

B. Skill / Foreign Language Courses / Courses offered by other schools

Students can choose the following courses as an option:

(i) WSU 101 (Sustainability: Issues, Challenges & Prospects) (2 credits)

The following is the synopsis of the course:

This course introduces and exposes the concept of sustainable development to students. The course aims to ensure future generation capabilities to meet their needs in the future are not affected, especially in the era of challenging globalization and the rapid

development of information technology at present. Sustainable development models and case studies are also discussed.

The minimum passing grade required is Grade C. For more information, please refer to the Centre for Co-Curricular Programme website.

(ii) HTV201 (Thinking Techniques) (2 credits)

Students must obtain a PASS result for this course. The minimum passing grade is based on programme graduation requirement or the respective school regulations. The course synopsis is as follows:

This course introduces students to various creative thinking such as styles and thinking tools that can broaden their understanding of creativity and improve problem-solving skills. Students are trained to select and apply the best techniques to solve specific problems. So this course helps students to learn to think effectively in order to make the most effective decisions in both their studies and daily life.

(iii) Other options/skill courses as recommended or required by the respective schools (if any)

(iv) English language course

The following courses may be taken as a university course to fulfil the compulsory English language requirements (or for students with MUET Band 5+) or as a skill/option course:

No	Code/Credit	Course Title
1.	LHP410/2	Effective Reading
2.	LHP411/2	Effective Writing
3.	LHP412/2	Effective Oral Presentation
4.	LHP458/2	English for Translation (offered in Semester 2 only)
5.	LHP459/2	English for Interpretation (offered in Semester 1 only)

(v) Foreign Language Courses

The foreign language courses offered by the School of Languages, Literacies and Translation can be taken by students as optional or compulsory courses to fulfil the number of units required for graduation. Students are not allowed to register for more than one foreign language course per semester. They must complete at least two levels of a foreign language course before they are allowed to register for another foreign language course. However, students are

not required to complete all four levels of one particular foreign language course. The foreign language courses offered are as follows:

Arabic	Chinese	Japanese	German	Spanish
LAA100/2	LAC100/2	LAJ100/2	LAG100/2	LAE100/2
LAA200/2	LAC200/2	LAJ200/2	LAG200/2	LAE200/2
LAA300/2	LAC300/2	LAJ300/2	LAG300/2	LAE300/2
LAA400/2	LAC400/2	LAJ400/2	LAG400/2	LAE400/2

French	Thai	Tamil	Korean
LAP100/2	LAS100/2	LAT100/2	LAK100/2
LAP200/2	LAS200/2	LAT200/2	LAK200/2
LAP300/2	LAS300/2	LAT300/2	LAK300/2
LAP400/2	LAS400/2		

The minimum passing grade required is Grade D-. For more information, please refer to the School of Languages, Literacies and Translation website.

4.0 SCHOOL OF CIVIL ENGINEERING

(<https://civil.eng.usm.my/>)

4.1 INTRODUCTION

The School of Civil Engineering was established in 1989. It is now a modern and dynamic school with an excellent track record in providing undergraduate and postgraduate education across a wide range of civil engineering disciplines. The School is widely recognized for the high quality of its academic programmes. The School produces competent, creative and highly dedicated graduates in civil engineering who contribute to human capital development in both government agencies and private sectors.

The School has formally adopted the Outcome Based Education (OBE) system since the 2006/2007 academic session to fulfill the Engineering Accreditation Council (EAC) requirements for undergraduate engineering programmes in Malaysia. The Bachelor of Engineering (Honours) (Civil Engineering) programme received full accreditation for five years (2014–2018) and subsequently a six-year full accreditation for the period 2019–2024. In the most recent accreditation cycle, the programme was granted full accreditation for six years by the Board of Engineers Malaysia (BEM), covering the period from 2025 to 2030. Starting from the 2021/2022 academic session, the programme name was changed to Bachelor of Civil Engineering with Honours

The School of Civil Engineering is active in both basic and applied research, as well as consultancy projects funded by both government agencies and industries. The School also receives many international students in its postgraduate programmes (PhD and MSc by research). Since the academic session 2019/2020, the School has also offered a new mixed-mode programme in Fire Safety Engineering, in collaboration with the other five (5) Engineering Schools in the Engineering Campus.

The School is supported by experienced faculty members (all holding PhD degree) and highly trained technical and administrative personnel. It is also equipped with state-of-the-art laboratory facilities backed by fully networked computer systems. The School is actively engaged with industry in areas such as structural and materials testing, field and laboratory water quality monitoring, air and noise pollution monitoring, environmental impact assessment, traffic planning, traffic impact assessment and geotechnical evaluation.

4.2 PHILOSOPHY AND OBJECTIVES

The School of Civil Engineering aims to be a leader in providing the highest quality undergraduate education in civil engineering available in the country. Its primary goal is to offer all students the opportunity for a broad-based educational experience and to enable students to address complex and comprehensive civil engineering problems. In addition, the School seeks to provide students with the necessary fundamentals for them to advance in the profession in response to the evolving technology, as well as societal needs and expectations. Last but not least, the School is committed to fostering intellectual interest and preparation for graduate studies and research.

These objectives are reflected in the mission statement of the School of Civil Engineering: -

“To nurture and sustain excellence in delivering comprehensive education, imparting knowledge, exploring frontiers of technology, and providing services to the industry and community, at the local and international levels, by applying the most advanced knowledge and leading expertise, creating innovative ventures, being truthful and by upholding USM’s motto “We Lead”.

The School of Civil Engineering has formally adopted the Outcome Based Education (OBE) approach, which focusses on achieving specified outcomes in terms of individual student learning. The educational structures and curriculum in the Bachelor of Civil Engineering with Honours programme at USM are designed to achieve capabilities and qualities highlighted earlier, which are regarded as means to achieve the desired outcomes. If the intended outcomes are not achieved, the process is re-evaluated to ensure continuous improvement through the Continual Quality Improvement (CQI) system.

OBE is a fundamental requirement for Malaysia’s full signatory membership in the Washington Accord (WA), a multinational agreement for the mutual recognition of engineering degrees. This ensures that Malaysian graduates are prepared for professional engineering practice in the international arena.

The Bachelor of Civil Engineering with Honours programme has in place the following accreditation requirements: -

1. Published Program Educational Objectives (PEO) that align with the mission of the institution;
2. A defined set of Programme Outcomes (PO) and an established assessment process to ensure the outcomes are measured; A defined set of Programme Outcomes (PO) and an established assessment process to ensure the outcomes are measured;
3. A curriculum and associated processes that ensure the achievement of these objectives and outcomes; and

4.A continuous evaluation system that demonstrates the achievement of the objectives and outcomes, with results utilized for Continual Quality Improvement (CQI).

Program Educational Objectives [PEO] are statements that describe the expected accomplishments of graduates within the first several years following graduation. The program educational objectives are aligned with the vision and mission of the Universiti Sains Malaysia, as outlined below:

- PEO 1 To produce competent, creative and innovative graduates, proficient in solving civil engineering problems within the broader contexts of global, societal, and sustainable development.
- PEO 2 To produce graduates with good leadership qualities and effective communication skills, capable of undertaking engineering tasks independently and collaboratively via interdisciplinary teams
- PEO 3 To produce graduates with professional and ethical attributes, who actively engaged in continuous pursuit of knowledge through research, continuing education and professional development activities.

Program Outcomes [PO] refer to the measurable abilities that students are expected to attain upon the successful completion of the Bachelor of Civil Engineering with Honours programme at Universiti Sains Malaysia. Knowledge, Skills and Abilities are emphasized throughout the 4-year undergraduate study in order to prepare students to be successful engineers by fulfilling the following outcomes:

- PO1 **Engineering Knowledge:** Ability to apply knowledge of mathematics, natural science, computing, engineering fundamentals, and an engineering specialization to develop solutions to complex civil engineering problems **(WK1 to WK4)**
- PO2 **Problem Analysis:** Ability to identify, formulate, research literature, and analyze complex civil engineering problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences with holistic considerations for sustainable development **(WK1 to WK4)**
- PO3 **Design / Development of Solutions:** Ability to design creative solutions for complex civil engineering problems and design systems, components or processes to meet identified needs with appropriate consideration for public health and safety, whole life cost, net zero carbon, as well as resource, cultural, societal, and environmental considerations as required. **(WK5)**
- PO4 **Investigation:** Ability to conduct investigation of complex civil engineering problems using research methods including research-based knowledge, including design of experiments, analysis and interpretation of data, and synthesis of

information to provide valid conclusions. **(WK8)**

- PO5 **Tool Usage:** Ability to create, select, apply, and recognize the limitations of appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex civil engineering problems. **(WK2 and WK6)**
- PO6 **The Engineer and the World:** Ability to analyze and evaluate sustainable development impacts on society, the economy, sustainability, health and safety, legal frameworks, and the environment in solving complex civil engineering problems. **(WK1, WK5, and WK7)**
- PO7 **Ethics:** Ability to apply ethical principles and commit to professional ethics and norms of engineering practice while adhering to relevant national and international laws and demonstrating an understanding of the need for diversity and inclusion. **(WK9)**
- PO8 **Individual and Collaborative Teamwork:** Ability to function effectively as an individual and as a member or leader in diverse and inclusive teams and in multidisciplinary, face-to-face, remote and distributed settings. **(WK9)**
- PO9 **Communication:** Ability to communicate effectively and inclusively on complex civil engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, considering cultural, language, and learning differences
- PO10 **Project Management and Finance:** Ability to apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work as a member and leader in a team and manage projects in multidisciplinary environments.
- PO11 **Lifelong Learning:** Ability to recognise the need for and have the preparation and ability for independent and lifelong learning, adaptability to new and emerging technologies and critical thinking in the broadest context of technological change. **(WK8)**

4.3 MAIN ADMINISTRATIVE STAFF



UNIVERSITI SAINS MALAYSIA



EXECUTIVE COMMITTEE

**2025
2027**



DEAN
Professor. Ir. Dr.
Fadzli Mohamed Nazri



DEPUTY DEAN
Assoc. Prof. Ir. Dr. Mustafasanie M. Yussof



DEPUTY DEAN
Assoc. Prof. Dr. Noorhazlinda Abd Rahman

Research, Innovation & Industry - Community Engagement

Academic, Career and International



Ts. Dr. Nik Azimatolakma Awang
Programme Chairman (Undergraduate)



Dr. Nuridah Sabtu
Programme Chairman (Postgraduate)



Mr. Mohd Redzuan Asmi
Senior Assistant Registrar



Ms. Hani Soraya Ahmad
Principal Assistant Registrar

SOCE@USM | **SCHOOL OF CIVIL ENGINEERING**

We Lead

TRANSFORMING HIGHER EDUCATION
FOR A SUSTAINABLE TOMORROW

4.4 LIST OF ACADEMIC STAFF

Professor	Ext.	Email
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Sharifah Akmam Syed Zakaria, Dr. <i>Environmental Engineering</i>	6253	akmam@usm.my

Senior Lecturer / Lecturer

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Chang Chun Kiat, Ir. Ts. Gs. Dr	5468	redac10@usm.my

4.5 INDUSTRY / COMMUNITY ADVISORY PANEL (ICAP)

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INDUSTRY
COMMUNITY
ADVISORY
PANELS

Appointment takes effect:
1st January 2025 to 31st December 2026

YBhg. Dato' Ir. Dr. Goh Teik Cheong
Executive Director
M.E.I Project Engineers Sdn. Bhd.

Ir. Ts. Hj. Mohamed Haniffa
Hj. Abdul Hamid
Chairman
Minconsult Advisory Council, MRTS &
MRTM Board of Director

Mr. Azmi Musa
Senior General Manager
SIRIM QAS International Sdn. Bhd.

Ir. Mohd Taufik Salleh
Head of Department/ General Manager
Indah Water Konsortium Sdn. Bhd.

Ir. Dr. Hj. Azlan bin Othman
Executive Director
Ithem Jurutera Sdn. Bhd.

Ts. Dr. Ong Chong Yong
Managing Director
Urban Axes (M) Holdings Sdn. Bhd.

Mr. Faisal Musa
Director
Solver Fire Engineering
Consultant Sdn. Bhd.

