



UNIVERSITI
MALAYA

Faculty of
SCIENCE

BOOKLET

BACHELOR DEGREE OF SCIENCE

2022/2023
ACADEMIC SESSION

<https://fs.um.edu.my/>

<https://www.facebook.com/FacultyScienceUM>

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FACULTY OF SCIENCE BOOKLET

This booklet provides information that is key to your successful navigation of the Science programme that you have been offered. In particular, you are advised to understand the information provided here that will assist your progress throughout the programme.

- Bachelor of Science with Education

Department of Chemistry

- Bachelor of Science in Chemistry

Department of Geology

- Bachelor of Science in Applied Geology

Department of Physics

- Bachelor of Science in Physics

Institute of Mathematical Sciences

- Bachelor of Science in Mathematics
- Bachelor of Science in Statistics
- Bachelor of Actuarial Science

Institute of Biological Sciences

- Bachelor of Science in Ecology and Biodiversity
- Bachelor of Science in Biochemistry
- Bachelor of Science in Biotechnology
- Bachelor of Science in Microbiology and Molecular Genetics
- Bachelor of Science in Environmental Management

The Bachelor of Science (BSc) is a 8 semesters programme. The time span of each programme allows undergraduates to sufficiently plan their pathway without burdening themselves with too many credits in one semester. You are advised to seek counsel with any of the appointed members of the panel of academic advisors for your respective programmes of study whenever you are facing any difficulties and uncertainties regarding academic and other matters related to your studies at this Faculty. Students are also reminded to understand and obey the rules set by the university as stated in the Universiti Malaya (Bachelors's Degree) Rules & Regulations 2019 together with Undergraduate Faculty of Science Handbook Academic Session 2022/2023.

THE DEAN'S WELCOME NOTE



Assalamualaikum WBT and Greetings to all.

First and foremost I would like to welcome all of you to the 2022/2023 academic session. More importantly welcome to the Faculty of Science. Being in this faculty means that you are in one of the oldest faculties in the Universiti Malaya. “Old” maybe the general features you will encounter around you — the buildings, the labs and the facade — but old doesn't mean irrelevant. Faculty of Science is one of the top performers in the university in terms of research output, securing the highest number of research grants and producing the highest numbers of research publications. Researchers in the faculty are very actively involved with their partners in the private and commercial sector, as well as public organisations and agencies. This represents a great gateway for highly motivated and proactive students like yourselves to start a career of your choice.

I would like to take this opportunity to congratulate all of you for being accepted to the various programmes in the Faculty of Science. For those of you who have made Faculty of Science as one of your choices, you will find that our programmes offer you a lot of opportunities for you to gain valuable knowledge and experience in the fields of your choice. For the rest of you who may have made other career plans I urge you to look at your future with the faculty of science positively, as an opportunity to explore new possibilities and quench your thirst for knowledge with the various courses that we have to offer. The range of courses that you can take is even greater this year, when programmes across different faculties will be made available to you as electives. The choice is yours, and opportunities are there for the taking.

Undergraduate years are probably going to be one of the best years if not THE best for many of you. (It certainly was for me). You will quickly discover that your experience at the university is more than just about classes and exams. Besides attending lectures and practical labs, or even dealing with crunch-time during the exam weeks, you will inadvertently (or not) be involved in social activities and sporting events organized by the various clubs and student groups. Participating in these activities (or if you like, you may opt to start a new one) is important as it broadens your perspectives beyond your classroom, and allows you to sharpen your soft skills. It is definitely a quick and an effective way to make new friends and extend your network, but most important is that it allows you to develop into a holistic individual and become “future proof”. With a journey well planned and time well spent, by the time you graduate you will be more than ready to face the challenges ahead. Grab this chance to be the best version of yourself for the future.

There will indeed be times when you face tough challenges and feel that the world is against you; remember that you are never on your own at the Faculty. You have friends around you, and the academics and staffs are there to assist and advise you accordingly. I wish you all the best, and remember to take time to smell the roses.

“Attitude Determines Altitude”

Prof Zul-Q
012 268 0863
zulq@um.edu.my

Professor Dr. Zulqarnain Bin Mohamed
Dean
Faculty of Science

INTRODUCTION TO FACULTY OF SCIENCE

The Faculty of Science is among the oldest and most accomplished faculties in the Universiti Malaya. Established in 1959 with four departments namely Department of Botany, Department of Chemistry, Department of Mathematics and Department of Zoology. Currently, the Faculty of Science is the biggest faculty in Universiti Malaya with nearly 2106 undergraduate students, 777 postgraduate students, 235 academic staffs and 242 support staffs.

In addition to functioning as a teaching centre, the Faculty of Science, staffed with locally and internationally feted researchers, serves as one of the main and excellent research hub for Science & Technology in the region. Faculty of Science has established Research Centres including Photonics, CENAR, CEBAR, UMCiL, Nanocat, CIUM, CRYSTAL, Mushroom Research Centre and Glycolipids Self-Assembly and Related Phenomena. Apart from many modern research facilities and equipment, the faculty also boasts several research centres including the Ulu Gombak Field Studies Centre and the Glami Lemi Biotechnology Research Centre (PPBGL) in Jelevu. Hence, the Faculty of Science continues to be the most productive faculty in Universiti Malaya in terms of research activities and scientific publications.

The faculty also manages its very own online scientific journal, the “Malaysian Journal of Science” which publishes high quality research outputs of its members besides receiving other worldwide contributions.

VISION, MISSION, CORE VALUES AND QUALITY POLICY, UNIVERSITI MALAYA

VISION

A global university impacting the world.

MISSION

Pushing the boundaries of knowledge and nurturing aspiring leaders.

CORE VALUES



QUALITY POLICY

Universiti Malaya is committed to conduct teaching and learning, carry out research and provide quality services on a global level, generate and enhance knowledge through continuous improvement efforts for the benefit of all stakeholders, especially Universiti Malaya's students.

ACADEMIC CALENDAR

SEMESTER I

Orientation (Week of Welcome) – WOW	1 week	09.10.2022	- 16.10.2022
Lectures	7 weeks*	17.10.2022	- 04.12.2022
Mid-Semester I Break Lectures	1 week	05.12.2022	- 11.12.2022
Lectures	7 weeks*	12.12.2022	- 29.01.2023
Revision Week	1 weeks*	30.01.2023	- 05.02.2023
Semester I Final Examination	2 weeks	06.02.2023	- 19.02.2023
Semester I Break	3 weeks	20.02.2023	- 12.03.2023
	22 weeks		

SEMESTER II

Lectures	6 weeks*	13.03.2023	- 23.04.2023
Mid – Semester II Break Lectures	1 week*	24.04.2023	- 30.04.2023
Lectures	8 weeks*	01.05.2023	- 25.06.2023
Revision Week	1 week	26.06.2023	- 02.07.2023
Semester II Final Examination	2 weeks*	03.07.2023	- 16.07.2023
Semester Break	1 week*	17.07.2023	- 23.07.2023
	19 weeks		

SEMESTER BREAK

Semester Break	9 weeks*	17.07.2023	- 17.09.2023
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SPECIAL SEMESTER

Lectures	7 weeks*	24.07.2023	-10.09.2023
Special Semester Final Examination	1 week	11.09.2023	-17.09.2023
	8 weeks		

Note:

(1) Course Registration and Examination Schedule can be referred at (<https://umsitsguide.um.edu.my/>).

(*) The Academic Calendar has taken into account public and festive holidays.

Maulidur Rasul (9 October 2022)	Eidul Fitri (22 & 23 April 2023)
Deepavali (24 October 2022)	Labour Day (1 May 2023)
Christmas Day (25 December 2022)	Wesak Day (4 May 2022)
New Year (1 January 2023)	His Majesty's King's Birthday (5 June 2023)
Chinese New Year (22 & 23 January 2023)	Eidul Adha (29 July 2023)
Federal Territory Day (1 February 2023)	Awal Muharam (19 July 2023)
Thaipusam (4 February 2023)	National Day (31 August 2023)
Nuzul Al-Quran (8 April 2023)	Malaysia Day (16 September 2023)

BACHELOR OF SCIENCE PROGRAMME STRUCTURE

Table 1: Programme Structure

COURSE	COURSE CO NTENT	CREDIT	
UNIVERSITY COURSES (12 / 14 credits)	GIG1012 / GLT1017*	Philosophy and Current Issues (local students) / Basic Malay Language (*only for international students)	2
	GIG1013	Appreciation of Ethics and Civilisations	2
	GIG1003	Basic Entrepreneurship Enculturation	2
	GKA/GKI/GKK/ GKP/GKS/GKU	Co-Curriculum	
	*GKB1001A/ *GKB1001B/ *GKB1001C (SUKSIS/PALAPES)		2 / 4
	English Course : Refer to the List of Courses To Be Completed By All Students (New Cohort) Table 3		4
PROGRAMME COURSES* (96-98 credits)	Core Courses	73 - 87	
	<u>Elective Courses</u>		
	(I) Programme Elective Courses or/and Minor Package **	24 – 38	
	(II) Elective University Courses (Student Holistic Empowerment [SHE] Kluster 1 – Kluster 4) Note: Refer to the List of Student Holistic Empowerment (SHE) – Table 4	8	
OVERALL TOTAL		132 - 135	

Note:

* Programme Course

For Bachelor of Actuarial Science programme:

(1) Programme Course : 133 credits

(2) Overall Total: 145 credits.

** Minor package

(1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.

(2) For further information, student can refer to UMSItS Guide via this link : <https://umsitguide.um.edu.my/>

(3) Minor package is not eligible for the following programmes :

- (a) Bachelor of Science with Education
- (b) Bachelor of Science in Biotechnology

List of Minor Package

- Malay Studies
- Japanese language
- Arabic Language
- Economy
- Sports Management
- Sports Science (Exercise Science)
- Statistical Sciences
- Mathematical Sciences
- Chemistry
- Geology
- Physics
- Biochemistry
- Environmental Management
- Ecology and Biodiversity
- Microbiology and Molecular Genetics
- Microbiology
- Genetics
- Information Technology
- Islamic Studies
- Performing Arts
- Anthropology and Sociology
- English
- Environmental Studies
- International and Strategic Studies
- Southeast Asian Studies
- East Asian Studies
- Indian Studies
- Chinese Studies
- Social Administration
- History
- Gender Studies
- Chemical Engineering
- Electrical Engineering
- Biomedical Engineering
- Civil Engineering
- Mechanical Engineering
- Built Environment

In order for the minor qualification to be displayed on the transcript, student must complete the minimum 25 credits under the same Minor Package.

**BACHELOR OF SCIENCE WITH EDUCATION
PROGRAMME STRUCTURE**

Table 2: Programme Structure

COURSE	COURSE CONTENT		CREDIT
UNIVERSITY COURSES (22 credits)	GIG1012	Philosophy and Current Issues (Local Student)	2
	GIG1013	Appreciation of Ethics and Civilisations	2
	GIG1003	Basic Entrepreneurship Culture	2
	GIG1004	Information Literacy	2
	GIG1005	Social Engagement	2
	GKA/GKI/GKK/ GKP/GKS/GKU	Co-Curriculum	2
	GIA-GIX ^{xxxx} (Except with code GIS ^{xxxx} courses)	External Faculty Elective Courses (KELF)	4
	English Course : Refer to the List of Courses To Be Completed By All Students (New Cohort) Table 3		6
FACULTY CORE COURSES (8 credits)	SIX1001	Introduction to Science & Technology Studies	3
	SIX1002	Ethics and Safety	2
	SIX1003/1004/1005	Biostatistics/Statistics/Geostatistics	3
PROGRAMME COURSES* (66 - 103credits)	Major Program Core Courses	Refer to the Structure of Programme at the respective Institutes/Departments:	66
	Program Elective Courses	<i>Biology/Mathematics/Chemistry/Physics</i>	
	Minor Program Courses	Compulsory Minor Courses Program Elective Courses (KT1) Program Elective Courses (KT2)	37
FACULTY ELECTIVE COURSES (8 credits)	Faculty Elective Courses	Courses taken from other Institutes/Departments <i>Note: Refer to the List of Faculty Elective Courses from the various Institutes/Departments</i>	8
OVERALL TOTAL **			141

TABLE 3 : ENGLISH COMMUNICATION PROGRAMME(UNIVERSITY COURSE) FACULTY OF LANGUAGES AND LINGUISTICS		
LIST OF COURSES TO BE COMPLETED BY ALL STUDENTS (NEW COHORT)		
PATH 1	<ul style="list-style-type: none"> • MUET Band 2 *(2008-2020) • MUET Band 2 & 2.5 (2021) • IELTS Band 4.0 • TOEFL Paper – Based Test (437 –473) • TOEFL Computer – Based Test (123 – 150) • TOEFL Internet – Based Test (41–52) • PTE (Academic) – (10 – 28) 	Students need to complete 2 courses (2 courses x 2 credits each) from this PATH
		COMPULSORY <ul style="list-style-type: none"> • GLT1018 – Proficiency in English I
		** CHOOSE ONE : <ul style="list-style-type: none"> • GLT1019 – Let’s Speak • GLT1020 – Fundamental Writing
PATH 2	<ul style="list-style-type: none"> • MUET Band 3 (2008-2020) • MUET Band 3 & 3.5 (2021) • IELTS Band 4.5 – 5.0 • TOEFL Paper – Based Test (477 – 510) • TOEFL Computer – Based Test (153 – 180) • TOEFL Internet – Based Test (53 – 64) • PTE (Academic) – (29 - 41) 	Students need to complete 2 courses (2 courses x 2 credits each) from this PATH
		COMPULSORY <ul style="list-style-type: none"> • GLT1021 – Proficiency in English II
		** CHOOSE ONE : <ul style="list-style-type: none"> • GLT1022 – Speak Up • GLT1023 – Effective Workplace Writing
PATH 3	<ul style="list-style-type: none"> • MUET Band 4 (2008 – 2020) • MUET Band 4 & 4.5 (2021) • IELTS Band 5.5 – 6.0 • TOEFL Paper – Based Test (513 – 547) • TOEFL Computer – Based Test (183 – 210) • TOEFL Internet – Based Test (65-78) • PTE (Academic) – (42 – 57) • FCE (B & C) • GCE A Level (English) (Minimum C) • IGCSE/GCSE (English) (A, B & C) 	Students need to complete 2 courses (2 courses x 2 credits each) from this PATH
		COMPULSORY <ul style="list-style-type: none"> • GLT1024 – Proficiency in English III
		** CHOOSE ONE : <ul style="list-style-type: none"> • GLT1025 – Effective Oral Communication • GLT1026 – Writing at the Workplace
PATH 4	<ul style="list-style-type: none"> • MUET Band 5 & Band 6 (2008- 2020) • MUET Band 5 & 5+ (2021) • IELTS Band 6.5 – 9.0 • TOEFL Paper – Based Test (550 – 677) • TOEFL Computer – Based Test (213 – 300) • TOEFL Internet – Based Test (79 – 120) • PTE (Academic) (58 – 90) • FCE (A) • GCE A Level (English) (B & A) 	Students need to complete 2 courses (2 courses x 2 credits each) from this PATH
		<ul style="list-style-type: none"> • GLT1027– Advanced Oral Communication* • GLT1028 – Advanced Business Writing*
		*(Students can only register for one course per semester)

These courses have prerequisites and students can only register for them after obtaining a PASS in the compulsory course as stipulated in the respective PATH.
 **Students who obtained MUET Band 5/6 are given the option to choose either a Communication English course or a Foreign Language course.