4.6 LABORATORY FACILITIES

The School of Civil Engineering provides complete laboratory facilities to produce civil engineers that are highly knowledgeable and innovative. Besides academic staffs who are experts in their respective fields of specialization, this school has fully equipped engineering laboratories. These include:

- Environmental Laboratory 1
- Environmental Laboratory 2
- Geotechnical Laboratory
- Highway Laboratory
- Hydraulics Laboratory
- Heavy Structures Laboratory
- Light Structures Laboratory
- Geomatics Instrument Portal
- Concrete Laboratory
- Computer Laboratory
- Traffic Laboratory
- Fabrication Workshop

4.7 JOB OPPORTUNITIES

Civil Engineering graduates have a wide job prospect in both government agencies and private sectors. The job prospect includes, but are not limited, to the followings:

- Consultant
- Contractor
- Developer
- Entrepreneur
- Manager
- Educator

The career specialization may be in one or a few of the followings:

- Disaster Management
- Innovative Materials and Sustainable Infrastructure
- Waste Management (solid, water and material)
- Sustainability of Environment and Resources (water, land, clean air)
- Sustainability of Roads and Mobility

4.8 POST GRADUATE STUDIES AND RESEARCH PROGRAMME

The School of Civil Engineering provides opportunities for individuals who are interested to pursue higher degree study. Higher degree's programme offers the opportunities to graduates who are qualified to enhance their knowledge in any areas of their interest. Students will be exposed to research techniques and methodologies, which will indirectly contribute towards knowledge expansion and development. Higher degree programmes, which lead to the award Master of Science (MSc) and Doctor of Philosophy (PhD) degrees, can be undertaken through either full time or part time modes. At present, master's degree programme is offered by both mixed-mode and research modes.

The School of Civil Engineering offers two modes of postgraduate programmes as follows:

Master of Science and Doctor of Philosophy by Research

Graduate students enrolled in the research mode may select a topic within their specific area of study. They will be under the supervision of a main supervisor and/or a co-supervisor. In some cases, field supervisors are appointed by the university to assist the graduate. At the end of their study, students are required to submit a thesis to be examined. Depending on the nature of the research, students are required to complete prerequisite courses (if necessary) either before or during undertaking the course of their research activities. Applications and registration for research-based programmes are open throughout the year.

Master of Science by Mixed-mode

The mixed-mode programme, which combines coursework and research, is a structured programme in which students are required to attend lectures, sit for examinations, complete a dissertation and undergo oral examination. The programme is based on a semester system and is offered on a full-time basis only. The minimum duration for completion is 1 year. However, the actual time to graduation is very much dependent on the initiative and performance of candidates, subject to a maximum of two academic years. The title of the research project is to be mutually agreed upon between the candidate and his/her supervisor. For the award of the Master degree, a candidate has to accumulate 40 units (including dissertation).

Degree Offered

The school offers the MSc Degree Programme by Mixed-Mode in the following:

- Master of Science in Fire Safety Engineering

Applicants for courses leading to the award of a Master's degree should possess a Bachelor degree in Civil Engineering or related areas (equivalent to a CGPA 2.75) from a recognized university. A candidate with a lower CGPA may be considered for admission based on relevant research and job experiences.

Applicants seeking admission to PhD programme should possess a MSc degree from a recognized university or equivalent qualifications acceptable to the Senate of Universiti Sains Malaysia. In exceptional cases, the Senate may consider candidates who hold a good Bachelor's degree for direct admission.

Research areas

The school may supervise research in the following areas but is not limited to:

Environmental Engineering

Landfill Technology, Composting, Water and Wastewater Treatment, Industrial Wastewater Treatment, Solid Waste Management, Environmental Impact Assessment (EIA), Air and Water Quality Studies, Sludge Management, Noise Pollution Control and Water Quality Modeling.

Geotechnical Engineering

Slope Stabilisation (soil/rock), Soil Improvement, Reinforced Soil, Landslide Risk Management and Application of Geosynthetics, Rock Mechanics and Rock Engineering, Blasting & Vibrations, Foundation Engineering, Land Reclamation and Rehabilitation, Geotechnical Modelling and Assessment, Piling Vibrations, Tunneling and Underground Excavation.

Water Resources Engineering

Water Supply, Urban Storm Water Management, Hydrological Modeling, Flood Forecasting, River Engineering, GIS Applications in Water Resources, Land Use Hydrology, Urban Hydrology, Sediment Transport, Modeling of Pump Station and Eco-hydrology.

Transportation & Highway Engineering

Pavement Engineering, Asphalt Technology, Traffic Engineering, Road Safety, Intelligent Transport Systems, Public Transport Studies, Highway Capacity Studies, Travel Behavior Studies, Road Maintenance and Sustainable Transport.

Structural Engineering

Concrete Technology, Masonry Engineering, Concrete Repair Materials and Techniques, Structural Health Monitoring and Assessment, Wind Engineering, Earthquake Engineering, Timber Engineering, Tensioned Structures, Shell & Spatial Structures, Sustainable and Resilient Structures, Innovative Technologies of Structural Systems, Computational Mechanics and Advanced Structural Analysis.

Geomatic and Management

Monitoring Systems, Global Positioning Systems (GPS), Spatial Decision Support Systems (GIS), Geo-Information Science (GIS), Digital Mapping & Imaging, Engineering Survey, Spatial Statistics, Emotional Intelligence and Engineering Entrepreneurship.

4.9 Curriculum Structure – Bachelor of Civil Engineering with Honours Programme Academic Session 2026/202

Type	Category	LEVEL 100		LEVEL 200		LEVEL 300		LEVEL 400		
CORE	Engineering Core	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	
		EAA110/2 Civil Engineering Drawing	EUM114/3 Advanced Engineering Calculus	EAA211/2 Engineering Mathematics for Civil Engineers	EAP215/3 Water Supply and Treatment Engineering	EAP315/3 Wastewater Engineering	EAS356/2 Reinforced Concrete Structural Design II	EAA371/5 Industrial Training	EAA492/6 (3) Final Year Project	
		EAA112/2 Introduction to Civil Engineering	EAK164/4 Civil Engineering Surveying	EAH226/2 Fluid Mechanics for Civil Engineers	EAG246/3 Geotechnical Analysis	EAG343/2 Geotechnical Design	EAS358/2 Structural Steel Design	EAA492/6 (3) Final Year Project	EAA496/5 Integrated Design Project	
		EAA113/2 Fundamental to Data Engineering and Computation	EAS152/3 Strength of Materials	EAG245/3 Soil Mechanics	EAH225/3 Hydraulics	EAL331/3 Transport Planning and Road Safety	EAA383/2 Construction Project Management			
	Lab	EUM113/3 Engineering Calculus	EAG153/3 Civil Engineering Materials	EAS253/3 Theory of Structures	EAA254/2 Construction Technology in Building and Infrastructure	EAS353/3 Reinforced Concrete Structural Design I	EAH327/3 Urban Water Design			
Unit	15	13	17	19	19	9	13	3	108	
University Requirement (LOCAL)	WAR122/2 Integrity and Anti-Corruption	LKM400/2 Malay Language		LSP201/2 (2) (PACKAGE A) English Language (MUET 3 and below)	Co-Curriculum/ Option/ Language subject (1 unit)	LSP301/2 (PACKAGE A) English Language	LHP410/2 (PACKAGE B AND C) English Language		15	
	SHE102/2 Aspirasi Negara Bangsa	WUS101/2 Core Entrepreneurship	Co-Curriculum (2 unit)			LSP301/2 (2) (PACKAGE B) English Language (MUET 4.0-4.5)				
University Requirement (MUTUAL)	Co-Curriculum (2 unit)	WAR123/2 Integrity and Anti-Corruption Challenges	LKM100/2 Malay Language	LSP301/2 (2) English Language (IELT 5.5-6.5, TOEFL 41-79, PTE 48-53)	Co-Curriculum/ Option/ Language subject (1 unit)	Co-Curriculum/ Option/ Language subject (2 unit)	LHP410/2 English Language		15	
	SHE103/2 Malaysian Citra 1	SHE104/2 Malaysian Citra 2								
ELECTIVE COURSES (SPECIALISATION)						EAP317/3 Air and Noise Pollution in Civil Engineering	EAA487/3 Disaster Management	EAP413/3 Solid and Industrial Waste Management		
						EAA384/3 Sustainable Practices in Construction	EAH416/3 Sustainable Water System Modeling	EAS459/3 Forensic Engineering For Civil Engineer		
						EAK381/3 Geographical Information System and Remote Sensing in Civil Engineering	EAS461/3 Building Pathology and Retrofitting	EAS460/3 Advanced Structural Analysis	12	
							EAG441/3 Soil Stabilization and Ground Improvement	EAG445/3 Rock Engineering and Underground Construction Technology		
							EAL433/3 Highway Design and Sustainable Pavement	EAL435/3 Advance Transport Modeling		
Unit	19	19 (17*)	19	19	20	14A, 12B,C (14*)	16A, 18B,C (18*)	9		
NOTE:	*International		A English Package A		B, C English Package B and C			Total Units for Graduation	135	

Note: This curriculum structure may vary slightly from time to time, and any change will be informed to the students

4.9.1 CURRICULUM BY SEMESTER

LEVEL 100

Courses Offered		Unit
Semester I		
EAA110	Civil Engineering Drawing	2
EAA112	Introduction to Civil Engineering	2
EAA113	Fundamentals to Data Engineering and Computation	2
EUM113	Engineering Calculus	3
EAG142	Geology for Civil Engineers	2
EAS151	Statics and Dynamics	3
		14
MID-SEMESTER BREAK		
Semester II		
EAK164	Civil Engineering Surveying	4
EUM114	Advanced Engineering Calculus	3
EAS152	Strength of Materials	3
EAS153	Civil Engineering Materials	3
		13
SEMESTER BREAK		

LEVEL 200

Courses Offered		Unit
Semester I		
EAA211	Engineering Mathematics for Civil Engineers	2
EAH226	Fluid Mechanics for Civil Engineers	2
EAG245	Soil Mechanics	3
EAL237	Transportation and Traffic Engineering	2
EAS253	Theory of Structures	3
EAP216	Introduction to Environmental Engineering	3
EAA205	Structures Engineering and Strength of Materials Laboratory	2
		17
MID-SEMESTER BREAK		
Semester II		
EAP215	Water Supply and Treatment Engineering	3
EAG246	Geotechnical Analysis	3
EAH225	Hydraulics	3
EAA284	Construction Technology in Building and Infrastructure	2
EAS254	Structural Analysis	3
EAL236	Pavement and Highway Engineering	3
EAA207	Geotechnical I, Hydraulics & Traffic Engineering Laboratory	2
		19
SEMESTER BREAK		

LEVEL 300

Courses Offered		Unit
Semester I		
EAP315	Wastewater Engineering	3
EAG343	Geotechnical Design	2
EAL331	Transport Planning and Road Safety	3
EAS353	Reinforced Concrete Structural Design I	3
EUP221	Engineers and the world	3
EAH325	Engineering Hydrology	3
EAA306	Geotechnical II, Environmental and Pavement Engineering Laboratory	2
		19
MID-SEMESTER BREAK		
Semester II		
EAS356	Reinforced Concrete Structural Design II	2
EAS358	Structural Steel Design	2
EAA383	Construction Project Management	2
EAH327	Urban Water Design	3
		9
		15
ELECTIVE COURSES		
EAP317	Air and Noise Pollution in Civil Engineering	3
EAA384	Sustainable Practices in Construction	3
EAK381	Geographical Information System and Remote Sensing in Civil Engineering	3
SEMESTER BREAK		14

LEVEL 400

Courses Offered		Unit
Semester I		
EAA371	Industrial Training	5
EAA492	Final Year Project	3
EAA496	Integrated Design Project	5
		13
ELECTIVE COURSES		
EAA487	Disaster Management	3
EAH418	Sustainable Water System Modelling	3
EAS461	Building Pathology and Retrofitting	3
EAG441	Soil Stabilization and Ground Improvement	3
EAL433	Highway Design and Sustainable Pavement	3
		16
MID-SEMESTER BREAK		
Semester II		

EAA492	Final Year Project	3
		3
ELECTIVE COURSES		
EAP413	Solid and Waste Management	3
EAH459	Forensic Engineering For Civil Engineer	3
EAS460	Advanced Structural Analysis	3
EAG445	Rock Engineering and Underground Construction Technology	3
EAL435	Advance Transport Modelling	3
SEMESTER BREAK		9

** Industrial Training is conducted/undertaken at the end of Year 3, Semester 2 and lasts for a duration of 10 weeks*

4.10 COURSES DESCRIPTION

EAA110/2 **Civil Engineering Drawing**

Course Objectives To provide knowledge and skill on the fundamental, techniques and applications of computer aided drawing (CAD) 2D and 3D, so that students are able to prepare engineering drawings for civil engineering applications.

Course Outcomes Students should be able to

- i Produce 2D and 3D engineering drawings using computer aided drawing (CAD) software.
- ii Able to construct civil engineering drawing using computer aided software.
- iii Able to produce structural drawings with Building Information Modeling (BIM) knowledge using computer-aided software.

Course Synopsis Introduction to computer aided drawing (CAD); important elements in engineering drawing; 2D and 3D drawing using Auto Cad computer aided drawing software; application of computer aided drawing in producing civil engineering drawings.

References

1. Westhuizen, V. D. (2012). Drawing for Civil Engineering, 2nd Edition, Cape Town: Juta & Company, Limited.
2. Lee, A. (2009). AutoCAD 2009 & AutoCAD LT 2009, Indianapolis
3. Raja R. A. Issa, Svetlana Olbina (2015). Building information modeling: applications and practices, American Society of Civil Engineers.
4. Shrock, C.R. (2006). Exercise workbook for advanced AutoCAD 2006, New York: Industrial Press, 2006.
5. Steve, B.C. & Jay, H.Z. (1999). Fundamentals of AutoCAD Released 14, Prentice-Hall International Limited, New Jersey.
6. Nawari, O. (2018). Building information modeling: automated code checking and compliance processes, Boca Raton, FL: CRC Press, 2018

EAA112/2 **Introduction to Civil Engineering**

Course Objectives To introduce the importance role of civil engineering in advancing students' abilities, fostering the early development of important skills such as teamwork, communication, and critical and creative thinking. This course aims to fuel interest, motivation, and problem-solving abilities among students.

Course Outcomes	Students should be able to - Explain the foundational principles, historical context, sub-discipline, scope and technological advancement in civil engineering including its significance and impact on society. - Assess the role of civil engineers in society and awareness of key issues in engineering practice, including the professional responsibility of engineers for public safety and sustainable development. - Differentiate between ethical considerations and individual and team accountabilities in various cycles of civil engineering work.
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Course Synopsis	This introductory course to civil engineering provides a comprehensive overview, covering historical evolution of civil engineering, the diversity of disciplines in civil engineering, aspects of governance and an introduction to construction materials. This course also emphasizes on safety, sustainability, professional ethics, communication skills and the introduction of legal aspects to ensure a holistic learning.
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References	- Hedge, M.N., and Shivakumaraswamy, B. (2003) “Textbook on Civil Engineering, 1st Edition, Scitech Publication (India) PVT. LTD - Baura, G.D. (2006) “Engineering Ethics: An Industrial Perspective, 1st Edition, Elsevier Academic Press - Martin, M.W., and Schinzinger, R. (2005) “Ethics in Engineering, 4th Edition, McGraw Hill - Idrus, I., Sulaiman, S.A., and Khamidi, M.F. (2010) “Engineers in Society”, 1st Edition, McGraw Hill (Malaysia) Sdn. Bhd - Alexander, C. and Watson, J. (2013) “Engineering Skills for Career Success”, 1st Edition, McGraw Hill - Bennet, R. and Millam, E. (2013) “Leadership for Engineers: The Magic of Mindset”, 1st Edition, McGraw Hill
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EAA113/2 Fundamentals to Data Engineering and Computation

Course Objectives	To introduce knowledge about the importance of using computer programming, data analysis and forming students' ability to solve problems related to data and computing in engineering.
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Course Outcomes	Students should be able to - Analyze data-driven decision-making processes to solve civil engineering problems. - Display clear and informative data visualizations using tools like Power BI and Tableau. - Construct data engineering tasks, including data manipulation, library usage, and big data processing using
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Python and Java.

- iv Organize structured and visually appealing presentations in written form and effectively elucidating projects outcomes.

**Course
Synopsis**

This course is an introductory to computer programming. It comprised the basic techniques in data analysis, visualization, and programming, with a primary focus on Python and Java. This course also acts as an introduction to students to delve into the field of data-based decision-making by providing them with a solid foundation and practical expertise related to computer programming.

References

1. Kte'pi, Bill, MA. (2023). Python (programming language). Salem Press Encyclopaedia of Science
2. Ken Arnold, James Gosling (1998). The Java programming language. The Java series, 2nd ed. Reading: Addison-Wesley,
3. Michael Dawson (2003). Python programming for the absolute beginner. Boston, Mass: Thomson/Course Technology.

EUM113/3

Engineering Calculus

**Course
Objectives**

This course reviews the concept of one and multivariable calculus and covers the concept of ordinary differential equation. This course will provide students with a variety of engineering examples and applications based on the above topics.

**Course
Outcomes**

Students should be able to

- i. Define the concept of one and multivariable calculus.
- ii. Recognize different methods for solving ode.
- iii. Use the analytical and numerical methods for solving ode.
- iv. Apply the above concepts for solving engineering problems.

**Course
Synopsis**

Calculus of one variable, Calculus of multivariable: Scalar and vector fields, partial differentiation, chain rule, gradient, directional derivative, Lagrange multiplier. Multiple integral: Double and triple integrals and their applications. First order ordinary differential equation: Solving differential equations: separable equations, homogenous and non-homogenous equations, linear and non-linear equations, exact and non-exact equations, Bernoulli equation and Ricatti equation. Second and higher order ordinary differential equation: Linear and homogeneous equations, non-homogeneous equations with method of undetermined coefficients, variation of parameters, reduction of order, D-operator, power series and Euler's equation. Laplace transform: Definition and basic properties, step function, Direct Delta, Heaviside function, Laplace transform method for solving ODE.

Numerical solutions: Taylor, Euler and Runge Kutta methods for solving ODE.

References

1. Glyn J. (2010). Modern Engineering Mathematics, 4th Edition, Pearson.
2. Glyn J. (2010). Advanced Modern Engineering Mathematics, 4th Edition, Pearson.
3. Thompson S.P. and Gardner M. (2008). Calculus Made Easy, Enlarge Edition. Johnston Press
4. Sharma J.N. (2007). Numerical Method for Engineers, 2nd Edition, Alpha Science
- 5.

(Course offered by the School of Electrical and Electronic Engineering)

EAG142/3

Geology for Civil Engineers

Course Objectives

To introduce to the students the principles of physical geology and engineering geology and their application in civil engineering aspects.

Course Outcomes

Students should be able to

- i Explain the principles of physical geology and engineering geology related to the civil engineering works.
- ii Interpret geological inputs related to the civil engineering works.
- iii Assess the engineering geological inputs in civil engineering project planning.

Course Synopsis

Introduction to principles of physical geology and engineering geology and applications in civil engineering covering: Internal and external earth structure, rock forming minerals, igneous rock and magma, sedimentary rock, metamorphic rock, geologic time, geological structure, hydrogeology, geological map, geological environment and hazard, methodology and application of engineering geology in engineering planning, case study involving geological factors in the planning of civil engineering project component.

References

1. Plummer, C.C., Carlson, D. and Hammersley, L., 2016. Physical geology. McGraw-Hill/Education.
2. Bell, F.G., 2007. Engineering geology. Elsevier.
3. Parriaux, A., 2009. Geology: basics for engineers. CRC Press.
4. Price, D.G., 2008. Engineering geology: principles and practice. Springer Science & Business Media.
5. Hölting, B. and Coldewey, W.G., 2019. Hydrogeology (pp. 33-37). Berlin: Springer.
6. Maltman, A., 2012. Geological maps: an introduction. Springer Science & Business Media.
7. Earle, S., 2015. Physical geology. BC campus.

Course Objectives

To build up the ability to solve problem of rigid body statics and particle dynamics by using the basic principle of engineering mechanics.

Course Outcomes

Students should be able to

- i. Analyse engineering statics problems using basic principles of statics to explain the effects of force on particles and rigid bodies.
- ii. Determine solutions for equilibrium problems of particles and rigid bodies by incorporating appropriate methodologies.
- iii. Analyse engineering dynamics problems using basic principles of dynamics to explain the motion of particles under the influence of unbalanced forces.
- iv. Determine solutions for motion problems of particles subjected to unbalanced forces by employing appropriate kinematics and kinetics methods.

Course Synopsis

This course aims to provide exposure to first-year civil engineering students on fundamental aspects of statics (of particle & rigid bodies) and particle dynamics. Aligned with the Strength of Materials course, topics covered include (1) Statics: Vectors; Particle Statics; Force and Moment Systems; Rigid Bodies and Structures in Equilibrium; Centroid; Center of Mass and Moment of Inertia; Friction. (2) Dynamics: Particle Kinematics and Kinetics (encompassing methods based on Newton's Laws of Motion and the Principle of Work and Energy in solving particle kinetics problems).

References

1. Hibbeler, R. C. (2022). Engineering Mechanics: Statics & Dynamics. 15th edition. Harlow: Pearson.
2. Meriam, J. L., Kraige, L. G., Bolton J. N. (2018). Engineering Mechanics: Statics. 9th Edition. Hoboken: Wiley.
3. Meriam, J. L., Kraige, L. G., Bolton J. N. (2018). Engineering Mechanics: Dynamics. 9th Edition. Hoboken: Wiley.
4. Plesha, M., Gray, G., Witt, R. J., and Costanzo, F. (2022). Engineering Mechanics: Statics and Dynamics. 3rd Edition. NY: McGraw Hill Education.
5. Hibbeler, R. C. (2021). Engineering Mechanics: Statics. 15th edition. Harlow: Pearson.
6. Hibbeler, R. C. (2021). Engineering Mechanics: Dynamics. 15th edition. Harlow: Pearson.
7. Beer, F., Johnston, E., Mazurek, D., Cornwell, P., and Self, B. (2018). Vector Mechanics for Engineers: Statics and

EUM114/3

Advanced Engineering Calculus

Course Objectives

This course covers the concepts of linear algebra, Fourier series, partial differential equation and vector calculus. This course will provide students with a variety of engineering examples and applications based on the above topics.

Course Outcomes

Students should be able to

- i. Define the concept of linear algebra, Fourier series, partial differential equation and vector calculus.
- ii. Explain and use the concept of linear algebra, Fourier series, partial differential equation and vector calculus.
- iii. Use numerical methods for solving linear systems.
- iv. Apply the above concept for solving engineering problem.

Course Synopsis

Linear algebra: Determinants, inverse matrix, Cramer's rule, Gauss elimination, LU (Doolittle and Crout), eigen value and vector eigen, system of linear equation, numerical method for solving linear equation: Gauss Seidel and Jacobian. **Fourier series:** Dirichlet condition, Fourier series expansion, function defined over a finite interval, half-range cosine and sine series. **Vector Calculus:** Introduction to vectors, vector differentiation, vector integration: line, surface and volume, Green's, Stoke's and Gauss Div theorems. **Partial differential equation:** Method for solving the first and second order PDE, linear and nonlinear PDE, wave, heat and Laplace equations.

References

1. Glyn J. (2010). Modern Engineering Mathematics, 4th Edition, Pearson.
2. Glyn J. (2010). Advanced Modern Engineering Mathematics, 4th Edition, Pearson.
3. Ramana B.V. (2007). Higher Engineering Mathematics, 1st Edition. Tata Mc Graw Hill
4. O'Neil P.V. (2007). Advanced Modern Engineering Mathematics, 1st Edition. Thomson.

(Course offered by the School of Electrical and Electronic Engineering)

EAK164/4

Civil Engineering Surveying

Course Objectives

To introduce the concept of geomatic measurement and its application in engineering and forming an understanding in the use of measuring equipment, measurement methods, observational data

analysis and the display of measurement results.