Refer to Faculty of Languages and Linguistics for further information. <https://fl.um.edu.my/>

Languageunit-fbl-rm(12/4/2021)

ELECTIVE UNIVERSITY COURSES (STUDENT HOLISTIC EMPOWERMENT [SHE])

Table 4

KLUSTER 1		
THINKING MATTERS: MIND AND INTELLECT		
Course Code	Course Name	Credit
GBI0001	Principles of Muamalat and Islamic Management	2
GBI0012	Hadith and Life	2
GBI0013	Islam and Science	2
GBI0014	Quran and Civilization	2
GBT0002	Critical Thinking and Problem Solving Skills	2
GBE0003	Economics 123	2
GBE0015	Seeing the World like an Economist	2
GBE0018	Philosophy, Religion and Spiritual Life	2
GBC0004	Personal Finance	2
GBC0019	Personal Income Tax	2
GBC0020	Tourism as a Business	2
GBC0005	Understanding Consumer Psychology	2
GBM0006	Physics and Radiation in Life	2
GBA0021	Appreciating Literature	2
GBA0022	An Overview of European Civilisation	2
GBA0007	Digital Literacy for student success	2
GBS0023	Dealing with pseudoscience	2
GBL0008	My Constitution	2
GBR0024	Introduction to Drama Aesthetic	2
GBX0009	Information seeking, Writing, and Academic publications	2
GBX0010	Introduction to Social Entrepreneurship	2
GBX0011	STEM Education Management	2
GBX0016	Mining the Millionaire Mind	2
GBX0017	Rethinking Development Ideas	2
KLUSTER 2		
EMOTIONAL, PHYSICAL AND SPIRITUAL INTELLIGENCE: HEART, BODY AND SOUL		
GDI0001	Strengthening of Islamic Creed	2
GDI0002	Basic of Islamic Psychospiritual	2
GDI0003	Islamic Akhlaq Education	2
GDM0006	Global Trends in Food and Health	2
GDA0007	Psychology Positive in Daily Life	2
GDR0008	Music Moves	2
GDR0009	Mindfulness through Music	2
GDR0010	Dance in the World	2

GDV0011	Wellness,Fitness and Nutrition	2
GDV0012	Exercise andActive Living	2
GDO0013	Tobacco and Smoking Cessation Programme	2
GDP0014	Stress Management	2
GDV0015	Appreciation of Harmony Singing	2
GDD0004	Dental Health	2
KLUSTER 3		
TECHNOLOGY/ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS: i-TECHIE		
GFT0006	Technologyn language learning	2
GFE0007	DataAnalytics Made Easy: For Beginners	2
GFK0008	Electrical and Electronics Technologies for the Non-Engineer	2
GFP0009	Digital Creativity	2
GFP0010	EducationalTechnology for All	2
GFP0011	Responsible Digital Citizenship	2
GFC0012	Digital Business	2
GFS0013	Introduction toBiocomputing	2
GFS0014	ScientificComputing for Non-Scientists	2
GFW0015	Computational Thinking with Robotics	2
GFW0003	Data Analyticsfor Digital Community	2
GFW0016	Cinematography 101	2
GFW0002	Computational Thinking	2
GFW0017	Social Informatics	2
GFW0018	Security andEthics in Cyberspace	2
GFW0001	Artificial Intelligencefor Everyone	2
GFW0021	Excel Associate	2
GFW0022	Microsoft Office Specialist: Microsoft Excel Expert	2
GFW0023	Microsoft Office Specialist: Word Expert	2
GFW0024	Microsoft Office Specialist: Powerpoint Associate	2
GFW0025	Microsoft Office Specialist: Word Associate	2
GFL0004	ECommerceLaw	2
GFR0019	Digital Video Productionfor Web	2
GFX0020	Basic Digital Graphics	2
GFX0005	Digital Photography	2
KLUSTER 4		
GLOBAL ISSUES AND COMMUNITY SUSTAINABILITY: MAKING THE WORLD A BETTER PLACE		
GQI0001	Fundamentals of IslamicPolitical Thought	2
GQI0002	Islamic Law and GlobalIssues	2
GQI0003	Islamic Economic Institutions	2
GQJ0004	Malay Language Usage in society	2
GQJ0005	Malay LanguageCompetency	2
GQJ0006	Introduction toMalay Literature	2
GQJ0007	Introduction to MalayCulture	2

GQB0008	Sustainable Construction	2
GQB0009	Exploring Real Estate	2
GQB0010	Urbanism	2
GQE0011	Democracy and Society	2
GQE0012	Community Economic Empowerment	2
GQE0013	Sustainability In Practice	2
GQP0014	Education for Sustainable and Sustainability	2
GQP0015	Global Education	2
GQP0016	Comparing Education Systems	2
GQC0017	Introduction to Corporate Social Responsibility	2
GQA0018	Gender and Citizenship	2
GQA0019	Human Rights in Southeast Asia	2
GQA0020	Literature and Gender	2
GQA0021	Introduction to Chinese Culture	2
GQA0022	Bite-Size Climate Action	2
GQS0023	Geoheritage and Geotourism	2
GQS0024	Environmental Science and Pollution Control	2
GQS0025	Science, Technology and Sustainable Development	2
GQS0026	Earth Natural Resources	2
GQL0027	Children and the Law	2
GQX0028	Introduction to Religious Dialogue	2
GQX0029	Introduction to Civilisational Dialogue	2
GQX0030	Appreciation of Calligraphy	2
GQX0031	Appreciation of Malaysian Heritage Dance	2
GQX0032	Peace and Global Citizenship	2
GQX0033	Social Cohesion in Malaysia	2
GQX0034	Indigenous Communities in Malaysia and Its Current Issues	2
GQX0035	Introduction to Disability Equality Training	2
GQX0036	Heritage of the Art of Canting	2
GQX0037	Heritage of Traditional Craft	2
GQX0038	Introduction to Tobacco Control	2
GQT0039	Communication Skills for Employment Purposes	2
GQT0040	Quranic Language	2
GQT0041	Arabic Language and Culture	2
GQT0042	Chinese Language and Culture	2

* Refer to the Centre for Internship Training and Academic Enrichment (CITra) website: <https://citra.um.edu.my/> for further information

UNIVERSITI MALAYA GRADING AND ATTENDANCE REQUIREMENT

GRADING SCHEME

The official University grades including the marks and their meaning are as follows:

MARKS	GRADE	GRADE POINT	DESCRIPTION
90.00 – 100.00	A+	4.00	Distinction
80.00 – 89.99	A	4.00	Excellent
75.00 – 79.99	A-	3.70	Excellent
70.00 – 74.99	B+	3.30	Pass with Honor
65.00 – 69.99	B	3.00	Pass with Honor
60.00 – 64.99	B-	2.70	Pass with Honor
55.00 – 59.99	C+	2.30	Pass
50.00 – 54.99	C	2.00	Pass
45.00 – 49.99	C-	1.70	Fail
40.00 – 44.99	D+	1.30	Fail
35.00 – 39.99	D	1.00	Fail
00.00 – 34.99	F	0.00	Fail

ATTENDANCE REQUIREMENTS:

Subject to the sub regulation 3(3) of these Regulations, a student whose attendance in any course is below **80% without any acceptable reason** or without obtaining prior permission from the lecturer concerned **may be barred from taking the final examination** of the semester for the course concerned by the Dean of the Faculty of the programme of study. The student will be notified in writing by the Dean of the Faculty concerned before the commencement of the semester examinations if he is barred from sitting for the final examination of the semester

Bachelor of Science with Education



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Introduction

Bachelor of Science with Education (B.Sc.Ed.) is a programme that was established in the year 1975 with the co-operation of the Faculty of Education. It is designed to provide students with opportunities to become certified physics, chemistry, biology, or mathematics teachers at the secondary and pre-university levels. The programme will cater students with solid grounding in physics, chemistry, biology or mathematics content knowledge. Students will also be provided with the pedagogical knowledge and skills to professionally equip them to become effective classroom teachers.

The programme had been recently reviewed to ensure the curriculum will prepare students to adapt to the 21st century challenges of teaching science or mathematics. Students will get to graduate after a minimum of 8 semesters where they will have to complete 141 credits comprising of courses from the University Courses (22 credits); Faculty Core Courses (8 credits), Faculty Elective Courses (8 credits), Science Major Courses (66 credits), and Education Minor Courses (37 credits).

Apart from the lectures in the Science Major Courses, students will be posted to schools to undergo professional preparation as school teachers as part of the Education Minor Courses. Students get to choose preferred specialization to become either a physics, chemistry, biology, or mathematics teacher that is qualified to teach not only at public secondary schools but also at the private secondary schools or pre-university colleges.

BACHELOR OF SCIENCE WITH EDUCATION (BIOLOGY) ACADEMIC SESSION 2022/2023 (141 CREDITS)			
UNIVERSITY COURSES (22 Credits)			
Course Code	Course Name		Credit
GLT ^{xxxx}	English Course		6
GIG1012	Philosophy and Current Issues		2
GIG1013	Appreciation of Ethics and Civilisations		2
GIG1003	Basic Entrepreneurship Culture		2
GIG1004	Information Literacy		2
GIG1005	Social Engagement		2
GKA/GKI/GKK/GKP/ GKS/GKU	Co-Curriculum		2
GIA-GIX ^{xxxx}	External Faculty Elective courses (KELF)		4
FACULTY CORE COURSES (8 Credits) [TF]			
Course Code	Course Name		Credit
SIX1001	Introduction to Science and Technology Studies		3
SIX1002	Ethics and Safety		2
SIX1003	Biostatistics		3
FACULTY ELECTIVE COURSES (8 Credits) [TF]			
*Courses offered by other Institute/Department in Faculty of Science.			
(Refer to the List of Courses offered by various Institute/Department in Faculty of Science other than Institute of Biological Sciences)			
Institute/ Department	Course Code	Course Title	Credit
Dept. of Chemistry	SIX1009	Basic Chemistry	2
Dept. of Geology	SIX1010	Earth's Ecosystem	2
Dept. of Physics	SIX1011	Contemporary Physics	2
Dept. of Science and Technology Studies	SIX1012	Logical Thinking in Science	3
Institute of Mathematical Sciences	SIX1013	Fundamentals of Advanced Mathematics	4
PROGRAMME COURSES (103 Credits)			
(I) MAJOR PROGRAMME CORE COURSES (66 Credits) [TP]			
Course Code	Course Name	Pre-Requisite(s)	Credit
LEVEL 1 (14 Credits)			
SIJ1001	Life Processes		2
SIL1001	Cell Biology		2
SIE1001	Organism Biology		2
SIH1001	Population Biology		2
SIH1003	Plant and Environment		2
SIK1001	Biology Practical		2*
SIO1001	Basic Physics		2

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SIV2001	Fundamentals of Bioinformatics	SIL1001 and SIK1001	3*
SIK2004	Human and Animal Physiology	SIJ1001	3
SIK2001	Human Anatomy	SIJ1001 and SIL1001	3*
SIK2003	General Biochemistry	SIJ1001	3
SIK2007	Histology	SIJ1001 and SIK1001	3*
SIL2002	Cytogenetics	SIL1001	3*
SIL2009	Recombinant DNA Technology	SIL1001	3*
SIR2008	Microbial Physiology and Biochemistry	SIJ1001	3*
SIR2004	General Microbiology	SIJ1001	3*
SIH2004	Environmental Pollution		2
SIH2010	Limnology		3*
SIO2003	Higher Plant Physiology	SIJ1001	3*
SIO2004	Cell and Tissue Culture	SIL1001 and SIK1001	3*
SIO2011	Plant Breeding	SIJ1001	3*
LEVEL 3 (7 Credits)			
SIH3003	Ecology		3*
SIH3008	Sustainable Development		2
SIK3004	Biology of Hormones	SIK2004	2
LEVEL 4 (4 Credits)			
SIP4007	Scientific Project	Completed minimum 42 credit major program courses	4
(II) MINOR PROGRAMME COURSES (37 CREDITS)			
Course Code	Course Name	Pre-Requisite(s)	Credit
COMPULSORY COURSES (19 CREDITS)			
PIX1002	Basic of Physical Education, Health and Co-curriculum		3
SIP1001	Integrating STEM in Science and Mathematics Education		3
PIX2001	Educational Psychology		3
SIP2001	School Experience		2
SIP3001	Teaching Practice I	SIP2001	4
SIP4001	Teaching Practice II	SIP3001	4

BIOLOGY TEACHING METHOD (12 Credits)			
SIP1006	Cognition in Biology Education		2
SIP1007	History, Philosophy and Curriculum in Biology Education		2
SIP2006	Technology in Biology Education		2
SIP2007	Teaching and Assessment of Abstract Concept in Biology		2
SIP3005	Teaching and Assessment of Field Work in Biology		2
SIP3006	Teaching and Assessment of Practical Work in Biology		2
SCIENCE TEACHING METHOD (6 Credits)			
SIP4004	Teaching and Assessment of Chemistry Components in Science		3
SIP4006	Teaching and Assessment of Physics Component in Science		3
<p>Note: * With practical component.</p>			

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE WITH EDUCATION
(BIOLOGY)**

COMPONENT	SEMESTER 1		SEMESTER 2		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GLT ^{xxxx}	3	GLT ^{xxxx}	3	14
	GIG1012	2	GIG1013	2	
	-	-	GIG1004	2	
	-	-	GIG1005	2	
Faculty Core Courses	SIX1001	3	SIX1003	3	8
	SIX1002	2	-	-	
Programme Courses	SIK1001	2	SIJ1001	2	14
	SIH1003	2	SIP1006	2	
	SIP1001	3	-	-	
	PIX1002	3	-	-	
TOTAL CREDITS		20		16	36

COMPONENT	SEMESTER 3		SEMESTER 4		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GIG1003	2	-	-	8
	GKA/GKI/GKK/ GKP/GKS/GKU	2	-	-	
	GIA-GIX ^{xxxx}	4	-	-	
Programme Courses	SIH1001	2	SIO1001	2	26
	SIE1001	2	SIO2003	3	
	SIL1001	2	SIO2011	3	
	SIP1007	2	SIK2001	3	
	SIP2006	2	SIK2007	3	
	-	-	SIP2007	2	
TOTAL CREDITS		18		16	34

COMPONENT	SPECIAL SEMESTER (YEAR 2)		TOTAL CREDITS
	COURSE	CREDIT	
Programme Courses	SIP2001 School Experience	2	2
TOTAL CREDIT		2	2

COMPONENT	SEMESTER 5		SEMESTER 6		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
Faculty Elective Courses	Faculty Elective Courses	2	Faculty Elective Courses	2	4
Programme Courses	SIL2002	3	SIK2003	3	27
	SIL2009	3	SIK2004	3	
	SIH2004	2	SIH2010	3	
	SIV2001	3	SIP3006	2	
	SIP3005	2	PIX2001	3	
TOTAL CREDITS		15		16	31

COMPONENT	SPECIAL SEMESTER (YEAR 3)		TOTAL CREDIT
	COURSE	CREDIT	
Programme Courses	SIP3001 Teaching Practice I	4	4
TOTAL CREDITS		4	4

COMPONENT	SEMESTER 7		SEMESTER 8		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
Faculty Elective Courses	-	-	Faculty Elective Courses	4	4
Programme Courses	SIO2004	3	SIH3008	2	26
	SIR2004	3	SIP4006	3	
	SIR2008	3	SIP4007	4	
	SIH3003	3	-	-	
	SIK3004	2	-	-	
	SIP4004	3	-	-	
TOTAL CREDITS		17		13	30

COMPONENT	SPECIAL SEMESTER (YEAR 4)		TOTAL CREDIT
	COURSE	CREDIT	
Programme Core Courses	SIP4001 Teaching Practice II	4	4
TOTAL CREDITS		4	4

BACHELOR OF SCIENCE WITH EDUCATION (MATHEMATICS) ACADEMIC SESSION 2022/2023 (141 CREDITS)			
UNIVERSITY COURSES (22 Credits)			
Course Code	Course Name		Credit
GLT ^{xxxx}	English Course		6
GIG1012	Philosophy and Current Issues		2
GIG1013	Appreciation of Ethics and Civilisations		2
GIG1003	Basic Entrepreneurship Culture		2
GIG1004	Information Literacy		2
GIG1005	Social Engagement		2
GKA/GKI/GKK/ GKP/GKS/GKU	Co-Curriculum		2
GIA-GIX ^{xxxx}	External Faculty Elective courses (KELF)		4
FACULTY CORE COURSES (8 Credits) [TF]			
Course Code	Course Name		Credit
SIX1001	Introduction to Science and Technology Studies		3
SIX1002	Ethics and Safety		2
SIX1004	Statistics		3
FACULTY ELECTIVE COURSES (8 Credits) [TF] * Courses offered by other Institute/Department in Faculty of Science. (Refer to the List of Courses offered by various Institute/Department in Faculty of Science other than Institute of Mathematical Sciences)			
Institute/ Department	Course Code	Course Title	Credit
Institute of Biological Sciences	SIX1006	Malaysian Flora	3
	SIX1007	Malaysian Fauna	3
	SIX1008	Bio Computing	2
Dept. of Chemistry	SIX1009	Basic Chemistry	2
Dept. of Geology	SIX1010	Earth's Ecosystem	2
Dept. of Physics	SIX1011	Contemporary Physics	2
Dept. of Science and Technology Studies	SIX1012	Logical Thinking in Science	3
PROGRAMME COURSES (103 Credits)			
(I) MAJOR PROGRAMME CORE COURSES (66 Credits) [TP]			
Course Code	Course Name	Pre- Requisite	Credit
LEVEL 1 (22 Credits)			
SIM1001	Basic Mathematics		4

SIM1002	Calculus I		4
SIN1002	Introduction to Worksheet		2
SIN1003	Mathematical Methods I	SIM1002	4
SIM1003	Calculus II	SIM1002	4
SIT1001	Probability and Statistics I	SIM1002	4
LEVEL 2 (36 Credits)			
SIM2001	Advanced Calculus	SIM1003	4
SIM2002	Linear Algebra	SIM1001	4
SIM2003	Introduction to Combinatorics	SIM1001	4
SIN2001	Mathematical Methods II	SIN1003	4
SIN2002	Structured Programming	SIM1002	4
SIN2003	Basic Operational Research	SIM1001 and SIN1002	4
SIN2005	System of Differential Equations	SIN1003	4
SIQ2003	Financial Mathematics and Derivatives	SIM1002	4
SIT2001	Probability and Statistics II	SIT1001	4
LEVEL 3 (4 Credits)			
SIM3003	Number Theory	SIM2002	4
LEVEL 4 (4 Credits)			
SIP4007	Scientific Project	Completed minimum 42 credit major program courses	4
(II) MINOR PROGRAMME COURSES (37 CREDITS)			
Course Code	Course Name	Pre-Requisite	Credit
COMPULSORY COURSES (19 CREDITS)			
PIX1002	Basic of Physical Education, Health and Co-curriculum		3
SIP1001	Integrating STEM in Science and Mathematics Education		3
PIX2001	Educational Psychology		3
SIP2001	School Experience		2
SIP3001	Teaching Practice I	SIP2001	4
SIP4001	Teaching Practice II	SIP3001	4

MATHEMATICS TEACHING METHOD (12 Credits)			
SIP1002	Assessment in Mathematics Education		2
SIP1003	Psychology in Learning Mathematics		2
SIP2002	Technology in Mathematics Education		2
SIP2003	Teaching of Numbers		2
SIP2004	Teaching of Algebra		2
SIP3002	Teaching of Geometry		2
ADVANCED MATHEMATICS TEACHING METHOD (6 Credits)			
SIP3003	Teaching of Probability and Statistics		2
SIP4002	Teaching of Discrete Mathematics		2
SIP4003	Teaching of Calculus		2
Note: * With practical component.			

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE WITH EDUCATION
(MATHEMATICS)**

COMPONENT	SEMESTER 1		SEMESTER 2		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GLT ^{xxxx}	3	GLT ^{xxxx}	3	14
	GIG1012	2	GIG1013	2	
	-	-	GIG1004	2	
	-	-	GIG1005	2	
Faculty Core Courses	-	-	SIX1001	3	5
	-	-	SIX1002	2	
Programme Core Courses	SIM1001	4	SIN1002	2	18
	SIM1002	4	SIP1003	2	
	PIX1002	3	-	-	
	SIP1001	3	-	-	
TOTAL CREDITS		19		18	37

COMPONENT	SEMESTER 3		SEMESTER 4		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GIG1003	2	GKA/GKI/ GKK/GKP/ GKS/GKU	2	8
	GIA-GIX ^{xxxx} (Except with code GIS ^{xxxx} courses)	4	-	-	
Faculty Core Courses	SIX1004	3	-	-	3
Programme Core Courses	SIM1003	4	SIN1003	4	27
	SIT1001	4	SIT2001	4	
	SIP1002	2	PIX2001	3	
	SIP2003	2	SIP2002	2	
	-	-	SIP2004	2	
TOTAL CREDITS		21		17	38

COMPONENT	SPECIAL SEMESTER (YEAR 2)		TOTAL CREDITS
	COURSE	CREDIT	
Programme Core Courses	SIP2001 School Experience	2	2

COMPONENT	SEMESTER 5		SEMESTER 6		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
Faculty Elective Courses	Faculty elective course	5	Faculty elective course	3	8
Programme Core Courses	SIM2003	4	SIM2001	4	28
	SIN2001	4	SIM2002	4	
	SIQ2003	4	SIN2002	4	
	SIP3002	2	SIP3003	2	
TOTAL CREDITS		19		17	36

COMPONENT	SPECIAL SEMESTER (YEAR 3)		TOTAL CREDITS
	COURSE	CREDIT	
Programme Core Courses	SIP3001 Teaching Practice I	4	4

COMPONENT	SEMESTER 7		SEMESTER 8		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
Programme Core Courses	SIN2003	4	SIP4007 Scientific Project	4	20
	SIN2005	4			
	SIM3003	4			
	SIP4002	2			
	SIP4003	2			
	-	-			
TOTAL CREDITS		16		4	20

COMPONENT	SPECIAL SEMESTER (YEAR 4)		TOTAL CREDITS
	COURSE	CREDITS	
Programme Core Courses	SIP4001 Teaching Practice II	4	4

BACHELOR OF SCIENCE WITH EDUCATION (CHEMISTRY) ACADEMIC SESSION 2022/2023 (141 CREDITS)			
UNIVERSITY COURSES (22 Credits)			
Course Code	Course Name		Credit
GLT ^{xxxx}	English Course		6
GIG1012	Philosophy and Current Issues		2
GIG1013	Appreciation of Ethics and Civilisations		2
GIG1003	Basic Entrepreneurship Culture		2
GIG1004	Information Literacy		2
GIG1005	Social Engagement		2
GKA/GKI/ GKK/GKP/ GKS/GKU	Co-Curriculum		2
GIA-GIX ^{xxx}	External Faculty Elective courses (KELF)		4
FACULTY CORE COURSES (8 Credits) [TF]			
Course Code	Course Name		Credit
SIX1001	Introduction to Science and Technology Studies		3
SIX1002	Ethics and Safety		2
SIX1004	Statistics		3
FACULTY ELECTIVE COURSES (8 Credits) [TF]			
* Courses offered by other Institute/Department in Faculty of Science. (Refer to the List of Courses offered by various Institute/Department in Faculty of Science other than Department of Chemistry)			
Institute/ Department	Course Code	Course Title	Credit
Institute of Biological Sciences	SIX1006	Malaysian Flora	3
	SIX1007	Malaysian Fauna	3
	SIX1008	Biocomputing	2
Dept. of Geology	SIX1010	Earth's Ecosystem	2
Dept. of Physics	SIX1011	Contemporary Physics	2
Dept. of Science and Technology Studies	SIX1012	Logical Thinking in Science	3
Institute of Mathematical Sciences	SIX1013	Fundamentals of Advanced Mathematics	4
PROGRAMME COURSES (103 Credits)			
(I) MAJOR PROGRAMME CORE COURSES (66 Credits) [TP]			
Course Code	Course Name	Pre-Requisite(s)	Credit
LEVEL 1 (17 Credits)			
SIC1001	Principles of Chemistry		2
SIC1002	Inorganic Chemistry I		4*
SIC1003	Organic Chemistry I		4*
SIC1004	Physical Chemistry I		4*

SIC1005	Basic Mathematics for Chemistry		3
LEVEL 2 (33 Credits)			
SIC2001	Inorganic Chemistry II	SIC1001 and SIC1002	4*
SIC2002	Organic Chemistry II	SIC1001 and SIC1003 This course is to be taken together with SIC2007 and SIC2008	4*
SIC2003	Physical Chemistry II	SIC1001, SIC1004 and SIC1005	4*
SIC2004	Analytical Chemistry I	SIC1001 and SIC1002	3*
SIC2005	Polymer Chemistry I	SIC1003 and SIC1004	3*
SIC2006	Molecular Spectroscopy	SIC1001, SIC1004 and SIC1005	3
SIC2007	Spectroscopic Methods in Organic Chemistry	SIC1003 This course is taken together with SIC2002	2
SIC2008	Biomolecules	SIC1003 This course is to be taken together with SIC2002	2
SIC2009	Introduction to Environmental Chemistry	SIC1002 and SIC1003	2
SIC2011	General Industrial Chemistry	SIC1001	2
SIC2012	Nuclear Chemistry	SIC1001 and SIC1002	2
SIC2013	Solid State Chemistry	SIC1002 and SIC1004	2
LEVEL 3 (12 Credits)			
SIC3001	Inorganic Chemistry III	SIC2001	4*
SIC3002	Organic Chemistry III	SIC2002	4*
SIC3003	Physical Chemistry III	SIC2003	4*
LEVEL 4 (4 Credits)			
SIP4007	Scientific Project	Completed minimum 42 credit major program courses	4
(I) MINOR PROGRAMME COURSES (37 CREDITS)			
Course Code	Course Name	Pre-Requisite(s)	Credit
COMPULSORY COURSES (19 CREDITS)			
PIX1002	Basic of Physical Education, Health and Co-curriculum		3
SIP1001	Integrating STEM in Science and Mathematics Education		3
PIX2001	Educational Psychology		3
SIP2001	School Experience		2
SIP3001	Teaching Practice I	SIP2001	4
SIP4001	Teaching Practice II	SIP3001	4

CHEMISTRY TEACHING METHOD (12 Credits)			
SIP1004	Trends and Issues in Chemistry Education		2
SIP1005	Practical Work in Chemistry		2
SIP2005	Teaching in Physical Chemistry	SIP1004	2
SIP2010	Teaching in Inorganic Chemistry	SIP1004	2
SIP2011	Teaching in Organic Chemistry	SIP1004	2
SIP3004	Assessment in Chemistry Education		2
SCIENCE TEACHING METHOD (6 Credits)			
SIP4005	Teaching and Assessment of Biology Components in Science		3
SIP4006	Teaching and Assessment of Physics Component in Science		3
Note: * With practical component.			

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE WITH EDUCATION
(CHEMISTRY)**

COMPONENT	SEMESTER 1		SEMESTER 2		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GLT ^{xxxx}	3	GLT ^{xxxx}	3	14
	GIG1012	2	GIG1013	2	
	-	-	GIG1004	2	
	-	-	GIG1005	2	
Faculty Core Courses	SIX1001	3	-	-	5
	SIX1002	2	-	-	
Programme Courses	SIC1005	3	SIC1001	2	17
	PIX1002	3	SIC1002	4*	
	SIP1001	3	SIP1004	2	
TOTAL CREDITS		19		17	36

COMPONENT	SEMESTER 3		SEMESTER 4		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GIG1003	2	GKA/GKI/ GKK/GKP/ GKS/GKU	2	8
	GIA-GIX ^{xxxx}	4	-	-	
Faculty Core Courses	SIX1004	3	-	-	3
Faculty Elective Courses	-	-	Faculty Elective Courses	5	5
Programme Courses	SIC1004	4*	SIC1003	4*	19
	SIC2011	2	PIX2001	3	
	SIP1005	2	SIP2010	2	
	SIP2005	2	-	-	
TOTAL CREDITS		19		16	35

COMPONENT	SPECIAL SEMESTER (YEAR 2)		TOTAL CREDITS
	COURSE	CREDIT	
Programme Core Courses	SIP2001 School Experience	2	2
TOTAL CREDIT		2	2

COMPONENT	SEMESTER 5		SEMESTER 6		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
Faculty Elective Courses	Faculty Elective Courses	3	-	-	3
Programme Courses	SIC2002	4*	SIC2001	4*	32
	SIC2004	3*	SIC2003	4*	
	SIC2007	2	SIC2005	3*	
	SIC2008	2	SIC2012	2	
	SIC2009	2	SIC2013	2	
	SIP2011	2	SIP3004	2	
TOTAL CREDIT		18		17	35

COMPONENT	SPECIAL SEMESTER (YEAR 3)				TOTAL CREDIT
	COURSE			CREDIT	
Programme Courses	SIP3001 Teaching Practice I			4	4
COMPONENT	SEMESTER 7		SEMESTER 8		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	-	-	-	-	0
Faculty Core Courses	-	-	-	-	0
Faculty Elective Courses	-	-	-	-	0
Programme Courses	SIC2006	3	SIC3002	4*	25
	SIC3001	4*	SIP4007	4	
	SIC3003	4*	SIP4006	3	
	SIP4005	3			
TOTAL CREDIT		14		11	25

COMPONENT	SPECIAL SEMESTER (YEAR 4)			TOTAL CREDIT
	COURSE		CREDIT	
Programme Core Courses	SIP4001 Teaching Practice II		4	4
TOTAL CREDIT			4	4

BACHELOR OF SCIENCE WITH EDUCATION (PHYSICS) ACADEMIC SESSION 2022/2023 (141 CREDITS)			
UNIVERSITY COURSES (22 Credits)			
Course Code	Course Name		Credit
GLT ^{xxxx}	English Course		6
GIG1012	Philosophy and Current Issues		2
GIG1013	Appreciation of Ethics and Civilisations		2
GIG1003	Basic Entrepreneurship Culture		2
GIG1004	Information Literacy		2
GIG1005	Social Engagement		2
GKA/GKI/GKK/GKP/ GKS/GKU	Co-Curriculum		2
GIA-GIX ^{xxxx}	External Faculty Elective courses (KELF)		4
FACULTY CORE COURSES (8 Credits) [TF]			
Course Code	Course Name		Credit
SIX1001	Introduction to Science and Technology Studies		3
SIX1002	Ethics and Safety		2
SIX1004	Statistics		3
FACULTY ELECTIVE COURSES (8 Credits) [TF]			
* Courses offered by other Institute/Department in Faculty of Science. (Refer to the List of Courses offered by various Institute/Department in Faculty of Science other than Department of Physics)			
Institute/ Department	Course Code	Course Title	Credit
Institute of Biological Sciences	SIX1006	Malaysian Flora	3
	SIX1007	Malaysian Fauna	3
	SIX1008	Biocomputing	2
Dept. of Chemistry	SIX1009	Basic Chemistry	2
Dept. of Geology	SIX1010	Earth's Ecosystem	2
Dept. of Science and Technology Studies	SIX1012	Logical Thinking in Science	3
Institute of Mathematical Sciences	SIX1013	Fundamentals of Advanced Mathematics	4
PROGRAMME COURSES (103 Credits)			
(I) MAJOR PROGRAMME CORE COURSES (66 Credits) [TP]			
Course Code	Course Name	Pre-Requisite	Credit
LEVEL 1 (13 Credits)			
SIF1001	Mathematical Methods I		3
SIF1002	Vibrations and Waves I		2

SIF1003	Thermal Physics		2
SIF1004	Modern Physics		2
SIF1005	Electronics I		2
SIF1006	Practical Physics I		2
LEVEL 2 (40 Credits)			
SIF2001	Quantum Mechanics I	SIF1001 and SIF1004	3
SIF2002	Electromagnetism I	SIF1001 and SIF1002	3
SIF2003	Electromagnetism II	SIF2002	3
SIF2004	Mechanics	SIF1001	3
SIF2005	Statistical Physics	SIF1001 and SIF1003	3
SIF2006	Optics	SIF1001 and SIF1002	2
SIF2007	Numerical and Computational Methods	SIF1001	3
SIF2009	Electronics Practical	SIF1005	2
SIF2010	Practical Physics II	SIF1006	2
SIF2011	Practical Applied Physics	SIF1006	4
SIF2012	Modern Optics and Laser Physics	SIF1002	3
SIF2014	Cosmology and General Relativity	SIF1004	3
SIF2015	Astrophysics	SIF2014	3
SIF2016	Materials Science	SIF1003 and SIF1004	3
LEVEL 3 (9 Credits)			
SIF3001	Nuclear Physics	SIF2001	3
SIF3002	Atomic and Molecular Physics	SIF2001	3
SIF3003	Solid State Physics	SIF2001 and SIF2005	3
LEVEL 4 (4 Credits)			
SIP4007	Scientific Project	Completed minimum 42 credit major program courses	4

(II) MINOR PROGRAMME COURSES (37 CREDITS)			
Course Code	Course Name	Pre-Requisite	Credit
COMPULSORY COURSES (19 CREDITS)			
PIX1002	Basic of Physical Education, Health and Co-curriculum		3
PIX2001	Educational Psychology		3
SIP1001	Integrating STEM in Science and Mathematics Education		3
SIP2001	School Experience		2
SIP3001	Teaching Practice I	SIP2001	4
SIP4001	Teaching Practice II	SIP3001	4
PHYSICS TEACHING METHOD (12 Credits)			
SIP1008	Teaching of Matter, Force and Energy		2
SIP1009	Teaching of Optics and Sound		2
SIP2008	Teaching of Electricity		2
SIP2009	Curriculum In Physics Education		2
SIP3007	Technology in Physics Education		2
SIP3008	Assessment Challenges in Physics Education		2
SCIENCE TEACHING METHOD (6 Credits)			
SIP4005	Teaching and Assessment of Biology Components in Science		3
SIP4004	Teaching and Assessment of Chemistry Components in Science		3
Note: * With practical component.			