**Course
Outcomes**

Students should be able to

- i. Relate the fundamental knowledge of surveying in civil engineering application.
- ii. Evaluate survey work problems by using the concept of vertical control, horizontal control, detailing and preparation of survey plan.
- iii. Operate effortlessly and accurately survey instruments and performing tasks with precision
- iv. Organize tasks effectively among team members towards achieving task goals.
- v. Integrate ethical principles and professional responsibilities in solving geomatic engineering problems.

**Course
Synopsis**

Introduction to geomatic engineering; vertical and horizontal control; detailing; data processing; earthworks; survey fieldwork.

References

1. Ogaja, C. A., Adero, N. J., Koome, D. (2023). Project Design for Geomatics Engineers and Surveyors, Second Edition. United States: CRC Press.
2. Ghilani, Charles D., (2008), 'Elementary surveying: an introduction to Geomatics', N.J.: Pearson Prentice Hall.
3. Irvine, William, (2006), 'Surveying for construction', New York: McGraw-Hill Book Co.
4. Geomatic Unit PPKA, Field Manual Book for EAK 163 (Yearly Publication).
5. Handbook for Annual Intensive Geomatic Practical (AIGP) (Yearly Issue).
6. Kavanagh, B.F., (2009) 'Surveying: Principles and Application', 8th. Edition, Pearson Prentice.

EAS152/3

Strength of Materials

**Course
Objectives**

To equip student with basic knowledge on fundamental principles that govern the strength and stiffness of deformable bodies for the purpose of solving engineering problems.

**Course
Outcomes**

Students should be able to

- i Identify effect of axial, torsional and flexural loads on stress and deflection in deformable bodies
- ii Analyse stresses and deflection in deformable bodies under the action of axial, torsional and flexural loads.
- iii Construct the detailed Mohr's circles to analyze complex stress stresses, shear force and bending moment diagram for various structural configurations.

Course Synopsis Tension, compression and shear; Axially loaded bar; Torsionally loaded bar; Laterally loaded beam; Deflection of beam; Stress and strain analysis; Theories of Column.

- References**
1. James M. Gere and Barry Goodno, Mechanics of Materials, 8th edition, Cengage Learning, 2012
 2. Ferdinand P. Beer, E. Russell Johnston, Jr. John T. DeWolf and David Mazurek, Mechanics of Materials, 6th edition, McGraw-Hill Science, 2011.
 3. William Nash and Merle C. Potter, Schaum's Outline of Strength of Materials – 5th edition, McGraw-Hill, 2010.
 4. Russel C. Hibbeler, Mechanics of Materials – 9th edition, Prentice Hall, 2013.
 5. William F. Riley, Leroy D. Sturges, Don H. Morris, Statics and Mechanics of Materials – An Integrated Approach, John-Wiley & Sons, 2002.
 6. Barry S. Onouye and Kevin Kane, Statics and Strength of Materials for Architecture and Building Construction- 4th edition, Pearson Education Limited, 2014.

EAS153/3 Civil Engineering Materials

Course Objectives To provide basic knowledge on important civil engineering materials used in the construction industry which include concrete, steel, timber, brickwork and other construction materials.

- Course Outcomes**
- Students should be able to
- i. Explain the characteristics of civil engineering materials with respect to their compliance with relevant standard and construction requirements
 - ii. Appraise the suitability and probable performance of civil engineering materials when used in different construction applications.
 - iii. Demonstrate awareness and understanding of the environmental impacts of civil engineering materials when used in construction.

Course Synopsis Introduction to civil engineering materials; concrete as the main construction material; component materials for concrete (cement, aggregates, water, admixtures); properties of materials, test on materials, production processes of concrete, test on fresh concrete; concrete mix design; test on hardened concrete, properties of hardened concrete, strength, deformation, durability performance; steel; timber; brick and block; other constructions materials; important properties; application and durability performance.

References

1. Neville A. M. (2011). Properties of Concrete, 5th edition, Longman
2. Neville A. M. and Brooks J.J. (2010). Concrete Technology, 2nd Edition, Longman, New Jersey.
3. Claisse P.A. (2016) Civil Engineering Materials. Butterworth-Heinemann.
4. Mehta P. K. and Monteiro P. J. M. (2014). Concrete: Microstructure, Properties and Materials, 4th edition, McGraw Hill Professional.
5. Gambhir M.L. (2017). Concrete Technology: Theory and Practice, 5th edition, McGrawHill Education. Gambhir M.L. (2017). Concrete Technology: Theory and Practice, 5th edition, McGraw Hill Education.
6. Young J.F., Mindess S., Gray R.J. and Bentur A. (1998). The Science and Technology of Civil Engineering Materials Prentice Hall.

EAA211/2

Engineering Mathematics for Civil Engineering

Course Objectives

To impart advanced knowledge on numerical methods, probability and statistics that are related to civil engineering and the applications of advanced mathematical knowledge for solving problems in civil engineering.

Course Outcomes

Students should be able to

- i Analyse the basic principles of numerical methods, probability and statistics for solving problems.
- ii Evaluate related civil engineering problems with a commitment to sustainability using the basic principle of numerical methods, probability and statistics.
- iii Develop programming codes using relevant programming language for statistical analysis and numerical methods for probability calculation related to civil engineering problems

Course Synopsis

This course covers the topics of errors in numerical calculation, numerical solution of system of linear and nonlinear equations, numerical method for differentiation and integration, numerical solution of ordinary and partial differential equations and probability and statistics

References

1. Yang, X.S. (2018). Mathematics for Civil Engineers: An Introduction, Dunedin.
2. Glyn, J. (2018). Advanced Modern Engineering Mathematics, 4th Edition, Pearson.
3. Chapra, S.C. and Canale, R.P. (2014). Numerical Methods for Engineering, 6th Edition, McGraw-hill.
4. Johnson (2011). Miller & Freund's Probability and Statistics for

Engineers. 8th Edition, Prentice Hall.

5. Hicks (2007). Handbook of civil engineering calculations, 2nd Edition, McGraw-Hill, New York.
6. Hicks (2010). Civil Engineering Formulas, 2nd Edition, McGraw-Hill, New York

EAH226/2

Fluid Mechanics for Civil Engineers

Course Objectives

To introduce fundamental principles of fluid mechanics and applications of fluid mechanics in the field of civil engineering.

Course Outcomes

Students should be able to

- i. Identify appropriate fundamental of fluid mechanic theories and knowledges for the characterization of different fluid flows.
- i. Analyse problems in fluid motion using appropriate fluid mechanics principles and theories in civil engineering application.
- i. recommend solutions to fluid motions problems using appropriate fluid mechanics principles and theories.

Course Synopsis

This course explains the fundamentals of fluid mechanics in civil engineering which includes properties of fluids, hydrostatics and kinematics.

References

1. Çengel Y.A. and Cimbala, J.M. (2018). Fluid Mechanics: fundamentals and applications. New York McGraw-Hill.
2. Hamill, L. (2011). Understanding hydraulics. Houndmills, Basingstoke: Palgrave.
3. Mott, R.L. and Untener, J.A. (2016). Applied fluid mechanics. Harlow, Essex, England: Pearson Education Limited.
4. Gerhart, A.L., Hochstein, J.I. and Gerhart, P.M. (2021) Munson, young and Okiishi's fundamentals of Fluid Mechanics: Si version. Estats Units d'Amèrica: Wiley.
5. Hibbeler, R.C. (2018). Fluid mechanics. Hoboken, Nj: Pearson.
6. White, F.M. (2016). Fluid Mechanics. 8th ed. New York, NY: McGraw-Hill Education.

EAG245/3

Soil Mechanics

Course Objectives

The objectives of Soil Mechanics course are to introduce to the student the principles that govern the use and application of soil as an engineering material in civil engineering projects and for the student to gain proficiency in the soil classification and quantitative evaluation of soil engineering properties such as stresses, permeability, and for the selection of soil mechanics parameters for

the geotechnical application such as compaction, consolidation and settlement.

Course Outcomes	Students should be able to - Explain fundamental theories and principles of soil mechanics applied in geotechnical engineering analyses. - Analyze geotechnical engineering problems using fundamental theories and principles of soil mechanics. - Evaluate geotechnical engineering problems related to the civil engineering work.
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Course Synopsis	Principles of Soil Mechanics including: Formation and Types of Soil, Phase Relationship, Clay Mineralogy, Soil Classification and Index Properties, Soil Plasticity, Water in soil, Permeability, Capillarity and Seepage, Stresses in Soil, Compaction, Consolidation and Settlement.
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References	- Budhu M. (2010). Soil Mechanics and Foundations (3rd ed.): Wiley. - Das B. M. (2012). Fundamentals of Geotechnical Engineering (4th ed.): CL-Engineering. - Mitchell J. K., and Soga, K. (2005). Fundamentals of Soil Behavior (3rd ed.): Wiley. Das B. M. (2013). Principles of Geotechnical Engineering (8th ed.): CL-Engineering. - Das B. M. (2013). Principles of Geotechnical Engineering (8th ed.): CL-Engineering. - Craig R. F. (2012). Craig's Soil Mechanics (8th ed.): Spon Press. - Holtz R. D., and Kovacs, W. D. (2010). An Introduction to Geotechnical Engineering (2nd ed.): Prentice Hall.
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EAS253/3 Theory of Structures

Course Objectives	To impart knowledge on analysis of statically determinate structures
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Course Outcomes	Students should be able to - Analyse statically determinate structures using basic principle equilibrium. - Draw axial force diagram, shear force diagram, bending moment diagram for statically determinate structures. - Evaluate the deflection shapes and slope diagrams constructed for statically determinate structures.
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Course Synopsis	This course covers topics related to analysis of statically determinate structures (such as beams, plane frames, plane trusses, cables, three hinged arches) and analysis of influence lines.
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References	Majid, T.A, Choong, K.K and Yussof, M.M, (2013) Theory of
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- Structures, Penerbit Universiti Sains Malaysia
2. Kassimali, A., (2010), Structural Analysis, 4th edition, PWS Publishing
 3. Hibbler, R.C., (2019), Structural Analysis, SI Edition 10th edition, Pearson Publication

EAL237/2

Transportation and Traffic Engineering

Course Objectives

Introduces basic engineering concepts and transportation issues that include public transportation, intelligent transportation systems, sustainable transportation and traffic engineering that includes traffic flow characteristics, road capacity analysis, service levels and intersection design.

Course Outcomes

- Students should be able to
- i. Explain the principles and important components of transportation and road network analysis in traffic engineering.
 - ii. Analyse problems in highway and traffic engineering related with traffic congestion in transport and highway system.
 - iii. Evaluate relevant solutions related to transportation and traffic engineering.

Course Synopsis

This course covers basic aspect and issue of transportation and traffic engineering that covers public transportation, intelligent transport system, sustainable transport, traffic characteristics, road capacity, level of service and design of intersections.

References

1. Garber, N.J. and Hoel, L.A. (2014), "Traffic and Highway Engineering", (Fifth Edition), Timothy Anderson, ISBN-13: 978-1133605157
2. Roess, R.P., Prassas, E.S. and McShane, W.R. (2010), "Traffic Engineering", (Third Edition), Pearson/Prentice Hall, ISBN-13: 978-0136135739
3. Meyer, M.D. (2016). "Transportation Planning Handbook", (Fourth Edition): Wiley. ISBN: 9781119174660
4. O'Flaherty, C.A. (1997) "Transport Planning and Traffic Engineering". Society of Automotive Engineers. ISBN: 0340662794

EAP216/3

Introduction to Environmental Engineering

Course Objectives

Explain the basis in environmental engineering and its related components together with the basic method to manage the environment.

Course

Students should be able to

Outcomes	i. Relate ethics and regulations related to environmental engineering with its components for environmental compliance and preservation. ii. Analyze environmental engineering components related to their principles and applications. iii. Evaluate the impacts of development towards environmental parameters and its protection plan.
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Course Synopsis	This course covers the introduction to environmental engineering fundamentals, ethics and laws related to environmental engineering, introduction to water pollution, noise management, solid waste and air quality; and environmental impact assessment with a suitable management plan.
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References	1. Davis, M.L., Cornwell, D.A. (2023) Introduction to environmental engineering, New York: McGraw-Hill 2. Mihelcic, J.R., and Zimmerman, J.B. (2014) Environmental Engineering: Fundamentals, Sustainability, Design. Wiley. 3. JKR/SIRIM 3:2020, Environmental protection and enhancement works for projects, JKR and SIRIM Berhad 2020 4. Environmental Quality Act 1974 and Regulations. (2022). MDC Sdn. Bhd., Kuala Lumpur.
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EAA205/2 Structures Engineering and Strength of Materials Laboratory

Course Objectives	Introducing and provide understanding to students on laboratory test procedures and techniques for strength of materials and concrete technology.
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Course Outcomes	Students should be able to - i Explain the application of fundamental principles of strength of materials and concrete technology in order to effectively solving problems in a laboratory setting. - ii Investigate the application of fundamental principles of strength of materials and concrete technology in order to effectively solving problems in a laboratory setting. - iii Perform laboratory experiments using appropriate methods, apparatus, and resources based on the established level of open-ended laboratory. - iv Discuss and collaborate in a group to achieve the outcomes set for the laboratory work.
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Course Synopsis	This course covers laboratory work for strength of materials and concrete technology.
References	1. Gere, J. M. (2001). Mechanics of Materials, 5th Edition, Brooks/Cole. 2. Beer, F. P., Johnston, E. R, Jr., and DeWolf, J. T. (2002). Mechanics of Materials, International Edition - 3rd Edition, McGraw-Hill. 3. Hibbeler, R. C. (2013). Mechanics of Materials – 9th edition, Prentice Hall. 4. Ryder, G.H. (2002). Strength of Materials, 3rd Edition, English Language Book Society, McMillan. 5. Callister, W.D. (2013). Materials Science and Engineering: An Introduction”, 9th Edition, New York, John Willey. 6. Neville, A.M. and Brooks, J.J. (2010). Concrete Technology, 2nd Edition, Longman. 7. Neville, A.M. (2011). Properties of Concrete, Longman, 5th Edition

EAP215/3 Water Supply and Treatment Engineering

Course Objectives	Delivering knowledge on the principle and practice of water supply and treatment engineering.
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Course Outcomes	Students should be able to - i Differentiate water sources, water characteristics, quality and quantity of raw water according to the standard of water treatment and supply engineering. - ii Analyze water demand, population and future development projection. - iii Design water treatment process and analyse every component of water treatment and distribution system. - iv identify sustainable aspect in designing water treatment and supply system.
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Course Synopsis	Sources and water use, water source assessment; methods to estimate water consumption; water characteristics, quality, testing and standards; physical, chemical and biological process in water treatment; design of water treatment units; water reticulation system.
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References	1. American Water Works Association and American Society of Civil Engineers (2012), 'Water Treatment Plant Design' 5th. Edition, McGraw Hill. 2. American Water Work Association (2011) Water Quality and Treatment, A Handbook and Community Water Supplies, 6th. Edition, McGraw Hill. 3. Nelson L. Nemerow, Franklin J. Agardy, Patrick Sullivan, and Joseph A. Salvato (2009), Environmental Engineering, 6th Edition, John Wiley and Sons, Inc. 4. Crittenden, J.C. and Montgomery Watson Harza (Firm (2012). MWH's water treatment: Principles and Pesign. Hoboken, N.J.: John Wiley & Sons
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EAG246/3 Geotechnical Analysis

Course Objectives	To impart knowledge about analysis related to soil mechanics including soil shear strength, soil lateral stress as well as analysis of geotechnical structures such as slopes and foundations.
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Course Outcomes	Students should be able to i. Apply fundamental theories and principles of geotechnical analysis for geotechnical engineering applications. ii. Evaluate geotechnical engineering problems using fundamental theories and principles of geotechnical analyses. iii. Perform as a team in solving geotechnical engineering problems through active collaboration.
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Course Synopsis	This course covers topics related to shear strength, lateral forces, slope stability, shallow foundation, deep foundation and site investigation.
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References	1. Budhu M. (2010). Soil Mechanics and Foundations (3rd ed.): Wiley. 2. Das B. M. (2012). Fundamentals of Geotechnical Engineering (4th ed.): CL-Engineering. 3. Braja M.Das, Principles of Geotechnical Engineering, (2020) Cengage Learning; 10th edition
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EAH225/3 Hydraulics

Course Objectives	To introduce the fundamentals of hydraulics and the applications of hydraulics the field of civil engineering.
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Course	Students should be able to
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Outcomes	i. Explain theories and basic principles of hydraulics in solving civil engineering related problems. ii. Analyze hydraulics problems using appropriate hydraulic theories and fundamental. iii. Evaluate solutions to hydraulic problems proposed using the appropriate hydraulic theory and principles.
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Course Synopsis	This course covers minor and major energy losses, flow in pipe, dimensional analysis, similitude, hydraulic modelling, flow in open channel and gradually varied flows.
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References	1. Cengel Y.A et.al (2018). Fluid Mechanics: Fundamentals And Applications, Fourth Edition. McGraw-Hill Education. 2. DID Malaysia. (2000). Urban Stormwater Management Manual For Malaysia, Kuala Lumpur. 3. Novak, P., Moffat, A.I.B., Nalluri, C., and Narayanan, R. (2001). Hydraulic Structures, Spon Press, London, 3rd Edition 4. Chin, D.A., (2000). Water Resources Engineering, Prentice Hall, New Jersey. 5. James, L.G., and Skoyerboe, G.V., (1992). Surface Irrigation: Theory and Practice, Prentice Hall.
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EAA284/2 Construction Technology in Building and Infrastructure

Course Objectives	Empowering students with basic knowledge and understanding of building and infrastructure construction technology in civil engineering, as well as fostering lifelong learning by equipping them to adapt to industry trends and advancements that grow beyond their basic understanding.
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Course Outcomes	Students should be able to i. Able to distinguish knowledge in building and infrastructure construction technology. ii. Relate the basic techniques in construction, sustainable development, legal, health and safety in society. iii. Explain construction project problems in multidisciplinary environment by providing suitable solutions. iv. Adapt emerging construction technologies into project designs while ensuring compliance with UBBL regulations.
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Course Synopsis	This course involves the fundamental of construction technology in building and infrastructure includes: site preparation, UBBL, Engineering drawings, methods of construction, industrialized building system (IBS) and Sustainable Rating Tool.
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References	1. Chudley and Greeno's Building Construction Handbook
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- (2020), 12th New edition, Taylor & Francis Ltd
2. Binu P and Rajesh Kumar R (2020) Construction Technology, 2nd Edition, Jyothis Publisher
 3. Edward Allen and Joseph Iano Exercises in Building Construction (2019), Seventh Edition, John Wiley & Sons Inc. Hoboken New Jersey
 4. Awang., H and Othuman Mydin., M., A. (2016). "Construction Method and Technology", Penerbit Universiti Sains Malaysia (Universiti Sains Malaysia Press).

EAS254/3

Structural Analysis

Course Objectives

To equip students with knowledge about two basic methods, i.e. force and displacement methods for the analysis of statically indeterminate structures.

Course Outcomes

Students should be able to

- i. Analyse indeterminate structures using force and displacement methods.
- ii. Analyse structures using virtual work and plastic methods.
- iii. Evaluate the effect of load on structure in terms of axial force, shear force, bending moment and deflection.

Course Synopsis

The course covers topics related to analysis of structures using energy methods, force and displacement methods for statically indeterminate structures (such as trusses, beams and frames) and plastic analysis.

References

1. Kassimali, A. (2015), Structural Analysis, 5th Edition, Cengage Learning
2. Hibbler, R.C. (2015), Structural Analysis, 9th Edition, Prentice-Hall
3. Leet, K.M., Uang, C-M. and Gilbert, A.M. (2010), Fundamentals of Structural Analysis, 4th Edition, McGraw Hill Education.

EAL236/3

Pavement and Highway Engineering

Course Objectives

Comprehensive understanding of the principles, materials, design, construction, and maintenance aspects related to highways and pavements. Overall, the course aims to prepare students for careers in civil engineering with specialization in the planning, design, construction, and operation and maintenance of road and highway systems.

Course

Students should be able to

Outcomes	i. Analyze pavement type, pavement design, construction materials, and highway route selection to solve problems related to pavement engineering. ii. Analyze problems related to pavement and highway engineering according to the relevant guidelines. iii. Evaluate the concept of geometric design of road and highway based on the relevant guidelines and aware about the engineering marvels and challenges in road and highway engineering.
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Course Synopsis	The course covers a range of topics, starting from the historical development and fundamental principles of highway design, progressing through the study of pavement materials and testing, mix types and production, pavement design, construction methods, and basic geometry design. Students will gain the necessary skills to contribute effectively to the planning, design, and management of highway infrastructure.
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References	1. Roberts F.L., Kandhal P.S., Brown E.R., Lee, D.Y. and Kennedy T.W, (2009), “Hot Mix Asphalt Materials, Mixture Design and Construction”, 2nd Edition, 4th Print, National Asphalt Pavement Association, Research and Education Foundation, Maryland, ISBN: 0-914313-02-1. 2. AASHTO, (2001), Hot Mix Asphalt Paving Handbook, 2nd Edition, AC 150/5370-14B, ISBN 0-309-07157-7. 3. Mallick, R.B., El-Korchi, T. (2022) Pavement Engineering: Principles and Practice, 3rd Ed.: Boca Raton, FL. CRC Press.
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EAA207/2 Geotechnical I, Hydraulic and Traffic Engineering Laboratory

Course Objectives	Introducing an understanding of laboratory test procedures and techniques for geotechnical, traffic and hydraulics.
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Course Outcomes	Students should be able to i. Explain the application of fundamental principles of geotechnical, traffic and water engineering in order to effectively solving problems in a laboratory setting ii. Investigate the application of fundamental principles of geotechnical, traffic and water engineering in order to effectively solving problems in a laboratory setting. iii. Perform laboratory experiments using appropriate methods, apparatus, and resources based on the established level of open-ended laboratory. iv. Discuss and collaborate in a group to achieve the outcomes set for the laboratory work.
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Course	This course covers laboratory work for geotechnical, traffic and
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Synopsis	hydraulic.
References	1. Schroeder, B.J. (2010), Manual of Transportation Engineering Studies, 2nd Edition, ITE 2. R.V. Raikar (2012). Laboratory Manual Hydraulics and Hydraulic Machines. PHI Learning Pvt. Ltd. 3. Head, K. H. (2006). Manual of Soil Laboratory Testing (3 ed.), Whittles Publishing.