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE WITH EDUCATION
(PHYSICS)**

COMPONENT	SEMESTER 1		SEMESTER 2		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GLT ^{xxxx}	3	GLT ^{xxxx}	3	14
	GIG1012	2	GIG1013	2	
	-	-	GIG1004	2	
	-	-	GIG1005	2	
Faculty Core Courses	SIX1001	3	SIX1004	3	8
	SIX1002	2	-	-	
Programme Courses	SIF1002	2	SIF1001	3	15
	SIP1001	3	SIF1003	2	
	PIX1002	3	SIP2009	2	
TOTAL CREDITS		18		19	37

COMPONENT	SEMESTER 3		SEMESTER 4		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GIG1003	2	GKA/GKI/GKK/ GKP/GKS/GKU	2	8
	GIA-GIX ^{xxxx}	4	-	-	
Programme Courses	SIF1004	2	SIF2001	3	26
	SIF1005	2	SIF2002	3	
	SIF1006	2	SIF2004	3	
	SIF2006	2	SIF2005	3	
	SIP1008	2	SIP2008	2	
	SIP1009	2	-	-	
TOTAL CREDITS		18		16	34

COMPONENT	SPECIAL SEMESTER (YEAR 2)		TOTAL CREDITS
	COURSE	CREDIT	
Programme Courses	SIP2001 School Experience	2	2
TOTAL CREDIT		2	2



COMPONENT	SEMESTER 5		SEMESTER 6		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
Faculty Elective Courses	Faculty Elective Courses	5	Faculty Elective Courses	3	8
Programme Courses	SIF2003	3	SIF2011	4	33
	SIF2007	3	SIF2012	3	
	SIF2009	2	SIF2015	3	
	SIF2010	2	SIF2016	3	
	SIF2014	3	SIP3008	2	
	SIP3007	2	PIX2001	3	
TOTAL CREDITS		20		21	41

COMPONENT	SPECIAL SEMESTER (YEAR 3)		TOTAL CREDITS
	COURSE	CREDIT	
Programme Courses	SIP3001 Teaching Practice I	4	4
TOTAL CREDIT		4	4

COMPONENT	SEMESTER 7		SEMESTER 8		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
Programme Courses	SIF3001	3	SIP4004	3	19
	SIF3002	3	SIP4007	4	
	SIF3003	3	-	-	
	SIP4005	3	-	-	
TOTAL CREDITS		12		7	19

COMPONENT	SPECIAL SEMESTER (YEAR 4)		TOTAL CREDITS
	COURSE	CREDIT	
Programme Core Courses	SIP4001 Teaching Practice II	4	4
TOTAL CREDIT		4	4

PROGRAMME COORDINATORS

	Name	Email	Contact
FACULTY OF EDUCATION			
	Associate Professor Dr Leong Kwan Eu	rkleong@um.edu.my	03-79675196
	Dr Mohd Nor Syahrir Abdullah	mnsyahrir@um.edu.my	03-79675087
	Dr Edy Hafizan Mohd Shahali	edyhafizan@um.edu.my	-
INSTITUTE OF BIOLOGICAL SCIENCES			
	Associate Professor Dr Sim Kae Shin	simkaeshin@um.edu.my	03-79676752
INSTITUTE OF MATHEMATICAL SCIENCES			
	Dr. Shahizat Amir	shahizat@um.edu.my	03-79675971

DEPARTMENT OF CHEMISTRY



Dr Arniza Khairani Binti
Mohd Jamil

arnizakhairani@um.edu.my 03-79674122

DEPARTMENT OF PHYSICS



Associate Professor Dr
Zul Hazrin Bin Zainal
Abidin

zul_hazrin@um.edu.my 03-79674095

PANEL OF ACADEMIC ADVISORS

FACULTY OF EDUCATION



Associate Professor Dr
Leong Kwan Eu

rkleong@um.edu.my

03-79675196



Dr Mohd Nor Syahrir
Abdullah

mnsyahrir@um.edu.my

03-79675087

INSTITUTE OF BIOLOGICAL SCIENCES



Professor Dr Siti
Nursheena Binti Mohd
Zain

nsheena@um.edu.my

03-79674361



Associate Professor Dr
Noor Hashida Binti
Hashim

nhhpasum@um.edu.my

03-79675936



Associate Professor
Dr Sim Kae Shin

simkaeshin@um.edu.my

03-79676752



Dr Tiong Yin Xin Sheena

stiong@um.edu.my

03-79677022
(2540)

INSTITUTE OF MATHEMATICAL SCIENCES



Dr Ong Siew Hui siewhui@um.edu.my -



Dr Dharini Pathmanathan dharini@um.edu.my 03-79674334



Dr Elayaraja Aruchunan elayarajah@um.edu.my -

DEPARTMENT OF CHEMISTRY



Associate Professor
Dr Azizah Mainal azizah_mainal@um.edu.my 03-79674399



Dr Nor Asrina Sairi azizah_mainal@um.edu.my 03-79677022
(2147)



Dr Nor Mas Mira Abd
Rahman nmmira@um.edu.my 03-79677022
(2527)



Dr Nor Saadah Binti Mohd Yusof

adah@um.edu.my

03-79674052



Dr Rozie Binti Sarip

rozie@um.edu.my

03-79677022
(2534)

DEPARTMENT OF PHYSICS



Associate Professor Dr
Zul Hazrin Bin Zainal
Abidin

zul_hazrin@um.edu.my

03-79674095



Associate Professor Dr
Azzuliani Binti Supangat

azzuliani@um.edu.my

03-79672737

INSTITUTE OF BIOLOGICAL SCIENCES



INSTITUTE OF BIOLOGICAL SCIENCES (ISB)

Biological science teaching and research in Malaysia can be traced back to the early days of 1959, when Universiti Malaya was instituted with two Divisions; the Kuala Lumpur and the Singapore Divisions. The Kuala Lumpur Division at Universiti Malaya was officially opened on January 15, 1959. Lessons began in the Department of Zoology and Botany on the 25th of May 1959 in borrowed premises until the Faculty of Science building was officially opened in 1961.

On the 1st of April 1967, the two Departments of Zoology and Botany became one as the School of Biological Sciences with five divisions: zoology, botany, ecology, genetics and physiology. Eight years later in April 1975, the School of Biological Sciences was separated into the Departments of Botany, Zoology, and Genetics and Cellular Biology. The other two divisions of Ecology and Physiology were managed by the Department of Zoology. Physiology was discontinued in 1978 while Ecology continued to flourish under the management of the Department of Zoology. In 1980, the Division of Microbiology was formed under the management of the Department of Genetics and Cellular Biology. On June 1st 1997, the amalgamation of these three departments led to the formation of the Institute of Biological Sciences (*Institut Sains Biologi, ISB*).

ISB aims to advance scientific and technological knowledge in the field of biology, through the establishment of research and scientific links with institutions in and outside the country. In the process of doing so, we hope that high quality graduates will be produced. These young men and women will play important roles in the development of our nation and the world in the future.

BACHELOR OF SCIENCE IN BIOTECHNOLOGY ACADEMIC SESSION 2022/2023 (133 CREDITS)			
UNIVERSITY COURSES (14 CREDITS)			
Course Code	Course Name		Credits
GIG1012 / GIG1017*	Philosophy and Current Issues (local students) / Basic Malay Language (*only for international students)		2
GIG1013	Appreciation of Ethics and Civilisations		2
GIG1003	Basic Entrepreneurship Enculturation		2
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum		4
GLTxxxx	English Course		4
CORE COURSES (87 CREDITS)			
Course Code	Course Name	Pre-Requisites	Credits
LEVEL 1 (22 Credits)			
SIX1015	Science, Technology and Society		2
SIX1016	Statistics		3
SIE1003	Cell Biology		2
SIJ1002	Fundamentals of Chemistry		3
SIJ1003	Biochemistry of Cells		3
SIO1001	Basic Physics		2
SIO1002	Fundamental Techniques in Biological Sciences		3
SIO1003	Bioinformatics Concepts		2
SIO1004	Introduction to Computer Programming in Bioinformatics		2
LEVEL 2 (35 Credits)			
SIJ2002	Structure and Function of Biomolecules	SIJ1002	3
SIJ2007	Enzymes: Mechanism and Control	SIJ1002, SIJ1003	2
SIJ2012	Nutritional Biochemistry		3
SIO2001	Applied Microbiology	SIJ1003, SIO1002	3
SIO2002	Animal Biotechnology	SIE1003, SIJ1003	3
SIO2003	Higher Plant Physiology	SIJ1002, SIJ1003	3
SIO2012	Bioinformatics Data Management	SIO1003	2
SIO2013	Bioprocess Design Principles	SIO1001, SIJ1002	3
SIO2014	Public Speaking and Oral Communication	SIO1002	3
SIO2015	Plant Biotechnology	SIE1003, SIJ1003	3
SIO2016	Plant Cell and Tissue Culture	SIJ1003	3
SIO2017	Scientific Writing	SIO1002	2

SIR1004	Concepts of Genetic Engineering		2
LEVEL 3 (13 Credits)			
SIO3016	Biological Data Analytics	SIO1004	2
SIO3017	Food Biotechnology	SIO2001, SIJ2012	3
SIO3018	Research Project in Biotechnology	SIO2001, SIO2002, SIO2015, SIO2017	8
LEVEL 4 (17 Credits)			
SIJ3009	Design Thinking and Knowledge Transfer	SIJ1003	3
SIO4001	Bioproduct Business and Supply Chain	SIO3017	2
SIO4003	Industrial Training in Biotechnology	SIO3018	12
ELECTIVE COURSES (32 CREDITS)			
(I) PROGRAMME ELECTIVE COURSES (24 CREDITS)			
Choose from all elective courses that are offered			
Course Code	Course Name	Pre-Requisites	Credits
Innovative Bioprocessing Module			
Take minimum 8 credits			
SIO3021	Fermentation and Product Recovery	SIO2001, SIO2013	3
SIO3022	Marine Biotechnology	SIO1002	2
SIO3024	Postharvest Process Engineering and Technology	SIO2003	3
SIO4002	Environmental Biotechnology	SIO2001, SIO2003	2
SIO4004	Enzyme Technology	SIO2013, SIJ2007	3
Biotechnology for Agriculture and Future Crop Module			
Take minimum 8 credits			
SIE2017	Animal Physiology	SIE1003	3
SIJ3005	Cellular and Molecular Immunology	SIJ1003	3
SIO3019	Animal Nutrition and Feed Technology	SIJ2012	3
SIO3020	Aquaculture Biotechnology		2
SIO3023	Plant Genetics and Breeding		2
SIO3025	Secondary Metabolites and Metabolomics	SIJ2002	2
SIO3026	Sustainable Food Systems		2
SIO3027	Animal Cell and Tissue Culture	SIO2002	2
SIO4005	Microbial Technologies for Soil and Plant Health		2
SIR3034	Applied Genomics in Animal Breeding	SIE1003	3

(II) ELECTIVE UNIVERSITY COURSES (8 CREDITS)		
Student Holistic Empowerment [SHE]		
Choose one course from each cluster		
Cluster	Cluster Title	Credits
Cluster 1	Thinking Matters: Mind and Intellect	2
Cluster 2	Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul	2
Cluster 3	Technology/Artificial Intelligence and Data Analytics: I-Techie	2
Cluster 4	Global Issues and Community Sustainability: Making the World a Better Place	2

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE IN BIOTECHNOLOGY**

COMPONENT	YEAR 1				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GIG1003	2	GIG1013	2	14
	GLTxxxx	2	GLTxxxx	2	
	GIG1012 / GLT1017*	2	GKA1001/ GK11001/ GKK1001/ GKP1001/ GKS1001/ GKU1001	2	
			GKA1001/ GK11001/ GKK1001/ GKP1001/ GKS1001/ GKU1001	2	
Core Courses	SIX1015	2	SIX1016	3	22
	SIE1003	2	SIJ1002	3	
	SIJ1003	3	SIO1001	2	
	SIO1002	3	SIO1004	2	
	SIO1003	2			
TOTAL CREDITS		18		18	36

*only for international students

COMPONENT		YEAR 2				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIJ2002	3	SIJ2007	2	25
		SIJ2012	3	SIO2013	3	
		SIO2001	3	SIO2015	3	
		SIO2002	3	SIO2016	3	
		SIO2003	3	SIO2017	2	
		SIO2012	2	SIR1004	2	
		SIO2014	3			
Elective Courses	Student Holistic Empowerment (SHE)			SHE Cluster 1	2	2
TOTAL CREDITS			20		17	37

COMPONENT		YEAR 3				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIO3016	2	SIO 3017	3	13
		SIO3018	4	SIO 3018	4	
Elective Courses	Program (EP)	<i>Choose from:</i> SIJ3005 (3) SIO3019 (3) SIO3021 (3) SIO3022 (2) SIO3023 (2) SIO3025 (2)	8/9	<i>Choose from:</i> SIO3020 (2) SIO3024 (3) SIO3026 (2) SIO3027 (2) SIO4004 (3)	8/9	16-18
	Student Holistic Empowerment (SHE)	SHE Cluster 2	2	SHE Cluster 3	2	4
TOTAL CREDITS			16-17		17-18	33-35

COMPONENT	YEAR 4						TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		SPECIAL SEMESTER		
	COURSE	CREDIT	COURSE	CREDIT	COURSE	CREDIT	
Core Courses	SIJ3009	3	SIO4003	8	SIO4003	4	17
	SIO4001	2					
Elective Courses – Program (EP)	<i>Choose from:</i> SIE2017 (3) SIR3034 (3) SIO4002 (2) SIO4005 (2)	8					8
Elective Courses – Student Holistic Empowerment (SHE)	SHE Cluster 4	2					2
TOTAL CREDITS		15		8		4	27

MINIMUM CREDITS FOR GRADUATION: 133

BACHELOR OF SCIENCE IN BIOCHEMISTRY ACADEMIC SESSION 2022/2023 (134 CREDITS)			
UNIVERSITY COURSES (14 CREDITS)			
Course Code	Course Code		Credits
GIG1012 / GIG1017*	Philosophy and Current Issues (local students) / Basic Malay Language (*only for international students)		2
GIG1013	Appreciation of Ethics and Civilisations		2
GIG1003	Basic Entrepreneurship Enculturation		2
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum		4
GLTxxxx	English Course		4
CORE COURSES (80 CREDITS)			
Course Code	Course Name	Pre-Requisites	Credits
LEVEL 1 (21 Credits)			
SIX1015	Science, Technology and Society		2
SIX1016	Statistics		3
SIE1002	Bioethics and Safety		2
SIJ1002	Fundamentals of Chemistry		3
SIJ1003	Biochemistry of Cells		3
SIJ1004	Introduction to Computational Biology		3
SIJ1005	Principles of Biochemical Techniques		3
SIO1001	Basic Physics		2
LEVEL 2 (27 Credits)			
SIJ2002	Structure and Function of Biomolecules	SIJ1002	3
SIJ2004	Metabolism and Regulation of Amino Acids and Nucleotides	SIJ1003	2
SIJ2005	Molecular Biology	SIJ1003	3
SIJ2006	Protein Biochemistry	SIJ1002	3
SIJ2007	Enzymes: Mechanism and Control	SIJ1002, SIJ2002	2
SIJ2008	Biochemistry Practical I		4
SIJ2009	Biochemistry Practical II	SIJ2008	4
SIJ2021	Metabolism and Regulation of Carbohydrate and Lipids	SIJ1003	3
SIJ2022	Scientific and Research Communication	SIJ1003	3
LEVEL 3 (32 Credits)			
SIJ3001	Research Project In Biochemistry	SIJ2008, SIJ2009	10
SIJ3004	Clinical Biochemistry and	SIJ1003	3

	Physiology		
SIJ3005	Cellular and Molecular Immunology	SIJ1003	3
SIJ3006	Membrane Biochemistry and Cell Signalling	SIJ2002	2
SIJ3008	Advanced Molecular Biology	SIJ2005	3
SIJ3009	Design Thinking and Knowledge Transfer	SIJ1003	3
SIJ3019	Industrial Attachment and Training	SIJ3001	8
ELECTIVE COURSES (40 CREDITS)			
(I) PROGRAMME ELECTIVE COURSES or/and MINOR PACKAGE** (32 CREDITS)			
Choose from all elective courses or/and Minor Packages that are offered			
Course Code	Course Name	Pre-Requisites	Credits
SIJ2012	Nutritional Biochemistry		3
SIJ2014	Toxicology		3
SIJ2015	Toxinology		2
SIJ2016	Food Process Biochemistry		2
SIJ2017	Microbial Biochemistry		2
SIJ2018	Functional Anatomy and Physiology		3
SIJ2019	Biochemistry of Hormones		2
SIJ2020	Neurochemistry	SIJ1003	2
SIJ3003	Plant Molecular Biology	SIJ2005	3
SIJ3011	Post-Genomic Technologies and Bioinformatics	SIJ2005, SIJ3008	3
SIJ3013	Natural Product Biochemistry and Drug Discovery		3
SIJ3016	Biochemistry of Cancer	SIJ2005	3
SIJ3017	Glycobiology		3
SIJ3018	Computational Biochemistry		3
SIJ3020	Fundamentals of Biochemical Pharmacology		2
SIJ3021	Structural Biology Techniques	SIJ2006	2
SIJ3022	Epigenetics and RNA Biology	SIJ2005	3
(II) ELECTIVE UNIVERSITY COURSES (8 CREDITS)			
Student Holistic Empowerment [SHE]			
Choose one course from each cluster			
Cluster	Cluster Title		Credits
Cluster 1	Thinking Matters: Mind and Intellect		2
Cluster 2	Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul		2
Cluster 3	Technology/Artificial Intelligence and Data Analytics: I-Techie		2

Cluster 4	Global Issues and Community Sustainability: Making the World a Better Place	2
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****Minor package**

(1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.

(2) For further information, student can refer to UMSItS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE IN BIOCHEMISTRY**

COMPONENT		YEAR 1				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
University Courses		GIG1012 / GLT1017*	2	GIG1013	2	12
		GLTxxxx	2	GLTxxxx	2	
		GKA / GKI / GKK/ GKP/ GKS / GKU	2	GKA / GKI / GKK/ GKP/ GKS / GKU	2	
Core Courses		SIX1015	2	SIX1016	3	21
		SIE1002	2	SIJ1002	3	
		SIJ1003	3	SIJ1004	3	
		SIJ1005	3	SIO1001	2	
Elective Courses	Student Holistic Empowerment (SHE)	SHE Cluster 4	2	SHE Cluster 3	2	4
TOTAL CREDITS			18		19	37

*only for international students

COMPONENT		YEAR 2				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
University Courses		GIG1003	2			2
Core Courses		SIJ2002	3	SIJ2004	2	27
		SIJ2021	3	SIJ2005	3	
		SIJ2006	3	SIJ2007	2	
		SIJ2008	4	SIJ2009	4	
				SIJ2022	3	
Elective Courses	Program (EP) *	SIJ2012/ SIJ2014/ SIJ2018	3	SIJ2015/ SIJ2016/ SIJ2017/ SIJ2019	4	7
TOTAL CREDITS			18		18	36

COMPONENT		YEAR 3				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIJ3001	5	SIJ3001	5	21
		SIJ3006	2	SIJ3004	3	
		SIJ3008	3	SIJ3005	3	
Elective Courses	Student Holistic Empowerment (SHE)	SHE Cluster 2	2	SHE Cluster 1	2	4
	Program (EP) *	SIJ3003/ SIJ3013/ SIJ3020/ SIJ3021/ SIJ3022	Min. 5	SIJ3011/ SIJ3016/ SIJ2020	Min. 5	10
TOTAL CREDITS			17		18	35

COMPONENT		YEAR 4				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIJ3009	3	SIJ3019	8	11
Elective Courses	Program (EP) *	SIJ3003/ SIJ3013/ SIJ3017/ SIJ3018/ SIJ3020/ SIJ3021/ SIJ3022/	Min. 15			15
TOTAL CREDITS			18		8	26

MINIMUM CREDITS FOR GRADUATION: 134

* For Minor Package courses offered please refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

BACHELOR OF SCIENCE IN ECOLOGY AND BIODIVERSITY ACADEMIC SESSION 2022/2023 (134 CREDITS)			
UNIVERSITY COURSES (14 CREDITS)			
Course Code	Course Name	Credits	
GIG1012 / GIG1017*	Philosophy and Current Issues (local students) / Basic Malay Language (*only for international students)	2	
GIG1013	Appreciation of Ethics and Civilisations	2	
GIG1003	Basic Entrepreneurship Enculturation	2	
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum	4	
GLTxxxx	English Course	4	
CORE COURSES (80 CREDITS)			
Course Code	Course Name	Pre-Requisites	Credits
LEVEL 1 (15 Credits)			
SIX1015	Science, Technology and Society		2
SIX1016	Statistics		3
SIE1002	Bioethics and Safety		2
SIE1003	Cell Biology		2
SIH1004	Environmental Sustainability		2
SIO1003	Bioinformatics Concepts		2
SIO1004	Introduction to Computer Programming in Bioinformatics		2
LEVEL 2 (30 Credits)			
SIE2001	Principles of Systematics		4
SIE2002	Plant Diversity		4
SIE2004	Mycology		3
SIE2005	Vertebrate Biology		4
SIE2006	Phycology		3
SIE2007	Population and Community Ecology		4
SIE2014	Protozoa and Invertebrate I		3
SIE2015	Invertebrate II		3
SIO2012	Bioinformatics Data Management	SIO1003	2
LEVEL 3 (35 Credits)			
SIE3004	Quantitative Ecology	SIX1016	3
SIE3005	Behavioural Ecology and Ethology	SIE2005 and SIE2015	3
SIE3017	Scientific Communication		2
SIE3018	Molecular Ecology and Applications	SIE1003 and SIE2001	4
SIE3019	Nature and Society		2

SIE3023	Research Project for Ecology and Biodiversity	SIX1016 and SIE2001	8
SIE3024	Industrial Training for Ecology and Biodiversity	SIE3025 and SIE3004	8
SIE3025	Biodiversity Governance and Conservation		3
SIO3016	Biological Data Analytics	SIO1004	2
ELECTIVE COURSES (40 CREDITS)			
(I) PROGRAMME ELECTIVE COURSES or/and MINOR PACKAGE ** (32 CREDITS)			
Choose from all elective courses or/and Minor Packages that are offered			
Course Code	Course Name	Pre-Requisites	Credits
SIE1004	Introductory Microbiology		2
SIE2010	Urban Zoology		3
SIE2011	Terrestrial Ecology		3
SIE2012	Aquatic Ecology		3
SIE2016	Plant Physiology		3
SIE2017	Animal Physiology		3
SIE3006	Economic Botany		3
SIE3007	Ecology and Management of Weeds		3
SIE3009	Plant Pathology	SIE2002	3
SIE3010	Horticulture and Landscaping	SIE2002	3
SIE3012	Parasitology		3
SIE3013	Economic Entomology	SIE2015	3
SIE3014	Integrated Pest Management		3
SIE3015	Ecotoxicology		3
SIE3016	Soil Ecology and Management		3
SIE3020	Fisheries Ecology and Management	SIX1016	3
SIE3021	Ecotourism		2
SIE3022	Bioimage Processing and Analysis	SIX1016	3
SIH2021	Key Issues in Climate Change		2
SIH2022	Ecosystem-based Management		2
SIH2025	Renewable Energy Transition and Society		2
SIH3009	Slope Eco-engineering Techniques		3
SIH3027	Green Agriculture		3
SIO3020	Aquaculture Biotechnology		2
SIO3026	Sustainable Food Systems		2
SIR2041	Population Genetics		3

(II) ELECTIVE UNIVERSITY COURSES (8 CREDITS)		
Student Holistic Empowerment [SHE]		
Choose one course from each cluster		
Cluster	Cluster Title	Credits
Cluster 1	Thinking Matters: Mind and Intellect	2
Cluster 2	Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul	2
Cluster 3	Technology/Artificial Intelligence and Data Analytics: I-Techie	2
Cluster 4	Global Issues and Community Sustainability: Making the World a Better Place	2

** Minor package

(1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.

(2) For further information, student can refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE IN ECOLOGY AND BIODIVERSITY**

COMPONENT		YEAR 1				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
University Courses		GLTxxx	2	GLTxxx	2	14
		GIG1013	2	GIG1012 / GLT1017*	2	
		GIG1003	2	GKA1001/ GK1001/ GKK1001/ GKP1001/ GKS1001/ GKU1001	2	
		GKA1001/ GK1001/ GKK1001/ GKP1001/ GKS1001/ GKU1001	2			
Core Courses		SIX1015	2	SIX1016	3	15
		SIE1003	2	SIE1002	2	
		SIO1004	2	SIH1004	2	
				SIO1003	2	
Elective Courses	Student Holistic Empowerment (SHE)	SHE Cluster 1	2	SHE Cluster 3	2	8
		SHE Cluster 2	2	SHE Cluster 4	2	
TOTAL CREDITS			18		19	37

*only for international students

COMPONENT		YEAR 2				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIE2002	4	SIE2001	4	26
		SIE2005	4	SIE2004	3	
		SIE2006	3	SIE2015	3	
		SIE2014	3	SIO2012	2	
Elective Courses	Program (EP) *	SIE2010/ SIE2011/ SIE2016/ SIH2021/ SIH2022	6	SIE1004/ SIE2012/ SIE2017/ SIH2025/ SIH3027/ SIO3026	6	12
TOTAL CREDITS			20		18	38

COMPONENT		YEAR 3				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIE3005	3	SIE2007	4	26
		SIE3017	2	SIE3004	3	
		SIE3023	4	SIE3018	4	
		SIO3016	2	SIE3023	4	
Elective Courses	Program (EP) *	SIE3006/ SIE3007/ SIE3012/ SIE3014/ SIO3020	6	SIE3009/ SIE3010/ SIE3013/ SIE3015/ SIE3016/ SIH3009	6	12
TOTAL CREDITS			17		21	38

COMPONENT		YEAR 4				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIE3025	3	SIE3024	8	13
		SIE3019	2			
Elective Courses	Program (EP) *	SIE3020/ SIE3021/ SIE3022/ SIR2041	8			8
TOTAL CREDITS			13		8	21

MINIMUM CREDITS FOR GRADUATION: 134

* For Minor Package courses offered please refer to UMSItS Guide via this link : <https://umsitsguide.um.edu.my/>

BACHELOR OF SCIENCE IN ENVIRONMENTAL MANAGEMENT ACADEMIC SESSION 2022/2023 (132 CREDITS)			
UNIVERSITY COURSES (14 CREDITS)			
Course Code	Course Name	Credits	
GIG1012 / GIG1017*	Philosophy and Current Issues (local students) / Basic Malay Language (*only for international students)	2	
GIG1013	Appreciation of Ethics and Civilisations	2	
GIG1003	Basic Entrepreneurship Enculturation	2	
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum	4	
GLTxxxx	English Course	4	
CORE COURSES (80 CREDITS)			
Course Code	Course Name	Pre-Requisites	Credits
LEVEL 1 (15 Credits)			
SIX1015	Science, Technology and Society		2
SIX1016	Statistics		3
SIE1002	Bioethics and Safety		2
SIH1004	Environmental Sustainability		2
SIH1005	Analytical Environmental Chemistry		2
SIO1003	Bioinformatics Concepts		2
SIO1004	Introduction to Computer Programming in Bioinformatics		2
LEVEL 2 (16 Credits)			
SIH2007	Principles of Waste Management		3
SIH2015	Soil Science and Community	SIH1005	5
SIH2016	Environmental Monitoring	SIH1004	3
SIH2017	Applied Ecology		3
SIH2018	Research Methods and Scientific Writing		2
LEVEL 3 (19 Credits)			
SIH3005	Environmental Impact Assessment	SIH2016	3
SIH3006	Environmental Management System	SIH1004	3
SIH3007	Integrated Waste Management	SIH2007	3
SIH3022	Environmental Management Research Project	SIH2018	8
SIH3023	Introduction to Administrative Management		2

LEVEL 4 (30 Credits)			
SIH4001	Industrial Training	SIH3022 & SIH3023	30
ELECTIVE COURSES (38 CREDITS)			
(I) PROGRAMME ELECTIVE COURSES or/and MINOR PACKAGE ** (30 CREDITS)			
Choose from all elective courses or/and Minor Packages that are offered			
Course Code	Course Name	Pre-Requisites	Credits
SIH2008	Environmental Health and Safety		2
SIH2014	Environmental Forensics		2
SIH2019	Environmental Risk Assessment and Management		2
SIH2020	Environmental Governance	SIH1004	3
SIH2021	Key Issues in Climate Change		2
SIH2022	Ecosystem-Based Management		2
SIH2023	Energy Saving Culture		2
SIH2024	Environmental Informatics	SIO1004	2
SIH2025	Renewable Energy Transition and Society		2
SIH2026	Water Management		2
SIH2028	Air Pollution Control		2
SIH2029	Disaster Management		2
SIH2030	Organisms and Environment		2
SIH3009	Slope Eco-engineering Techniques		3
SIH3017	Technology and Management of Hazardous Waste	SIH3007	3
SIH3018	Environmental Microbiology	SIH1004	3
SIH3019	Tourism and Environment		3
SIH3025	Introduction to Bioremediation	SIH3018	3
SIH3026	Environmental Well-Being		2
SIH3027	Green Agriculture		3
SIE2012	Aquatic Ecology		3
SIE3025	Biodiversity Governance and Conservation		3
SIO2012	Bioinformatics Data Management	SIO1003	2
SIO3016	Biological Data Analytics	SIO1004	2
SIO3026	Sustainable Food Systems		2

(II) ELECTIVE UNIVERSITY COURSES (8 CREDITS)		
Student Holistic Empowerment [SHE]		
Choose one course from each cluster		
Cluster	Cluster Title	Credits
Cluster 1	Thinking Matters: Mind and Intellect	2
Cluster 2	Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul	2

Cluster 3	Technology/Artificial Intelligence and Data Analytics: I-Techie	2
Cluster 4	Global Issues and Community Sustainability: Making the World a Better Place	2

** Minor package

- (1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.
- (2) For further information, student can refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE IN ENVIRONMENTAL MANAGEMENT**

COMPONENT		YEAR 1				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
University Courses		GLTxxx	2	GLTxxx	2	14
		GIG1013	2	GIG1012 / GLT1017*	2	
		GIG1003	2	GKA1001/ GKI1001/ GKK1001/ GKP1001/ GKS1001/ GKU1001	2	
		GKA1001/ GKI1001/ GKK1001/ GKP1001/ GKS1001/ GKU1001	2			
Core Courses		SIX1015	2	SIX1016	3	15
		SIH1004	2	SIE1002	2	
		SIO1003	2	SIH1005	2	
				SIO1004	2	
Elective Courses	Student Holistic Empowerment (SHE)	SHE Cluster 1	2	SHE Cluster 3	2	8
		SHE Cluster 2	2	SHE Cluster 4	2	
TOTAL CREDITS			18		19	37

*only for international students

Faculty of Science Booklet, Academic Session 2022/2023

COMPONENT		YEAR 2				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIH2007	3	SIH2016	3	16
		SIH2015	5	SIH2017	3	
				SIH2018	2	
Elective Courses	Program (EP) *	<i>Choose from the following courses to fulfill 9 credits:</i> SIH2008/ SIH2014/ SIH2019/ SIH2020/ SIH2021/ SIH2022/ SIH2023/ SIH2024/ SIH2025/ SIH2026/ SIH2028/ SIH2029/ SIH2030/ SIE2012/ SIO2012	9	<i>Choose from the following courses to fulfill 9 credits:</i> SIH2008/ SIH2014/ SIH2019/ SIH2020/ SIH2021/ SIH2022/ SIH2023/ SIH2024/ SIH2025/ SIH2026/ SIH2028/ SIH2029/ SIH2030/ SIE2012/ SIO2012	9	18
TOTAL CREDITS			17		17	34

COMPONENT		YEAR 3				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIH3006	3	SIH3005	3	19
		SIH3007	3	SIH3022	4 (P)	
		SIH3022	4 (P)	SIH3023	2	
Elective Courses	Program (EP) *	<i>Choose from the following courses to fulfill 6 credits:</i> SIH3009/ SIH3017/ SIH3018/ SIH3019/ SIH3025/ SIH3026/ SIH3027/ SIE2012/ SIE3025/ SIO3016	6	<i>Choose from the following courses to fulfill 6 credits:</i> SIH3009/ SIH3017/ SIH3018/ SIH3019/ SIH3025/ SIH3026/ SIH3027/ SIE2012/ SIE3025/ SIO3016	6	12
TOTAL CREDITS			16		15	31

(P) Progressive

COMPONENT	YEAR 4				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
Core Courses	SIH4001	15 (P)	SIH4001	15 (P)	30
TOTAL CREDITS		15		15	30

(P) Progressive

MINIMUM CREDITS FOR GRADUATION: 132

* For Minor Package courses offered please refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