EAP315/3 Wastewater Engineering

Course Objectives	To impart knowledge on the principles and practices of wastewater engineering in Civil Engineering field.
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Course Outcomes	Students should be able to i. Determine characteristics of sewage based on environmental regulations and the principles of biological degradation. ii. Design sewerage network and various units of physical and biological process in sewage treatment plant. iii. Justify sewage treatment plant design based on Malaysia Sewerage Industry Guidelines (MSIG).
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Course Synopsis	Introduction and characteristics of wastewater, wastewater compositions, wastewater flow rate and loading, sewerage design and network, biodegradation of organic matter, design requirements of physical units, types and detailed design of physical treatment units, design of biological treatment system, sludge management, wastewater treatment plant in Malaysia.
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References	1. Hamidi Abdul Aziz, Wastewater Engineering: In accordance to Malaysian Sewerage Industry Guidelines, Suruhanjaya Perkhidmatan Air Negara (SPAN) (With design examples), School of Civil Engineering, USM, 2023. 2. SPAN's, Malaysia Sewerage Industry Guidelines (MSIG) 2009: Volume II, III and IV. 3. Metcalf and Eddy. Wastewater Engineering: Treatment and Reuse, 5th Edition, McGraw-Hill, 2014
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EAG343/2 Geotechnical Design

Course Objectives	To impart knowledge to students on aspects of geotechnical engineering design which include slopes, retaining walls, foundations and excavation.
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Course Outcomes	Students should be able to - Relate geotechnical engineering theories and principles to design solutions. - Design geotechnical engineering component problems according to the project need. - Explain design solutions in appropriate professional formats through comprehensive group design project.
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Course Synopsis	Analysis and design of geotechnical engineering covering site investigation works, slope stability (application of computer software for analysis and design), retaining wall and foundation (shallow and deep) and excavation (shallow and deep).
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References	1. Braja M.Das, Principles of Geotechnical Engineering, (2020) Cengage Learning; 10th edition 2. Tomlinson, M. J., and Woodward, J. (2007). Pile Design and Construction Practice (5 ed.): Spon Press. 3. JKR Malaysia (2010). Guidelines for Slope Design (1. ed): JKR, Kuala Lumpur. 4. JKR Malaysia (2006). Guidelines for Slope Maintenance (1 ed): JKR, Kuala Lumpur.
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EAL331/3 Transport Planning and Road Safety

Course Objectives	Introduce the basic concept of transportation engineering planning and give students an understanding of the relationship between operational analysis and the design of transportation system facilities with road safety.
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Course Outcomes	Students should be able to - Explain the concept in transportation engineering and road safety to solve problems related with transportation system. - Analyze transportation engineering and road safety problems using current practices. - integrate ideas using knowledge in transportation engineering and road safety.
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Course Synopsis	This course covers basic aspects of planning in transportation engineering and road safety that cover transportation planning and demand modelling, highway and traffic safety and basic knowledge of traffic impact analysis.
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References	1. Meyer, M. D. (2016). Transportation planning handbook. John Wiley & Sons. 2. Wolshon, B., & Pande, A. (2016). Traffic engineering handbook. John Wiley & Sons. 3. Mohd Sadullah, A.F., Marjan., J.M., & Nordin., N.A., (2012) MeTRA: Guidebook for Traffic and Road Safety Audit
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EAS353/3**Reinforced Concrete Structural Design I****Course Objectives**

To impart understanding and knowledge of the design of reinforced concrete for a building structure in accordance with current practices code.

Course Outcomes

Students should be able to

- i. Analyse loading types and forces for design purposes.
- ii. Design reinforced concrete structural members for a building following the current code of practice.
- iii. Produce structural drawings and detailing in accordance to the current code of practice.
- iv. Perform in a group work for a design project with the aim of producing a comprehensive design report that achieves the set objectives.

Course Synopsis

Reinforced concrete structural design: structural elements - slab, staircase, beam, column, foundation and checking for serviceability limit state.

References

1. W.H. Mosley et al. (2011), Reinforced Concrete Design to Eurocode 2, 7th Edition, Palgrave McMillan
2. W.M.C. McKenzie, (2015) Design of Structural Elements to Eurocode 2nd Edition, Palgrave Macmillan
3. Designers Guide to EN 1992-1-1 and EN 1992-1-2: Design of Concrete Structures

EUP221/3**Engineers and the World****Course Objectives**

This course aims to provide understanding and basic knowledge regarding the principles required by engineers from the aspect of public engagement with the community effectively. This course also requires the direct involvement of prospective engineers in solving real project problems through critical thinking and creative and efficient group work.

Course Outcomes

Students should be able to

- i. Relate appropriate rules and laws of engineers and the world that are appropriate to the problems of society collectively.
- ii. Explain role and ethics of a professional engineer in the society and the world.

- iii. Prioritise the importance of project management and financial management for engineers in society and the world.

**Course
Synopsis**

This course involves an introduction to the basic principles of project management and finance, ethics and laws related to the environment, the Worker Health and Safety Act, professional practice and project management knowledge.

References

1. Sarah Bell (2022) Engineers, Society, and Sustainability, Springer;
2. Harold Kerzner (2013) Project management: a systems approach to planning, scheduling, and controlling, John Wiley & Sons;
3. Anthony Merna, Yang Chu, Faisal Al-Thani (2010) Project finance in construction: a structured guide to assessment, Blackwell

EAH325/3

Engineering Hydrology

**Course
Objectives**

To introduce the students to the principles of hydrology in civil engineering.

**Course
Outcomes**

Students should be able to

- i. Analyze hydrological systems using math, science, and engineering principles to solve complex water problems.
- ii. Evaluate hydrological issues using data and research method to provide sustainable solutions with societal and environmental considerations.
- iii. Relate the social, economic, and environmental impacts of hydrological engineering projects within the context of sustainability and ethical responsibility.

**Course
Synopsis**

Engineering hydrology describes the components and hydrological processes of a river catchment. The course includes data acquisition and analysis of rainfall, infiltration, evaporation, groundwater, streamflow, characteristic of a data, effect of land used, topography and weather on hydrological process. Data analysis using statistical methods and frequency analysis, urban drainage and application in civil engineering are also presented.

References

1. Subramanya, K. (2013). Engineering Hydrology, Tata McGraw Hill, New Delhi, 4th Edition;
2. Christophe, H. (2011). Hydrology: a science of nature, CRC Press;
3. Ohja, Bhunya, Berndtsson (2008) 3. Engineering Hydrology (Oxford Higher Education), Oxford University Press.

Course Objectives

To introduce and provide understanding to the students of of laboratory testing procedures and techniques for geotechnical, environmental and pavement engineering.

Course Outcomes

Students should be able to

- i Explain the application of fundamental principles of geotechnical, environmental and pavement engineering in order to effectively solving problems in a laboratory setting.
- ii Investigate the applications of fundamental principles of geotechnical, environmental and pavement engineering in order to effectively solve problems in a laboratory setting.
- iii Perform laboratory experiments using appropriate methods, apparatus, and resources based on the prescribed level of open-ended laboratory.
- iv Discuss and collaborate in a group to achieve the outcomes set for the laboratory work.

Course Synopsis

This course covers laboratory work for geotechnical, environmental and pavement engineering.

References

1. Das, B.M. (2009) Principles of Geotechnical Engineering (7 ed.), CL -Engineering
2. Craig, R.F (2004). Craig's Soil Mechanics (7 ed), Spon Press
3. Head, K.H. (2006) Manual of Soil Laboratory Testing (3 ed), Whittles Publishing
4. R. Gopalan, R. Wilfered Sugumar (2008) A laboratory Manual for Environmental Chemistry, I.K. International Pvt. Ltd.
5. APHA (2005) Standard Methods for the Examination of Water and Wastewater (21 ed) American Public Health Associations, American Water Works Association, Water Environment Federation Publication. APHA Washington D.C.
6. ASTM (2006), ASTM D6927, 2006, "Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures", ASTM International, West Conshohocken, Pennsylvania
7. ASTM (2006), ASTM Standard D5, 2006, "Standard Test Method For Penetration Of Bituminous Materials", ASTM International, West Conshohocken, Pennsylvania
8. ASTM (2007), ASTM Standard D113, 2007, "Standard Test Method for Ductility of Bituminous Materials", ASTM International, West Conshohocken, Pennsylvania
9. ASTM (2009), ASTM Standard D36, 2009, "Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)", ASTM International, West Conshohocken,

Pennsylvania

10. ASTM (2010), ASTM D92, 2010, "Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester", ASTM International, West Conshohocken, Pennsylvania
11. BSI (1989), BS 812: Part 105.1, 1989, "Methods for Determination of Particle Shape "Flakiness Index", British Standards

EAS356/2

Reinforced Concrete Structural Design II

Course Objectives

This course is the continuity to EAS353 and aims to provide knowledge pertaining to the design of other reinforced concrete structural members.

Course Outcomes

Students should be able to

- i. Analyse loading types and forces for design purposes.
- ii. Design structural concrete members in accordance to the current code of practice.
- iii. Perform effectively in a group work for a design project with the aim of producing a comprehensive design report
- iv. Defend design solutions to structural design through clear communication in the design project.

Course Synopsis

This course covers determination of structural capacity of piles, effect of lateral force and eccentricity to the pile capacity, pile cap design, flat slab and retaining wall.

References

1. W.H. Mosley et al. (2011), Reinforced Concrete Design to Eurocode 2, 7th Edition, Palgrave MacMillan
2. W.M.C. McKenzie, (2015) Design of Structural Elements to Eurocode 2nd Edition, Palgrave Macmillan
3. Designers Guide to EN 1992-1-1 and EN 1992-1-2: Design of Concrete Structures

EAS358/2

Structural Steel Design

Course Objectives

To impart understanding and knowledge of the design of steel structures in accordance with the current code of practice.

Course Outcomes

Students should be able to

- i. analyse loading types and forces for design purposes.
- ii. design building structural elements according to current code of practice, relevant building design guidelines, and industry standards (if applicable).
- iii. perform in group work to produce a comprehensive design output and report.
- iv. defend design choices and solutions related to structural

steel components through clear communication in written report.

**Course
Synopsis**

This course provides a comprehensive exploration of structural steel design, encompassing an introduction to steel structures, design considerations, and the detailed design of flexural, compression, and tension members. Additionally, it covers connection design, roof trusses, and portal frames. Emphasis is placed on the necessity of applying current codes of practice, relevant building design guidelines, and industry standards (if applicable) to ensure structures meet safety and compliance requirements.

References

1. Hejazi, F. and Chun, T.K. (2018). Steel Structures Design Based on Eurocode 3. Springer Singapore.
2. Arya, C. (2022). Design of Structural Elements: Concrete, Steelwork, Masonry, and Timber Designs to Eurocodes. CRC Press.
3. MS EN 1993-1-1:2005 Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings
4. MS EN 1993-1-2:2005 Eurocode 3: Design of steel structures - Part 1-2: General rules - Structural fire design
5. MS EN 1993-1-8:2005 Eurocode 3: Design of steel structures - Part 1-8: Design of joints
6. Koschmidder, D.M. and Brown, D.G. eds. (2012). Elastic design of single-span steel portal frame buildings to Eurocode 3. Steel Construction Institute.

EAA383/2

Construction Project Management

**Course
Objectives**

This course applies management aspects and analysis tabulation for construction management.

**Course
Outcomes**

Students should be able to

- i. Appraise engineering problems using appropriate engineering management concept in the real project practice.
- ii. Explain engineering problems that are related to community and society at large through effective communication medium.
- iii. Integrate engineers and the world issues related to sustainable development to comply with society requirements.
- iv. Prioritise relevant engineering management principles to solve project problems in the real practice.

**Course
Synopsis**

This course explains the basic concepts for the management of a construction project including some important aspects of project management knowledge areas recommended by Project Management Book of Knowledge (PMBOK).

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|-------------------|--|
| References | <ol style="list-style-type: none"> 1. Daniel W. Halpin, Bolivar A. Senior (2012) Construction management, John Wiley & Sons 2. Eddy M. Rojas (2009) Construction project management: a practical guide for building and electrical contractors, Fort Lauderdale, FL 3. Frederick E. Gould, Nancy E. Joyce (2003) Construction project management, Prentice Hall |
|-------------------|--|

EAH327/2 Urban Water Design

Course Objectives	To provide detailed knowledge on the management of urban drainage in civil engineering
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Course Outcomes	Students should be able to - i Design urban drainage systems whilst taking into consideration sustainable development. - ii Justify urban drainage system design based on the relevant manuals and guidelines, whilst considering sustainability aspects. - iii Explain through detailed analysis urban drainage design solutions addressing sustainability and stakeholder needs.
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Course Synopsis	This course explains on the aspects of urban drainage management, control at source, environmentally friendly drainage system, hydrological analysis, Best Management Practices (BMPs), Quantity Control, Quality Control, detention pond, retention basin, swale and computer modelling which are based on environmentally friendly drainage concept.
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- | | |
|-------------------|---|
| References | <ol style="list-style-type: none"> 1. DID Malaysia. (2012). Urban Stormwater Management Manual for Malaysia, Second Edition, Kuala Lumpur. 2. Chin, D.A., (2013). Water Resources Engineering, 3rd Edition, Prentice Hall, New Jersey. 3. Mc Cuen, R.H. (2005). Hydrologic design and analysis, 3rd Edition, Prentice Hall, New Jersey |
|-------------------|---|

EAP317/3 Air and Noise Pollution in Civil Engineering

Course Objectives	To provide knowledge on aspects of assessment and control of air pollution and noise related to civil engineering
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Course Outcomes	Students should be able to i. Evaluate the parameters and characteristics of air and noise pollution from sources involving the field of civil engineering and control measures to control the environmental problems. ii. Explain the theory and analysis of air pollution related to
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- civil engineering field through presentation and report.
- iii. Analyze role of engineers in addressing environmental implications of engineering projects related to air and noise pollution on a local, national, and global scale contributing to sustainable development.
- iv. Relate air and noise pollution issues within civil engineering contexts, incorporating fundamental ethical principles, and compliance with national and international laws and regulations.