BACHELOR OF SCIENCE IN MICROBIOLOGY AND MOLECULAR GENETICS ACADEMIC SESSION 2022/2023 (133 CREDITS)			
UNIVERSITY COURSES (14 CREDITS)			
Course Code	Course Name	Credits	
GIG1012 / GIG1017*	Philosophy and Current Issues (local students) / Basic Malay Language (*only for international students)	2	
GIG1013	Appreciation of Ethics and Civilisations	2	
GIG1003	Basic Entrepreneurship Enculturation	2	
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum	4	
GLTxxxx	English Course	4	
CORE COURSES (73 CREDITS)			
Course Code	Course Name	Pre-Requisites	Credits
LEVEL 1 (24 Credits)			
SIX1015	Science, Technology and Society		2
SIX1016	Statistics		3
SIC1001	Principles of Chemistry		2
SIE1002	Bioethics and Safety		2
SIJ1004	Introduction to Computational Biology		3
SIR1001	Fundamental Microbiology		3
SIR1002	Fundamental Genetics		2
SIR1003	Biochemistry		2
SIR1004	Concepts of Genetic Engineering		2
SIR1005	Genetics and Molecular Biology Practical I		3
LEVEL 2 (23 Credits)			
SIR2011	Bacteriology		2
SIR2012	Immunology	SIR1001	2
SIR2013	Virology	SIR1001	2
SIR2014	Microbiology Practical	SIR1001	3
SIR2015	Microbial Physiology	SIR1001	2
SIR2016	Eukaryotic Microorganisms	SIR1001	3
SIR2017	Microbial Ecology	SIR1001	2
SIR2018	Molecular Genetics	SIR1002	2
SIR2019	Genomes	SIR1002	2
SIR2020	Genetics and Molecular Biology Practical II	SIR1002	3

LEVEL 3 and 4 (26 Credits)			
SIR3018	Biosafety and Biosecurity		2
SIR3019	Human Molecular Genetics	SIR2018	3
SIR4001	Research Project	SIR3018	10
SIR4002	Industrial Training	SIR2014 & SIR2020	8
SIR4003	Science Communication		3
ELECTIVE COURSES (46 CREDITS)			
(I) PROGRAMME ELECTIVE COURSES or/and MINOR PACKAGE ** (38 CREDITS)			
Choose from all elective courses or/and Minor Packages that are offered			
Course Code	Course Name	Pre-Requisites	Credits
SIE2004	Mycology		3
SIE2006	Phycology		3
SIE3012	Parasitology		3
SIH3027	Green Agriculture		3
SIM1001	Basic Mathematics		4
SIM1002	Calculus I		4
SIO1003	Bioinformatics Concepts		2
SIO1004	Introduction to Computer Programming in Bioinformatics		2
SIO2012	Bioinformatics Data Management	SIO1003	2
SIO3016	Biological Data Analytics	SIO1004	2
SIO3023	Plant Genetics and Breeding		2
SIO4005	Microbial Technologies for Soil and Plant Health		2
SIR2031	Food Microbiology	SIR1001	2
SIR2041	Population Genetics		3
SIR3020	Public Health Microbiology	SIR1001	3
SIR3021	Diagnostic Microbiology	SIR2014	2
SIR3022	Advanced Immunology	SIR2012	3
SIR3023	Advanced Virology	SIR2013	3
SIR3024	Microbial Pathogenesis	SIR1001	2
SIR3025	Cytogenetics		3
SIR3026	Developmental Genetics	SIR2018	2
SIR3027	Epigenetics and Gene Regulation	SIR2018	3
SIR3028	Eukaryotic Cell Signalling	SIR2018	3
SIR3029	Genetic Basis of Cancer	SIR2018	3
SIR3031	Advanced Food Microbiology	SIR2031 & SIX1016	3
SIR3032	Agricultural Microbiology	SIR1001	3
SIR3033	Applied and Environmental Microbiology	SIR1001	3
SIR3034	Applied Genomics in Animal Breeding		3
SIR3035	Animal Genetics and Gene Manipulation	SIR1004	3

SIR3036	Fermentation Technology	SIR1001	3
SIR3037	Pharmaceutical Microbiology	SIR2011 & SIR2012	3
SIR3041	Marine and Estuarine Microbiology	SIR2017	3
SIR3042	Plant Molecular and Cellular Biology	SIR1002	2
SIR3043	Conservation Genetics	SIR2019	3
SIR3044	Molecular Evolution and Phylogenetics	SIR1002	3
SIR3045	Advanced Mycology	SIR2016	2
(II) ELECTIVE UNIVERSITY COURSES (8 CREDITS)			
Student Holistic Empowerment [SHE]			
Choose one course from each cluster			
Cluster	Cluster Title	Credits	
Cluster 1	Thinking Matters: Mind and Intellect	2	
Cluster 2	Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul	2	
Cluster 3	Technology/Artificial Intelligence and Data Analytics: I-Techie	2	
Cluster 4	Global Issues and Community Sustainability: Making the World a Better Place	2	

** Minor package

- (1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.
- (2) For further information, student can refer to UMSiTS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER,
(PLANNING OF COURSES)
BACHELOR OF SCIENCE IN MICROBIOLOGY AND MOLECULAR GENETICS**

COMPONENT	YEAR 1				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GIG1012 / GLT1017*	2	GIG1013	2	14
	GLTxxxx	2	GLTxxxx	2	
			GKA/GKI/ GKK/GKP/ GKS/GKU 1001	4	
			GIG1003	2	
Core Courses	SIX1016	3	SIC1001	2	24
	SIE1002	2	SIR1003	2	
	SIJ1004	3	SIR1005	3	
	SIR1001	3	SIX1015	2	
	SIR1002	2			
	SIR1004	2			
TOTAL CREDITS		20		18	38

*only for international students

COMPONENT	YEAR 2				TOTAL CREDITS	
	SEMESTER 1		SEMESTER 2			
	COURSE	CREDIT	COURSE	CREDIT		
Core Courses	SIR2011	2	SIR2012	2	25	
	SIR2013	2	SIR2014	3		
	SIR2015	2	SIR2017	2		
	SIR2016	3	SIR2019	2		
	SIR2018	2	SIR2020	3		
			SIR3018	2		
Elective Courses	Program (EP) *	SIE2006/ SIM1001/ SIO1003/ SIR2031/ SIR2041/ SIR3025	6	SIE2004/ SIE3012/ SIM1002/ SIO1004/ SIR3031/ SIR3044	3	9
		Student Holistic Empowerment (SHE)	SHE Cluster 3	2	SHE Cluster 2	2
TOTAL CREDITS		19		19	38	

COMPONENT		YEAR 3				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIR4001	5	SIR4001	5	10
Elective Courses	Program (EP) *	SIO2012/ SIR3020/ SIR3021/ SIR3022/ SIR3028/ SIR3033/ SIR3034/ SIR3042/ SIR3043	11	SIO3023/ SIR3023/ SIR3024/ SIR3026/ SIR3027/ SIR3032/ SIR3035/ SIR3041/ SIR3045	11	22
TOTAL CREDITS			16		16	32

COMPONENT		YEAR 4				TOTAL CREDITS
		SEMESTER 1		SEMESTER 2		
		COURSE	CREDIT	COURSE	CREDIT	
Core Courses		SIR4003	3	SIR4002	8	14
		SIR3019	3			
Elective Courses	Program (EP) *	SIH3027/ SIO3016/ SIO4005/ SIR3029/ SIR3036/ SIR3037	7			11
	Student Holistic Empowerment (SHE)	SHE Clusters 1, 4	4			
TOTAL CREDITS			17		8	25


MINIMUM CREDITS FOR GRADUATION: 133

* For Minor Package courses offered please refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>






HEAD OF INSTITUTE

	Name	Email	Phone	Room No.
	Prof. Dr. Mohamad Suffian Mohamad Annuar	suffian_annuar @um.edu.my	7967 4118	Pejabat Ketua








DEPUTY HEADS OF INSTITUTE





	Name	Email	Phone	Room No.
	Assoc. Prof. Dr. Norhaniza Aminudin	hanizaaminudin@um .edu.my	7967 4217	Pejabat Timbalan Ketua (Akademik dan HEP)

PROGRAMME COORDINATORS





BACHELOR OF SCIENCE IN BIOTECHNOLOGY			
	Associate Prof. Dr. Tan Yee Shin	tanyeeshin@um.edu.my	7967 6753
BACHELOR OF SCIENCE IN BIOCHEMISTRY			
	Associate Prof. Dr. Adawiyah Suriza Shuib	adawiyah@um.edu.my	7967 4219
BACHELOR OF SCIENCE IN ECOLOGY A BIODIVERSITY			
	Dr. Noorhidayah Mamat	nhidayahm@um.edu.my	7967 6739
BACHELOR OF SCIENCE IN ENVIRONMENTAL MANAGEMENT			
	Dr. Rosazlin Abdullah	rosazlin@um.edu.my	7967 4360
BACHELOR OF SCIENCE IN MICROBIOLOGY AND MOLECULAR GENETICS			
	Associate Prof. Dr. Geok Yuan Annie Tan	gyatan@um.edu.my	7967 5898





PANEL OF ACADEMIC ADVISORS

BACHELOR OF SCIENCE IN BIOTECHNOLOGY				
		Associate Prof. Dr. Tan Yee Shin	tanyeeshin@um.edu.my	7967 6753
		Associate Prof. Dr. Chandran Somasundram	chandran@um.edu.my	7967 4382
		Dr. Acga Cheng	acgacheng@um.edu.my	7967 4351
		Dr. Ahmad Faris Mohd Adnan	ahmad_farisz@um.edu.my	7967 4356
		Dr. Chang Siow Wee	siowwee@um.edu.my	7967 7296
		Dr. Vijayan Manickam Achari	vijay.ramana@um.edu.my	7967 6738
		Dr. Jamilah Syafawati Yaacob	jamilahsyafawati@um.edu.my	7967 4090





	Dr. Norhidayah Mohd Taufek	hidayah.taufek@um.edu.my	7967 6737
	Dr. Nuradilla Mohamad Fauzi	dilfauzi@um.edu.my	7967 7119
	Dr. Nur Kusaira Khairul Ikram	nkusaira@um.edu.my	7967 4366
	Dr. Wan Abd Al- Qadr Imad Wan Mohtar	qadyr@um.edu.my	7967 4128









BACHELOR OF SCIENCE IN BIOCHEMISTRY









	Associate Prof. Dr. Zazali Alias	alias@um.edu.my	7967 7117
	Associate Prof. Dr. Adawiyah Suriza Shuib	adawiyah@um.edu.my	7967 4219
	Associate Prof. Dr. Norhaniza Aminudin	hanizaaminudin@um.edu.my	7967 6793
	Associate Prof. Dr. Saharuddin Mohamad	saharuddin@um.edu.my	7967 6732

	Dr. Gokula Mohan	g.mohan@um.edu.my	N/A
	Dr. Nikman Adli Nor Hashim	nikmanadli@um.edu.my	7967 6734
	Dr. Nur Airina Muhamad	nurairina@um.edu.my	7967 4355
	Dr. Zuliana Razali	zuliana@um.edu.my	7967 4423



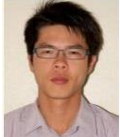





BACHELOR OF SCIENCE IN ECOLOGY AND BIODIVERSITY


	Dr. Noorhidayah Mamat	nhidayahm@um.edu.my	7967 6739
	Professor Dr. Rosli Ramli	rosliiramli@um.edu.my	7967 6762
	Associate Prof. Dr. Hasmahzaiti Omar	zaiti_1978@um.edu.my	7967 6764
	Dr. Arpah Abu	arpah@um.edu.my	7967 6742

	Dr. Azidah Abdul Aziz	azie@um.edu.my	7967 4369
	Dr. Amy Then Yee Hui	amy_then@um.edu.my	7967 4368
	Dr. Muhamad Shakirin Mispan	shakirin@um.edu.my	7967 6757
	Dr. Nurul Amalina Mohd Zain	amalina86@um.edu.my	7967 4355
	Dr. Nurul Ashikin Abdullah	shikin84@um.edu.my	7967 6768
	Dr. Sarah Abdul Razak	sarahrazak@um.edu.my	7967 4354
	Dr. Sugumaran A/L Manickam	maran@um.edu.my	7967 4665 / 4688
	Dr. Yong Kien Thai	yongkt@um.edu.my	7967 4687




BACHELOR OF SCIENCE IN ENVIRONMENTAL MANAGEMENT			
	Dr. Rosazlin Abdullah	rosazlin@um.edu.my	7967 4360
	Professor Dr. Salmah Ismail	salmah_r@um.edu.my	7967 7150
	Associate Prof. Dr. Noor Zalina Mahmood	alin@um.edu.my	7967 4359
	Associate Prof. Dr. Zul Ilham Zulkiflee Lubes	ilham@um.edu.my	7967 7022
	Dr. Adi Ainurzaman Jamaludin	adiainurzaman@um.edu.my	7967 6705
	Dr. Pozi Milow	pozimilow@um.edu.my	7967 6777
	Dr. Shamsul Azlin Ahmad Shamsudin	shamsulshamsuddin@um.edu.my	7967 2536
	Dr. Sujatha Ramasamy	sujatha@um.edu.my	7967 4182

BACHELOR OF SCIENCE IN MICROBIOLOGY AND MOLECULAR GENETICS			
	Associate Prof. Dr. Geok Yuan Annie Tan	gyatan@um.edu.my	7967 5898
	Professor Dr. Chan Kok Gan	kokgan@um.edu.my	7967 7748
	Professor Dr. Nazia Abdul Majid	nazia@um.edu.my	7967 5833
	Professor Dr. Subha A/P Bhassu	subhabhassu@um.edu.my	7967 5829
	Associate Prof. Dr. Bong Chui Wei	cwbong@um.edu.my	7967 5899
	Associate Prof. Dr. Chai Lay Ching	lcchai@um.edu.my	7967 5832
	Associate Prof. Dr. Lee Choon Weng	lee@um.edu.my	7967 5841
	Associate Prof. Dr. Ng Ching Ching	ccng@um.edu.my	7967 5872

	Dr. Jasmine Elanie Khairat	jasmine@um.edu.my	7967 5836
	Dr. Khanom Simarani	hanom_ss@um.edu.my	7967 5843
	Dr. Lim Yat Yuen	yatyuen.lim@um.edu.my	7967 7022 ext. 2587
	Dr. Muhamad Afiq Aziz	afiqaziz@um.edu.my	7967 2131
	Dr. Nur Ardiyana Rejab	ardiyana@um.edu.my	7967 5851
	Dr. Nurul Shamsiah Mohd Suhaimi	nurull@um.edu.my	7967 5857
	Dr. Syarifah Aisyafaznim Sayed Abdul Rahman	aisyafaznim@um.edu.my	7967 5830
	Dr. Tang Swee Seong	sstang@um.edu.my	7967 7022 ext. 2350

	Dr. Taznim Begam Mohd Mohidin	taznim@um.edu.my	7967 2587
---	----------------------------------	------------------	-----------

BACHELOR OF SCIENCE WITH EDUCATION (BIOLOGY)

	Associate Prof. Dr. Sim Kae Shin	simkaeshin@um.edu.my	7967 6752
	Professor Dr. Siti Nursheena Mohd Zain	nsheena@um.edu.my	7967 4361
	Associate Prof. Dr. Noor Hashida Hashim	nhhpasum@um.edu.my	7967 4213
	Dr. Tiong Yin Xin Sheena	stiong@um.edu.my	7967 7022 (ext. 2540)

References:

Official Handbook for 2022/2023:
Accessible via the official website for Faculty of Science:
fs.um.edu.my

Official website for Institute of Biological Sciences (ISB):
biology.um.edu.my

University of Malaya (Bachelor's Degree) Rules 2019
University of Malaya (Bachelor's Degree) Regulations 2019
University of Malaya Student Portal
myum.um.edu.my

Academic staff profiles at UMExpert website:
umexpert.um.edu.my

INSTITUTE OF MATHEMATICAL SCIENCES



INSTITUTE OF MATHEMATICAL SCIENCES

The Institute of Mathematical Sciences (ISM) was established as a department in the Faculty of Science when the University of Malaya was founded in Kuala Lumpur in 1959. It has grown into three branches, i.e., pure mathematics, applied mathematics, and statistics.

For the 2022/2023 session, ISM offers the following three first degree programs:

- Bachelor of Science in Mathematics
- Bachelor of Science in Statistics
- Bachelor of Actuarial Science

The three Bachelor of Science programs are set up to provide more opportunities for an undergraduate to major in the field of mathematics according to his or her interests. All these programs will assist to fulfill the vacancies of skilled workforce in science and technology in the public and private sectors in line with Malaysia's aspiration to become a developed nation.

BACHELOR OF SCIENCE IN MATHEMATICS ACADEMIC SESSION 2022/2023 (134 CREDITS)			
1. UNIVERSITY COURSES (12 CREDITS)			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
GLT ^{xxxx}	English Courses	-	4
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum	-	2
GIG1012 / GLT1017	Philosophy and Current Issues / Basic Malay Language (only for international students)	-	2
GIG1013	Appreciation of Ethics and Civilisations	-	2
GIG1003	Basic Entrepreneurship Culture	-	2
2. CORE COURSES (79 CREDITS)			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
LEVEL 1 (30 Credits)			
SIX1015	Science, Technology and Society	-	2
SIX1016	Statistics	-	3
SIM1001	Basic Mathematics	-	4
SIM1002	Calculus I	-	4
SIM1003	Calculus II	SIM1002	4
SIM1004	Fundamentals of Computing	-	3
SIM1005	Fundamentals of Spreadsheets	-	2
SIM1006	Ordinary Differential Equations	SIM1002	4
SIT1001	Probability and Statistics I	SIM1002	4
LEVEL 2 (41 Credits)			
SIM2001	Advanced Calculus	SIM1003	4
SIM2002	Linear Algebra	SIM1001	4
SIM2007	Appreciation of Mathematics	SIM1003	2
SIM2010	Numerical Computation	SIM1003	4
SIM2011	Structured Programming	SIM1002	4
SIM2012	Basic Operations Research	SIM1001	4
SIM2013	Introduction to Combinatorics	SIM1001	3
SIM2014	Algebra I	SIM1001	3
SIM2015	Introduction to Analysis	SIM1003	3
SIM2016	Complex Variables	SIM1003	3
SIM2018	Partial Differential Equations	SIM1006	4
SIT2007	Foundations of Data Science	SIT1001	3
LEVEL 3 (8 Credits)			
SIM3020	Industrial Training	SIM2007	8

3. ELECTIVE COURSES (43 CREDITS)			
(I) STUDENT HOLISTIC EMPOWERMENT (8 CREDITS)			
‡ ONE COMPULSORY course is taken from each cluster.			
CLUSTER			CREDITS
CLUSTER 1	Thinking Matters: Mind and Intellect		2
CLUSTER 2	Emotional, Physical and Spiritual Intelligence: Heart, Body and Soul		2
CLUSTER 3	Technology/Artificial Intelligence and Data Analytics: I-techie		2
CLUSTER 4	Global Issues and Community Sustainability: Making the World a Better Place		2
(II) PROGRAM ELECTIVE COURSES or/and MINOR PACKAGE **			
(at least 35 CREDITS)			
Choose from all elective courses or/and Minor Packages that are offered			
MATHEMATICAL SCIENCE			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
SIM2017	Geometry	SIM1001	3
SIM2019	Systems of Ordinary Differential Equations	SIM1006	4
SIM2021	Optimization Techniques	SIM2001	4
SIM3001	Graph Theory	SIM2013	4
SIM3002	Combinatorial Mathematics	SIM2013	4
SIM3003	Number Theory	SIM2002	4
SIM3004	Advanced Linear Algebra	SIM2002	4
SIM3005	Matrix Theory	SIM2002	4
SIM3006	Algebra II	SIM2014	4
SIM3007	Ring Theory	SIM2014	4
SIM3008	Group Theory	SIM2014	4
SIM3009	Differential Geometry	SIM2001	4
SIM3010	Topology	SIM2001	4
SIM3011	Complex Analysis	SIM2016	4
SIM3012	Real Analysis	SIM2015	4
SIM3021	Mathematical Science Project	SIM2011	4
SIM3022	Cryptography	SIT1001 and SIM2011	4
SIQ1001	Introduction to Accounting	-	3
SIQ2001	Microeconomics	-	3
SIQ2002	Macroeconomics	-	3
SIQ2003	Financial Mathematics and Derivatives	SIM1002	4
SIT2001	Probability and Statistics II	SIT1001	4
APPLIED MATHEMATICS			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
SIM2019	Systems of Ordinary Differential Equations	SIM1006	4
SIM2020	Management Mathematics	SIM1002	4

SIM2021	Optimization Techniques	SIM2001	4
SIM3021	Mathematical Science Project	SIM2011	4
SIM3022	Cryptography	SIT1001 and SIM2011	4
SIM3023	Numerical Methods and Analysis	SIM2010	4

SIM3024	Computational Geometry	SIM2011	4
SIM3025	Scientific Computing	SIM2011	4
SIM3026	Production and Inventory Control	SIM2012 and SIM2020	4
SIM3027	Mathematical Programming	SIM2012	4
SIM3028	Industrial Operations Research	SIM2012	4
SIM3029	Computational Fluid Dynamics	SIM2018	4
SIM3030	Dynamical Systems Theory	SIM2019	3
SIQ2001	Microeconomics	-	3
SIQ2002	Macroeconomics	-	3
SIT2001	Probability and Statistics II	SIT1001	4
SIT2010	Stochastic Processes	SIT2001	3
SIT3005	Times Series and Forecasting Methods	SIT2001	4

Students who wish to take SIM3020 are advised to have passed at least 90 credits of the listed courses in the program.

**** Minor package**

- (1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.
- (2) For further information, student can refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE IN MATHEMATICS**

COMPONENT	YEAR 1				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GLT ^{xxxx}	2	GLT ^{xxxx}	2	8
	GIG1012 / GLT1017*	2	GIG1013	2	
Core Courses	SIX1016	3	SIX1015	2	26
	SIM1001	4	SIM1006	4	
	SIM1002	4	SIM1003	4	
	SIM1004	3	SIM1005	2	
Elective Courses	Student Holistic Empowerment (SHE) Cluster 1	2	Student Holistic Empowerment (SHE) Cluster 2	2	4
TOTAL CREDITS		20		18	38

*only for international students

COMPONENT	YEAR 2				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GIG1003	2			4
	GKA/GKI/GKK/ GKP/GKS/GKU	2			
Core Courses	SIT1001	4	SIT2007	3	31
	SIM2001	4	SIM2015	3	
	SIM2002	4	SIM2016	3	
	SIM2007	2	SIM2010	4	
			SIM2011	4	
Elective Courses	Student Holistic Empowerment (SHE) Cluster 3	2	Student Holistic Empowerment (SHE) Cluster 4	2	4
TOTAL CREDITS		20		19	39

COMPONENT	YEAR 3				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
Core Courses	SIM2013	3			14
	SIM2014	3			
	SIM2012	4			
	SIM2018	4			
Elective Courses *	Elective Course 1	4	Elective Course 2	4	20
			Elective Course 3	4	
			Elective Course 4	4	
			Elective Course 5	4	
TOTAL CREDITS		18		16	34

COMPONENT	YEAR 4				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
Core Courses	SIM3020	8			8
Elective Courses *			Elective Course 6	4	15
			Elective Course 7	4	
			Elective Course 8	4	
			Elective Course 9	3	
TOTAL CREDITS		8		15	23

* For Minor Package courses offered please refer to UMSiTS Guide via this link : <https://umsitsguide.um.edu.my>

BACHELOR OF SCIENCE IN STATISTICS			
ACADEMIC SESSION 2022/2023			
(134 CREDITS)			
1. UNIVERSITY COURSES (12 CREDITS)			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
GLT ^{xxxx}	English Courses	-	4
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum	-	2
GIG1012 / GLT1017	Philosophy and Current Issues / Basic Malay Language (only for international students)	-	2
GIG1013	Appreciation of Ethics and Civilisations	-	2
GIG1003	Basic Entrepreneurship Culture	-	2
2. CORE COURSES (76 CREDITS)			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
LEVEL 1 (26 Credits)			
SIX1015	Science, Technology and Society	-	2
SIM1001	Basic Mathematics	-	4
SIM1002	Calculus I	-	4
SIM1003	Calculus II	SIM1002	4
SIT1001	Probability and Statistics I	SIM1002	4
SIT1002	Statistical Programming	-	4
SIT1003	Analysis of Data and Statistical Report Writing	-	4
LEVEL 2 (28 Credits)			
SIM2001	Advanced Calculus	SIM1003	4
SIM2002	Linear Algebra	SIM1001	4
SIT2001	Probability and Statistics II	SIT1001	4
SIT2007	Foundations of Data Science	SIT1001	3
SIT2008	Further Mathematical Statistics	SIT2001	4
SIT2009	Regression Analysis	SIT1001	4
SIT2010	Stochastic Processes	SIT2001	3
SIT2011	Statistics and Community	SIT1003	2
LEVEL 3 (22 Credits)			
SIT3005	Time Series and Forecasting Methods	SIT2001	4
SIT3015	Introduction to Multivariate Analysis	SIT2001	3
SIT3016	Generalized Linear Models	SIT2001 and SIT2009	4
SIT3017	Statistical Learning and Data Mining	SIT2007	3
SIT3021	Industrial Training	SIT3017	8

3. ELECTIVE COURSES (46 CREDITS)			
(I) STUDENT HOLISTIC EMPOWERMENT (8 CREDITS)			
‡ ONE COMPULSORY course is taken from each cluster.			
CLUSTER			CREDITS
CLUSTER 1	Thinking Matters: Mind and Intellect		2
CLUSTER 2	Emotional, Physical and Spiritual Intelligence: Heart, Body and Soul		2
CLUSTER 3	Technology/Artificial Intelligence and Data Analytics: I-techie		2
CLUSTER 4	Global Issues and Community Sustainability: Making the World a Better Place		2
(II) PROGRAM ELECTIVE COURSES or/and MINOR PACKAGE **			
(at least 38 CREDITS)			
Choose from all elective courses or/and Minor Packages that are offered			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
SIM2010	Numerical Computation	SIM1003	4
SIM2012	Basic Operations Research	SIM1001	4
SIQ1001	Introduction to Accounting	-	3
SIQ2001	Microeconomics	-	3
SIQ2002	Macroeconomics	-	3
SIQ2003	Financial Mathematics and Derivatives	SIM1002	4
SIT3003	Computer Intensive Methods in Statistics	SIT2001	4
SIT3004	Applied Stochastic Processes	SIT2010	4
SIT3008	Introduction to Survey Sampling	SIT2001	4
SIT3009	Statistical Process Control	SIT2001	4
SIT3012	Design and Analysis of Experiments	SIT1001 and SIT2009	4
SIT3013	Analysis of Failure and Survival Data	SIT2001	4
SIT3018	Non-Parametric Statistics	SIT1001	4
SIT3019	Introduction to Bayesian Statistics	SIT2001	4
SIT3020	Python for Data Science	SIT3017	4
SIT3022	Probability Theory	SIM2001 and SIT2008	4
SIT3023	Statistical Laboratory	SIT1002 and SIT2007	3
SIT3024	Statistical Consultancy and Data Analysis	SIT3021	3
SIT3025	Statistical Science Project	SIT1002 and SIT2007	4
The exact number of program elective courses offered in each year may differ.			

** Minor package

- (1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.
- (2) For further information, student can refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF SCIENCE IN STATISTICS**

COMPONENT	YEAR 1				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GLT ^{xxxx}	2	GLT ^{xxxx}	2	8
	GIG1012 / GLT1017*	2	GIG1013	2	
Core Courses	SIT1002	4	SIM1003	4	26
	SIM1001	4	SIT1001	4	
	SIM1002	4	SIT1003	4	
			SIX1015	2	
Elective Courses	Student Holistic Empowerment (SHE) Cluster 1	2			2
TOTAL CREDITS		18		18	36

*only for international students

COMPONENT	YEAR 2				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GIG1003	2			2
Core Courses	SIM2001	4	SIT2008	4	31
	SIM2002	4	SIT2010	3	
	SIT2001	4	SIT2009	4	
	SIT2007	3	SIT3015	3	
	SIT2011	2			
Elective Courses	Student Holistic Empowerment (SHE) Cluster 2	2	Student Holistic Empowerment (SHE) Cluster 3	2	8
			Elective Course 1	4	
TOTAL CREDITS		21		20	41

COMPONENT	YEAR 3				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GKA/GKI/GKK/ GKP/GKS/GKU	2			2
Core Courses	SIT3005	4	SIT3021	8	19
	SIT3016	4			
	SIT3017	3			
Elective Courses *	Elective Course 2	4			6
	Student Holistic Empowerment (SHE) Cluster 4	2			
TOTAL CREDITS		19		8	27

COMPONENT	YEAR 4				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
Elective Courses *	Elective Course 3	4	Elective Course 7	4	30
	Elective Course 4	4	Elective Course 8	4	
	Elective Course 5	4	Elective Course 9	4	
	Elective Course 6	3	Elective Course 10	3	
TOTAL CREDITS		15		15	30

* For Minor Package courses offered please refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

BACHELOR OF ACTUARIAL SCIENCE			
ACADEMIC SESSION 2022/2023			
(145 CREDITS)			
1. UNIVERSITY COURSES (12 CREDITS)			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
GLT ^{xxxx}	English Courses	-	4
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum	-	2
GIG1012 / GLT1017	Philosophy and Current Issues / Basic Malay Language (only for international students)	-	2
GIG1013	Appreciation of Ethics and Civilisations	-	2
GIG1003	Basic Entrepreneurship Culture	-	2
2. CORE COURSES (87 CREDITS)			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
LEVEL 1 (24 Credits)			
SIX1015	Science, Technology and Society	-	2
SIX1016	Statistics	-	3
SIM1001	Basic Mathematics	-	4
SIM1002	Calculus I	-	4
SIM1003	Calculus II	SIM1002	4
SIQ1001	Introduction to Accounting	-	3
SIT1001	Probability and Statistics I	SIM1002	4
LEVEL 2 (31 Credits)			
SIM2001	Advanced Calculus	SIM1003	4
SIM2002	Linear Algebra	SIM1001	4
SIM2007	Appreciation of Mathematics	SIM1003	2
SIM2011	Structured Programming	SIM1002	4
SIQ2001	Microeconomics	-	3
SIQ2002	Macroeconomics	-	3
SIQ2003	Financial Mathematics and Derivatives	SIM1002	4
SIT2001	Probability and Statistics II	SIT1001	4
SIT2007	Foundations of Data Science	SIT1001	3
LEVEL 3 (32 Credits)			
SIQ3001	Actuarial Mathematics I	SIQ2003	4
SIQ3002	Portfolio Theory and Asset Models	SIQ2003	4
SIQ3003	Actuarial Mathematics II	SIQ3001	4
SIQ3004	Mathematics of Financial Derivatives	SIQ2003	4
SIQ3005	Life Insurance and Takaful		4
SIQ3006	Risk Theory	SIT2001	4
SIQ3007	Industrial Training	SIQ3001	8

3. ELECTIVE COURSES (46 CREDITS)			
(I) STUDENT HOLISTIC EMPOWERMENT (8 CREDITS)			
‡ ONE COMPULSORY course is taken from each cluster			
CLUSTER			CREDITS
CLUSTER 1	Thinking Matters: Mind and Intellect		2
CLUSTER 2	Emotional, Physical and Spiritual Intelligence: Heart, Body and Soul		2
CLUSTER 3	Technology/Artificial Intelligence and Data Analytics: I-techie		2
CLUSTER 4	Global Issues and Community Sustainability: Making the World a Better Place		2
(II) PROGRAM ELECTIVE COURSES or/and MINOR PACKAGE **			
(at least 38 CREDITS)			
Choose from all elective courses or/and Minor Packages that are offered			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDITS
SIM1004	Fundamentals of Computing	-	3
SIM1005	Fundamentals of Spreadsheets	-	2
SIM1006	Ordinary Differential Equations	SIM1002	4
SIM2010	Numerical Computation	SIM1003	4
SIM2012	Basic Operations Research	SIM1001	4
SIM3021	Mathematical Science Project	SIM2011	4
SIQ3008	Foundation of Islamic Finance		4
SIQ3009	Pension Mathematics	SIQ3001	4
SIQ3010	Survival Models	SIT2001	4
SIQ3011	Business Finance		3
SIQ3012	Financial and Business Management		3
SIQ3013	Stochastic Models	SIT2001	4
SIT2008	Further Mathematical Statistics	SIT2001	4
SIT2009	Regression Analysis	SIT1001	4
SIT2010	Stochastic Processes	SIT2001	3
SIT3003	Computer Intensive Methods in Statistics	SIT2001	4
SIT3004	Applied Stochastic Processes	SIT2010	4
SIT3005	Time Series and Forecasting Methods	SIT2001	4
SIT3015	Introduction to Multivariate Analysis	SIT2001	3
SIT3016	Generalized Linear Models	SIT2001 and SIT2009	4
SIT3017	Statistical Learning and Data Mining	SIT2007	3
SIT3018	Non-Parametric Statistics	SIT1001	4
SIT3019	Introduction to Bayesian Statistics	SIT2001	4
SIT3020	Python for Data Science	SIT3017	4
SIT3022	Probability Theory	SIM2001 and SIT2008	4
Students who wish to take SIQ3007 are advised to have passed at least 110 credits of the listed courses in the program.			