**Course
Synopsis**

This course discusses national laws related to air pollution; general and specific sources and effects of air pollution; air pollutant sampling and measurement; meteorological conditions and their effect on the dispersion of air pollutants; air pollution control equipment. In addition, this course also provides an introduction to noise pollution, important properties of noise, noise effects and legal aspects, noise measurement and analysis, noise pollution control. mechanisms, calculation of key principles, key characteristics of noise levels and decibels.

References

1. Environmental Quality Act 1974 and Regulations. (2022). MDC Sdn. Bhd., Kuala Lumpur.
2. Tiwary, A. and Colls, J. (2010). Air Pollution: Measurement, Modelling and Mitigation, 3rd Ed. Routledge, New York.
3. Brimblecombe, P. (2001) The Urban Atmosphere and Its Effects, ICP Press
4. Environmental noise propagation: definitions, measuring and control aspects; 21 March 2012, London. St. Albans: Institute of Acoustics, 2012.
5. Davis, M.L. and Cornwell, D.A. (2013). Introduction to Environmental Engineering, 5th Ed. McGrawHill, New York.
6. Guidelines for Environmental Noise Limits and Control, 3rd edition, Department of Environment, Ministry of Energy, Science and Technology, Environment and Climate Change (2019).
7. Saxena, P. and Naik, V. (2019). Air pollution: sources, impacts and controls. Wallingford, Oxfordshire: CAB International.
8. Tiwary, A. and Williams, I. (2018). Air pollution: measurement, modelling and mitigation. Milton: Taylor & Francis Group.

EAA384/3

Sustainable Practices in Construction

**Course
Objectives**

To provide students with a comprehensive understanding of sustainable construction practices and the various rating systems designed to assess and certify the performance of environmentally friendly buildings.

Course Outcomes	Students should be able to - Evaluate the principles of sustainable construction, including integrating energy efficiency, resource conservation, and environmentally responsible design practices. - Integrate entrepreneurial skills to capitalize on sustainable opportunities in construction, fostering innovative solutions aligned with sustainability goals. - Relate various sustainable design strategies ethically and professionally with suitable solutions rooted in the principles acquired. - Integrate knowledge and personal skills across diverse green building certification systems that effective for sustainable design practice in both individual and collaborative teamwork contexts.
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Course Synopsis	This course delves into sustainable construction principles, emphasizing green building rating tools like MYCREST, LEED, BREEAM, and others. Students analyze criteria, methodologies, and applications, enabling them to design and construct environmentally friendly, energy-efficient buildings across the life cycle.
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References	- Kubba, Sam A. A (2009). Handbook of green building design and construction: LEED, BREEAM, and Green Globes. Green building design and construction. Elsevier, B-H. - David S-K Ting, Rupp Carriveau (2019). Energy generation and efficiency technologies for green residential buildings. Stevenage: Institution of Engineering and Technology - CIDB Malaysia (2020). A Reference Guide for MyCREST Malaysian Carbon Reduction & Environmental Sustainability Tool DESIGN & CONSTRUCTION STAGE Version 2, Construction Industry Development Board Malaysia.
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EAK381/3 Geographical Information System and Remote Sensing in Civil Engineering

Course Objectives	Provide an understanding of the basic concepts of geographic information systems and remote sensing by emphasizing methods of mapping, collection, processing, and analysis of spatial data that are common to civil engineering applications.
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Course Outcomes	Students should be able to - Determine the basic spatial concepts and data models to the solution of geo-spatial problem. - Display the solution for complex geo-spatial problems using GIS software.
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- iii. Relate solutions to complex spatial problem with the environment and sustainability elements.

**Course
Synopsis**

This course covers the basic introduction to geographic information systems (GIS), functions and components of GIS, introduction to spatial database management, spatial analysis, surface modelling, pathway analysis, and site suitability analysis particularly its applications to civil engineering.

References

1. Samat, N. dan Masron, S. (2008). Sistem Maklumat Geografi Dalam Analisis Guna Tanah. Universiti Sains Malaysia.
2. Chang K.T. (2012). Geographic Information Systems. McGraw-Hill, 6th Ed.
3. Stephen, W. (2002). GIS Basics. London: Taylor & Francis.
4. Richard, A. (2002). Environmental GIS and Data Analysis York: John Wiley & Sons, Inc. ISBN 0471985643

EAA371/5

Industrial Training

**Course
Objectives**

This course gives the exposure towards the actual practice in civil engineering through wide and structured industrial training.

**Course
Outcomes**

Students should be able to

- i. Relate theory and practice in civil engineering throughout an industry training period systematically.
- ii. Analyze complex problems encountered during the industrial training by applying relevant civil engineering theories and practice with sustainable impact considerations.
- iii. Adapt and commit in ethical principles and professional responsibilities throughout the industrial training.
- iv. Perform communication skills effectively in the working environment that relates to industrial training, including preparation reports, documentation and presentation
- v. Practise independent and life-long learning in the context of technological change in civil engineering practices relevant to the industrial training.
- vi. Explain knowledge of engineering management as well as entrepreneurial skills in diverse environments throughout the industrial training.
- vii. Practice collaborative solution to tasks in industrial training independently or with teams.
- viii. Demonstrate the use of appropriate technique, resources and modern engineering and IT tools to solve problems throughout the industrial training.

**Course
Synopsis**

The training provides industry exposure to students for 10 weeks long in order to develop the professional skills in civil engineering practice through involvement in real jobs.

References

1. Russell, R. J. (Ed.). (2002, October). Guide to hiring and retaining great civil engineers. American Society of Civil Engineers.
2. Chen, W.F., Richard Liew JY, (2002). The Civil Engineering Handbook, 2nd Edition, CRC Press.
3. Scott, S. (1997) Civil Engineering Practice - An Introduction, Butterworth- Heineman

EAA492/6

Final Year Project

Course Objectives

To impart knowledge on civil engineering related problems by carrying out and providing solutions to research problem and presenting the output in written and oral forms.

Course Outcomes

Students should be able to

- i. Formulate a precise problem statement followed by the development of clear, achievable, and specific objectives
- ii. Investigate research problem by reviewing and synthesising relevant literature in the discipline for deriving substantiated conclusions.
- iii. Design research solutions that meet specific needs followed by investigation using research-based knowledge in the field of engineering practice taking into account the factors of efficient use of resources, total cost of living, reuse of resources, or similar concepts as stated.
- iv. Organize an array of techniques, resources, engineering, and IT tools, including predictive modeling, to address research problems, while demonstrating a nuanced understanding of their capabilities, limitations, and relevance within the engineering practice area
- v. Relate in-depth science or engineering analysis with an examination of societal, environmental, and sustainability issues related to the research topic.
- vi. Perform professional ethics and responsibilities in avoiding plagiarism in research works.
- vii. Organize advanced proficiency in employing proper referencing, refining writing skills, adhering to precise formatting guidelines and cultivating a commitment to lifelong learning through the preparation of scholarly dissertation.
- iii. Perform presentation skills needed to effectively communicate the purpose, scope, and conclusion of the research.

Course Synopsis

This course provides learning experience to the students in various skills throughout the course including research initiative, technical

expertise, written and oral reporting skills.

References

1. Final Year Project Manual (2018), School of Civil Engineering, USM.
2. Final Year Project Friday Lecture Notes.
3. Civil Engineering Journal (local and International)

EAA496/5

Integrated Design Project

Course Objectives

To carry out integrated design work covering various specialization in civil engineering area.

Course Outcomes

Students should be able to

- i. Assess an engineering project brief as part of a design team to define the problem, identify stakeholders and set project requirements and specifications.
- ii. Generate creative design solutions using standard engineering design processes, research-based knowledge and methods together with the use of modern tools usage.
- iii. Synthesize technical knowledge of the detailed engineering designs from the aspect of societal, health, safety, legal, cultural, ethical and environmental factors.
- iv. Synthesize the technical definitions, regulations and specifications from the engineering codes, manuals, standards, and guidelines to ensure consistency, safety and quality of the engineering designs that adhere to several government and regulatory authorities guidelines.
- v. Demonstrate working effectively as a team and negotiation strategies to enable effective collaboration and task management.
- vi. Plan project task timeline, allocate resources, including cost estimation and monitor progress towards achieving project goals by applying industry-standard project management tools and techniques.
- vii. Demonstrate effective oral, written and visual communication skills through presentations and technical report.

Course Synopsis

This course integrates various sub-areas of the civil engineering knowledge that covers (but not limited) preliminary planning, earthwork, impact studies, building and infrastructure design, geotechnical design as well as project management. Based on a given project development, students communicate, interact and work as a team to produce comprehensive engineering proposals including site investigation, local authority/regulating body requirements, design, technical specification, engineering drawings and cost estimation.

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|-------------------|--|
| References | <ol style="list-style-type: none"> 1. Budhu, M. (2010). Soil Mechanics and Foundations (3ed), Wiley 2. DID Malaysia (2012). Urban Stormwater Management Manual for Malaysia, Second Edition, Kuala Lumpur. 3. Kassimali, A. (2015). Structural Analysis, 9th Edition, Prentice Hall. 4. Mosley, B., Bungey, J. and Hulse, R. (2007). Reinforced Concrete Design to Eurocode 2, Plagrove MacMillan. |
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EAA487/3	Disaster Management
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Course Objectives	To expose students to the disaster and natural disaster risk reduction methods.
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Course Outcomes	Students should be able to i. Evaluate the concepts and cycle of disaster management for disaster risk mitigation. ii. Propose mitigation and planning methods whilst integrating sustainable development principles for disaster risk mitigation and emergency response using standard operating procedures and related technologies iii. Demonstrate the ability to propose mitigation and planning methods for emergency response using emerging operating procedures and technological changes.
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Course Synopsis	This course provides knowledge about disaster management including disaster management cycle, policy and mechanism of disaster management, types of disaster, risk, hazard and vulnerability, management and reduction of disaster risk and post-disaster rehabilitation.
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|-------------------|---|
| References | <ol style="list-style-type: none"> 1. Wisner, B., Gaillard, J.C, Kelman, I. (2012). The Routledge Handbook of Hazards and Disaster Risk Reduction, Routledge Taylor and Francis Group. 2. Smith, K. (2013). Environmental Hazards Assessing Risk and Reducing Disaster, 6th Edition, Routledge Taylor and Francis Group. 3. Turnbull, M., Sterret, C., L., and Hilleboe, A. (2013). Toward Resilience: A Guide to Disaster Risk Reduction and Climate Change Adaptation, Practical Action Publishing Ltd.1. Wisner, B., 4. Gaillard, J.C, Kelman, I. (2012). The Routledge Handbook of Hazards and Disaster Risk Reduction, Routledge Taylor and Francis Group. |
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EAH418/3**Sustainable Water System Modelling****Course Objectives**

Covers aspects of effective data collection techniques, including river survey sampling, for modeling urban drainage, river hydraulics and watershed hydrology, as well as water supply hydraulics for informed water resource management.

Course Outcomes

Students should be able to

- i Arrange various hydrological data sources to inform sustainable water system modeling decisions.
- ii Forecast water system (rivers and water distribution) behaviours with suitable computer modeling software effectively.
- iii Demonstrate the ability to use suitable software tools for sustainable water systems modelling, demonstrating proficiency in software operation and interpretation of results.
- iv Propose suitable engineering solutions based on the model output to address the impact on the society, the economy, sustainability, health and safety, and the environment.

Course Synopsis

This course introduces students to several sustainable water system modelling, delving into hydrological data collection methods and suitable software tools for the purpose of river basin management and water distribution. The students will gain proficiency in sampling techniques for river survey data acquisition and develop skills in modelling urban drainage, river hydraulics, and watershed hydrology for effective water resource management.

References

1. Donald W. Knight, Assad Y. Shamseldin (2006). River basin modelling for flood risk mitigation. Taylor & Francis, London, New York.
2. Marcelo Garcia (2008). Sedimentation engineering: processes, measurements, modeling, and practice. ASCE manuals and reports on engineering practice; 110, American Society of Civil Engineers.
3. Faruk Bhuiyan and Andrew Manning (2014). Research collection on sediment transport, InTech; Rijeka, Croatia.

EAS461/3**Building Pathology and Retrofitting****Course Objectives**

Giving exposure to aspects of concrete technology from the perspective of durability and deterioration of concrete structures, additives, production, properties and uses of special types of concrete other than normal concrete, non-destructive and semi-destructive testing methods as well as repair techniques for structural upgrading.

Course Outcomes

Students should be able to

- i. evaluate defect and deterioration problems in concrete

structures by applying semi and non-destructive testing techniques.

- ii. propose suitable repair material and technique for rehabilitating concrete structure with specific defect or deterioration problem.
- iii. explain the appropriate repair materials and techniques for rehabilitating concrete structures with specific defect or deterioration problems.
- iv. perform in group work to produce a comprehensive design output and report.

**Course
Synopsis**

The course covers the utilization of admixtures in concrete, special concretes, durability and deterioration of concrete structures, non and semi-destructive testing techniques, and concrete repair and retrofitting techniques.

References

1. Bungey J.H., Millard S.G. and Grantham M.G. (2006). Testing of concrete in structures, 4th edition, Taylor & Francis.
2. Mehta P.K. and Monteiro P.J.M. (2014). Concrete – Structures, Properties and Materials, McGraw Hill Education.
3. Neville A.M. (2011). Properties of Concrete, Fifth Edition, Pearson Education Limited.
4. ACI, BRE, CONCRETE SOCIETY, ICRI (2003). Concrete Repair Manual, 2nd Edition, American Concrete Institute.
5. Emmons P.H. (1993). Concrete Repair and Maintenance Illustrated, American Concrete Institute.

EAG441/3

Soil Stabilization and Ground Improvement

**Course
Objectives**

The objectives of this are to introduce to the students the advanced geotechnical engineering aspects which include soil stabilization and ground improvement.

**Course
Outcomes**

Students should be able to

- i Explain the principles of geotechnical engineering related to soil stabilization and ground improvement.
- ii Evaluate geotechnical problems related to soil stabilization and ground improvement.
- iii Design solutions to geotechnical engineering problems related to soil stabilization and ground improvement.

**Course
Synopsis**

This course covers key aspects of analysis and design of soil stabilization and ground improvement which are related to factors and categories of failures, method of investigation and forensic, remediation and stabilization work for soft and weak soil.

References

1. Kirsch, K., and Bell, A. (2012). Ground Improvement (3 ed.):

CRC Press.

2. Duncan, J. M., and Wright, S. G. (2005). Soil Strength and Slope Stability (1 ed.): Wiley.
3. Myint-Win, B., Jian, C., Low, L. B. K., and Choa, V. (2004). Soil Improvement: Prefabricated Vertical Drain Techniques (1 ed.): Cengage Learning.

EAL433/3

Highway Design and Sustainable Pavement

Course Objectives

Highway Design: To understand highway geometric design methods that include the design of alignments, cross-sections, level crossings, and elevated intersections with an emphasis on road safety aspects based on specifications.

Sustainable Pavement: To understand the concept, requirements and types of materials, long life pavement, medium temperature asphalt mix, reclaimed asphalt pavement, porous asphalt, plant-based grade, use of waste material as bitumen modifier.

Course Outcomes

Students should be able to

- i. Relate the concept of sustainability in the production and construction of asphalt pavement materials.
- ii. Analyze the appropriate design concepts, principles in highway geometric design and compliance to the guideline.
- iii. Design elements in highway geometry that covers horizontal, vertical alignments, cross section and junctions according to the relevant guidelines.

Course Synopsis

Highway Design: Basic elements, curve types, superelevation, summit and valley curves, camber, lane types and road shoulder. At-grade Intersection: types, requirements, sight distance. Grade Separated Intersection: justification, types, distance between interchange.

Sustainable Pavement: long term pavement performance, Warm Mix Asphalt (WMA), Recycled Asphalt Pavement (RAP), Porous Asphalt and Pavement, Plant Based Binder, Use of waste material as bitumen modifier.

References

1. REAM, 'A Guide On Geometric Design Of Roads', Road Engineering Association of Malaysia REAM-GL2/2002, Shah Alam, Selangor
2. Lembaga Lebuh Raya Malaysia, (2011), Guidelines for Malaysia Toll Expressway System – Design Standards, Edisi 1, LLM/GP/T5-08, ISBN 978-983-99565-5-9, Percetakan Nasional Malaysia Berhad, Kuala Lumpur
3. Jabatan Kerja Raya Malaysia, (1987) 'Arahan Teknik (Jalan) 13/87 A Guide to the Design of At-Grade Intersections', Kuala Lumpur.

4. Kasthurirangan Gopalakrishnan, Wynand JvdM Steyn, John Harvey, (2014) Climate Change, Energy, Sustainability and Pavements, Springer Berlin, Heidelberg, <https://doi.org/10.1007/978-3-662-44719-2>
5. Bouzid Choubane (2012), Pavement performance: current trends, advances, and challenges, West Conshohocken, PA: ASTM International, ISBN:9780803175419 [0803175418]

EAP413/3

Solid and Industrial Waste Management

Course Objectives

Introduce and give in-depth knowledge to students about solid waste management and industry.

Course Outcomes

Students should be able to

- i. Relate ethics and regulations in waste management system with respect to public health and environmental sustainability.
- ii. Evaluate aspects related to generation of solid waste and industrial waste including method of handling, processing, controlling and disposal.
- iii. Explain alternative solution to problems and design related with solid and industrial waste management issues.
- iv. Integrate functional elements in waste management and financial management for engineers in society and the world.

Course Synopsis

This course discusses the functional elements and national laws related to waste management; generation, storage, handling, collection, process operation and maintenance of solid and industrial (scheduled waste) waste before treatment, processing, or ultimate disposal option. This course also discusses control of generation of landfill gas and leachate; and landfill safe closure.

References

1. George Tchobanoglous, Integrated Solid Waste Management: Engineering Principles and Management Issues, McGraw-Hill, International Edition, 1993
2. Clifton VanGuilder, Hazardous Waste Management: An Introduction, Mercury Learning and Information, 2012
3. Bagachi, A, Design of landfills and Integrated Solid Waste Management 3rd ed, John Wiley & Sons, Hoboken, 2004

EAS459/3

Forensic Engineering for Civil Engineers

Course Objectives

To provide knowledge on the investigation of damage and construction failure in the field of civil engineering and then suggest the appropriate damage investigation procedure and analysis method in solving the problem.

Course Outcomes	Students should be able to - Recommend the process of forensic investigation for building and infrastructure in civil engineering. - Perform to ethical principles in investigation of failures in the context of civil engineering forensic. - Integrate latest technology and relevant sources for investigating of failures in civil engineering application. - Perform presentation skills needed to elaborate the findings of the forensic investigation.
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Course Synopsis	The course includes an introduction to Forensic Engineering related to the field of Civil Engineering. Students will be exposed to construction damage and failure scenarios as well as appropriate analysis and evaluation methods to identify the cause of damage and methods to solve the problem.
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References	- Forensic Practices Committee of the Technical Council on Forensic Engineering. (2012). Guidelines for forensic engineering practice. American Society of Civil Engineers (ASCE). - Committee on Forensic Investigation of American Society of Civil Engineers (2018), Guideline for Failure Investigation, American Society of Civil Engineers (ASCE) - Noon, R. K. (2020). Introduction to forensic engineering. CRC Press.
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EAS460/3 Advanced Structural Analysis

Course Objectives	Provide knowledge to students on advanced method of structural analysis.
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Course Outcomes	Students should be able to - Evaluate structures design components using Finite Element Method (FEM). - Propose structures design component considering dynamic effect. - Demonstrate tall buildings design considering wind loads based on Malaysian standard
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Course Synopsis	This course provides knowledge about: advanced method of structural analysis which covers finite element method; structural dynamics; and analysis of tall building.
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References	- Bathe, K.J. (1996). Finite Element Procedures, Prentice Hall - Chopra, A.K. (2019). Dynamics of Structures: Theory and Application to Earthquake Engineering, 5th Edition,
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Pearson/Prentice Hall

3. Smith, B.S. and Coull, A. (1991). Tall Building Structures Analysis and Design, John Wiley & Sons, Inc.

EAG445/3

Rock Engineering and Underground Construction Technology

Course Objectives

Introducing students to the basic principles of rock engineering and its application in the field of civil engineering in addition to tunnel technology in subsurface dredging.

Course Outcomes

Students should be able to

- i. Relate the fundamental principles of rock mechanics to rock engineering application such as rock slope and underground excavation.
- ii. Evaluate problems related to rock mechanics and rock engineering application such as rock slope and underground excavation.
- iii. Design solution to problem related to rock engineering application such as rock slope and underground excavation.
- iv. Perform the design solution to problem related to rock engineering application such as rock slope and underground excavation through collaborative team effort.

Course Synopsis

This course covers key aspects of rock engineering and underground excavation including the discontinues nature of rock mass, seepage in rock mass and groundwater control methods, laboratory and in-situ rock testing, shear strength of intact rock and rock mass, rock mass classification, joint orientation and plotting of stereographic projection, rock engineering application in underground excavation and rock slope and tunnelling technology in underground excavation.

References

1. Marinos, V., 2020. Engineering Geology and Tunnels. In Tunnel Engineering-Selected Topics. London: IntechOpen.
2. Ramamurthy, T. ed., 2010. Engineering in rocks for slopes, foundations and tunnels. PHI Learning Pvt. Ltd.
3. Franklin, J.A. and Dusseault, M.B., 1991. Rock engineering applications, 1991
4. Palmström, A. and Stille, H., 2010. Rock engineering. Thomas Telford Ltd.

EAL345/3

Advanced Transportation Modeling

Course Objectives

To understand the overall transport planning process, including emphasis on the advanced aspects of travel demand modeling, aspects of supply preparation as well as the procedures involved in

traffic impact studies.

**Course
Outcomes**

Students should be able to

- i. Explain the related fundamental principles and current knowledge in transportation planning and traffic impact assessment.
- ii. Analyse problems related to transportation planning and traffic impact assessment in a comprehensive manner.
- iii. Construct solution related to transportation planning and traffic impact assessment problems using transportation planning software.

**Course
Synopsis**

This course covers the transportation planning process related to transport demand modelling and the procedure involved in traffic impact assessment.

References

1. De Dios Ortuzar, J., & Willumsen, L. G. (2011). Modelling transport. John Wiley & Sons. ISBN: 9781119993308
2. Grossardt, T & Keiron, B. (2018). Transportation Planning and Public Participation: Theory, Process, and Practice. Elsevier Science. ISBN: 9780128129562; 0128129565
3. Teodorović, D. (2017). Transportation Engineering: Theory, Practice and Modeling. Butterworth-Heinemann. ISBN: 9780128038185; 0128038187
4. Canstantinos, A., Dimitrou, L. and Pereira, F. (eds) (2019). Mobility Patterns, Big Data and Transport Analytics: Tools and Applications for Modeling. Elsevier. ISBN: 780128129708

5.0 STUDENT’S FEEDBACK

The aim of this feedback form is to obtain students’ response regarding the contents of this Guidebook. The information obtained will be useful in improving it.

Please respond to items 1 – 5 below based on the following 4-point scale:

1 = Strongly disagree	2 = Disagree	3 = Agree	4 = Strongly agree
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1. This Guidebook is very useful.

1	2	3	4
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2. The information provided in this Guidebook is accurate.

1	2	3	4
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If you choose 1 or 2 for Question no. 2, please state the page number that contains information that is inaccurate in the space below:

3. The information provided in this Guidebook is clear and easy to understand.

1	2	3	4
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4. On the whole, the quality of this Guidebook is good.

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5. I prefer to use CD compared to this Guidebook.

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6. If you think other information should be included to make this Guidebook better, please write your suggestions in the space below:

Please submit this feedback form to your School’s General Office in the 4th week of Semester I, Academic Session 2026/2027.