** Minor package

- (1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.
 (2) For further information, student can refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)
BACHELOR OF ACTUARIAL SCIENCE**

COMPONENT	YEAR 1				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GLT ^{xxxx}	2	GLT ^{xxxx}	2	12
	GIG1012 / GLT1017**	2	GIG1013	2	
	GIG1003	2	GKA/GKI/GKK/ GKP/GKS/GKU	2	
Core Courses	SIM1001	4	SIQ1001	3	24
	SIM1002	4	SIM1003	4	
	SIX1016	3	SIT1001	4	
			SIX1015	2	
Elective Courses *	Student Holistic Empowerment (SHE) Cluster 1	2			2
TOTAL CREDITS		19		19	38

**only for international students

COMPONENT	YEAR 2				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
Core Courses	SIM2011	4	SIM2001	4	31
	SIQ2001	3	SIM2002	4	
	SIQ2003	4	SIM2007	2	
	SIT2001	4	SIQ2002	3	
	SIT2007	3			
Elective Courses *	Student Holistic Empowerment (SHE) Cluster 2	2	Elective Course 1	4	9
			Elective Course 2	3	
TOTAL CREDITS		20		20	40

COMPONENT	YEAR 3				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
Core Courses	SIQ3001	4	SIQ3003	4	24
	SIQ3002	4	SIQ3004	4	
	SIQ3005	4	SIQ3006	4	
Elective Courses *	Elective Course 3	4	Student Holistic Empowerment (SHE) Cluster 3	2	16
	Elective Course 4	4	Student Holistic Empowerment (SHE) Cluster 4	2	
			Elective Course 5	4	
TOTAL CREDITS		20		20	40

COMPONENT	YEAR 4				TOTAL CREDITS
	SEMESTER 1		SEMESTER 2		
	COURSE	CREDIT	COURSE	CREDIT	
Core Courses	SIQ3007	8			8
Elective Courses*			Elective Course 6	4	19
			Elective Course 7	4	
			Elective Course 8	4	
			Elective Course 9	4	
			Elective Course 10	3	
TOTAL CREDITS		8		19	27

* For Minor Package courses offered please refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

Name	Email	Phone	Room No
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HEAD



Assoc. Prof. Dr. Zailan Siri	zailansiri@um.edu.my	7967 4335	145
------------------------------	----------------------	-----------	-----

DEPUTY HEAD (UNDERGRADUATE)



Prof. Dr. Wong Kok Bin	kbwong@um.edu.my	7967 4317	121
------------------------	------------------	-----------	-----

DEPUTY HEAD (POSTGRADUATE)



Assoc. Prof. Dr. Rossita Mohamad Yunus	rossita@um.edu.my	7967 4342	205
--	-------------------	-----------	-----

DEPUTY HEAD (RESEARCH)



Assoc. Prof. Dr. Noor Fadiya Mohd Noor	drfadiya@um.edu.my	7967 4330	136
--	--------------------	-----------	-----

DEPUTY HEAD (DEVELOPMENT)



Assoc. Prof. Dr. Ng Kok Haur	kokhaur@um.edu.my	7967 4338	146
------------------------------	-------------------	-----------	-----

DEPUTY HEAD (STUDENT AFFAIRS)



Dr. Muhamad Hifzhudin Noor Aziz	hifz_din @um.edu.my	7967 4033	009
------------------------------------	---------------------	--------------	-----

PROGRAM COORDINATORS

Name	Email	Phone	Room No
------	-------	-------	---------

Bachelor of Science in Mathematics



Associate Prof. Dr. Chooi Wai Leong	wlchooi @um.edu.my	7967 4332	105
--	--------------------	--------------	-----

Bachelor of Science in Statistics



Dr. Nur Anisah Mohamed @ A. Rahman	nuranisah_mohamed@ um.edu.my	7967 4126	109
--	---------------------------------	--------------	-----

Bachelor of Actuarial Science



Pn. Nadiah Zabri	nadiah.zabri@um.edu. my	7967 4341	204
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PANEL OF ACADEMIC ADVISORS

Name	Email	Phone	Room No
------	-------	-------	---------

Bachelor of Science in Mathematics



Prof. Dr. Angelina
Chin Yan Mui

acym@um.edu.my

7967
4308

110



Prof. Dr. Wan
Ainun Mior
Othman

wanainun@um.edu.my

7967
4340

127



Prof. Dr. Wong
Kok Bin

kbwong@um.edu.my

7967
4317

121



Associate Prof.
Dr. Chooi Wai
Leong

wlchooi @um.edu.my

7967
4332

105



Dr. Amizah Malip

amizah.malip@um.edu
.my

7967
4303

105







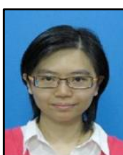

Dr. Siti Suzlin
Supadi

suzlin@um.edu.my





7967
4345

124

Bachelor of Science in Statistics

	Professor Dr. Ibrahim Mohamed	imohamed@um.edu.my	7967 4329	135
	Associate Prof. Dr. Adriana Irawati Nur Ibrahim	adrianaibrahim@um.edu. my	7967 4107	207
	Associate Prof. Dr. Khang Tsung Fei	tfkhang@um.edu.my	7967 4171	208
	Associate Prof. Dr. Ng Kok Haur	kokhaur@um.edu.my	7967 4338	146
	Dr. Ng Choung Min	ngcm@um.edu.my	7967 4331	137
	Dr. Nur Anisah Mohamed	nuranisah_mohamed@um .edu.my	7967 4034	008

Bachelor of Actuarial Science

	Associate Prof. Raveendran VGK Menon	aveemenon@um.edu.my	7967 4309	111
	Dr. Koh You Beng	kohyoubeng@um.edu.my	7967 4315	119
	Dr. Mohd Azmi Haron	azmiharon@um.edu.my	7967 4339	202
	Pn. Nadiyah Zabri	nadiyah.zabri@um.edu.my	7967 4341	204
	Dr. Shaiful Anuar Abu Bakar	saab@um.edu.my	7967 4304	106

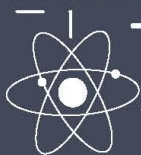
References

Handbook
Faculty of Science
<https://fs.um.edu.my>

University of Malaya (Bachelor's Degree) Rules 2019
University of Malaya (Bachelor's Degree) Regulations 2019
University of Malaya Student Portal
myum.um.edu.my

PHYSICAL

ANALYSIS



ORGANIC



DEPARTMENT OF CHEMISTRY

INORGANIC



POLYMER



DEPARTMENT OF CHEMISTRY

The Department of Chemistry is the largest department in the Faculty of Science. The Department started operation in the academic year 1959/1960 and is one of the oldest departments in the faculty. The Department is the first institution of higher learning in Malaysia to receive the prestigious Royal Society of Chemistry, UK accreditation for its BSc (Chemistry) and BSc (Applied Chemistry) programme since August 2012.

One of the objectives of the Department is to provide a centre of excellence in chemical education and research in Malaysia. Students from the Department are trained to develop their critical, creative, and innovative thinking. The Department is proud to produce graduates who are highly regarded, and much sought after in the workforce market.

Presently, the Department has 56 academic staff, several of whom are from abroad, and 1 Emeritus Professor. Apart from teaching at both undergraduate and postgraduate degree levels, the staff also conduct quality research in fundamental and applied chemistry. Although the academic staff have different research interests, they adhere to the same philosophy in solving chemical-related problems and in the development of expertise in chemistry.

In addition to the undergraduate programme, the department also offers MSc by research and coursework, and PhD programmes. Since the establishment, the Department has produced many MSc and PhD graduates who assume high positions in both government and private organizations locally and internationally.

BACHELOR OF SCIENCE IN CHEMISTRY SESSION 2022/2023 (132 CREDITS)			
UNIVERSITY COURSES (14 CREDITS)			
Course Code	Course Name	Credit	
GIG1012 / GLT1017*	Philosophy and Current Issues (local students) / Basic Malay Language (*only for international students)	2	
GIG1013	Appreciation of Ethics and Civilisations	2	
GIG1003	Basic Entrepreneurship Enculturation	2	
GKA/GKI/GKK/ GKP/GKS/GKU	Co-Curriculum	4	
GLTxxxx	English Course	4	
CORE COURSES (77 CREDITS)			
Course Code	Course Name	Credit	
LEVEL 1 (26 CREDITS)			
SIX1015	Science, Technology and Society	2	
SIX1016	Statistics	3	
SIC1001	Principle Chemistry	2	
SIC1006	Computer Programming for the Sciences	3	
SIC1007	Inorganic Chemistry I	3	
SIC1008	Organic Chemistry I	3	
SIC1009	Physical Chemistry I	3	
SIC1010	Mathematics in Chemistry	2	
SIC1011	Safety and Basic Laboratory Techniques***	3	
Course Code	Course Name	Pre-Requisite(s)	Credit
SIC1012	Laboratory Skills**	<i>SIC1011</i>	2
LEVEL 2 (25 CREDITS)			
SIC2016	Inorganic Chemistry II	<i>SIC1001 and SIC1007 Taken concurrently with SIC2017</i>	3
SIC2017	Practical of Inorganic Chemistry II**	<i>SIC1007 and SIC1012 Taken concurrently with SIC2016</i>	2
SIC2018	Organic Chemistry II	<i>SIC1001 and SIC1008 Taken concurrently with SIC2019</i>	3

SIC2019	Practical of Organic Chemistry II**	<i>SIC1008 and SIC1012 Taken concurrently with SIC2018</i>	2
SIC2020	Physical Chemistry II	<i>SIC1001, SIC1009 and SIC1010 Taken concurrently with SIC2021</i>	3
SIC2021	Practical of Physical Chemistry II**	<i>SIC1009 and SIC1012 Taken concurrently with SIC2020</i>	2
SIC2022	Basic Analytical Chemistry***	<i>SIC1001, SIC1007 and SIC1012</i>	3
SIC2023	Molecular Spectroscopy	<i>SIC1001, SIC1009 and SIC1010</i>	3
SIC2024	Spectroscopic Methods in Organic Chemistry	<i>SIC1008 Taken concurrently with SIC2018</i>	2
SIC2025	Chemistry and Society	<i>SIC1001, SIC1007, SIC1008, SIC1009, and SIC1010</i>	2
LEVEL 3 (26 CREDITS)			
SIC3020	Inorganic Chemistry III	<i>SIC2016 Taken concurrently with SIC3021</i>	2
SIC3021	Practical of Inorganic Chemistry III**	<i>SIC2016 and SIC2017 Taken concurrently with SIC3020</i>	2
SIC3022	Organic Chemistry III	<i>SIC2018 Taken concurrently with SIC3023</i>	2
SIC3023	Practical of Organic Chemistry III**	<i>SIC2018 and SIC2019 Taken concurrently with SIC3022</i>	2
SIC3024	Physical Chemistry III	<i>SIC2020 Taken concurrently with SIC3025</i>	2
SIC3025	Practical of Physical Chemistry III**	<i>SIC2020 and SIC2021 Taken concurrently with SIC3024</i>	2

SIC3026	Industrial Training	SIC2016, SIC2018, SIC2020 and SIC2022	8
SIC3027	Research Project	SIC2016, SIC2018, SIC2020 and SIC2022	6

PURE CHEMISTRY PACKAGE

ELECTIVE COURSES (41 CREDITS)

**(I) PROGRAMME ELECTIVE COURSES or/and MINOR PACKAGE **
(33 Credits)**

Choose from all elective courses or/and Minor Packages that are offered

Course Code	Course Name	Pre-Requisite(s)	Credit
SIC3028	Advanced Analytical Chemistry***	SIC2022	3
SIC3029	Polymer Chemistry***	SIC2020 and SIC2021	3
SIC3030	Heterocyclic and Medicinal Chemistry	SIC2018	3
SIC3031	Electrochemistry	SIC2016	3
SIC3032	Environmental Chemistry***	SIC2022	3
SIC3033	Natural Products and Biosynthesis	SIC2018	3
SIC3034	Organic Synthesis	SIC2018	2
SIC3035	Mechanistic Organic Chemistry	SIC2018	3
SIC3036	Physical Organic Chemistry	SIC2018	3
SIC3037	Bioinorganic Chemistry	SIC2016	2
SIC3038	Nuclear Chemistry	SIC2016	2
SIC3039	Materials Chemistry	SIC2016 and SIC2020	3
SIC3040	Chemometrics***	SIC2020	3
SIC3041	Computational Chemistry***	SIC2020	3
SIC3042	Colloid Chemistry***	SIC2020 and SIC2021	3

(II) ELECTIVE UNIVERSITY COURSES (8 CREDITS)		
Student Holistic Empowerment [SHE]		
Choose one course from each cluster		
Cluster	Cluster Title	Credits
Cluster 1	Thinking Matters: Mind and Intellect	2
Cluster 2	Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul	2
Cluster 3	Technology/Artificial Intelligence and Data Analytics: I-Technie	2
Cluster 4	Global Issues and Community Sustainability: Making the World a Better Place	2

APPLIED CHEMISTRY PACKAGE			
ELECTIVE COURSES (41 CREDITS)			
(I) PROGRAMME ELECTIVE COURSES or/and MINOR PACKAGE ** (33 Credits)			
Choose from all elective courses or/and Minor Packages that are offered			
Course Code	Course Name	Pre-Requisite(s)	Credit
SIC3040	Chemometrics***	SIC2020	3
SIC3041	Computational Chemistry***	SIC2020	3
SIC3042	Colloid Chemistry***	SIC2020 and SIC2021	3
SIC3043	Analytical Chemistry and Instrumentation***	SIC2022	3
SIC3044	Industrial Chemistry	SIC2016	3
SIC3045	Industrial Polymer Chemistry***	SIC2020 and SIC2021	3
SIC3046	Oleochemistry	SIC2018	3
SIC3047	Petrochemistry	SIC2016 and SIC2018	3
SIC3048	Process Chemistry	SIC3044	3
SIC3049	Food Chemistry	SIC2018	2
SIC3050	Natural Products and Biotechnological Processes	SIC2018	2
SIC3051	Applied Electrochemistry	SIC2020	3
SIC3052	Catalysis	SIC2016	2
SIC3053	Quality Assurance in Chemical Laboratory	SIC2022	2
SIC3054	Environmental Pollution and Waste Management***	SIC2022	3
SIC3055	Liquid Crystals	SIC2020	2
(II) ELECTIVE UNIVERSITY COURSES (8 CREDITS)			
Student Holistic Empowerment [SHE]			
Choose one course from each cluster			
Cluster	Cluster Title	Credits	
Cluster 1	Thinking Matters: Mind and Intellect	2	
Cluster 2	Emotional, Physical and Spiritual Intelligence: Heart, Body & Soul	2	
Cluster 3	Technology/Artificial Intelligence and Data Analytics:	2	

	I-Technie	
Cluster 4	Global Issues and Community Sustainability: Making the World a Better Place	2

* For non-Malaysian

** Practical course

*** With practical component

** Minor package.

(1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.

(2) For further information, student can refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER
(Programme Planning)
BACHELOR OF SCIENCE IN CHEMISTRY**

Year	Component	Semester I			Semester II			
		Code	Course	Credit	Code	Course	Credit	
1	University courses	GIG1012/ GLT1017	Philosophy and Current Issues/ Basic Malay Language*	2	GIG1013	Appreciation of Ethics and Civilisations	2	
		GLTXXXX	English	2	GLTXXXX	English	2	
					GIG1003	Basic Entrepreneurship Enculturation	2	
					GKA/GKI/ GKK/ GKP/ GKS/GKU 1001	Co-Curriculum	2	
	Core courses	SIX1015	Science, Technology and Society	2	SIX1016	Statistics	3	
		SIC1010	Mathematics in Chemistry	2	SIC1009	Physical Chemistry I	3	
		SIC1007	Inorganic Chemistry I	3	SIC1001	Principles of Chemistry	2	
		SIC1008	Organic Chemistry I	3	SIC1012	Laboratory Skills	2	
		SIC1011	Safety and Basic Laboratory Techniques	3				
	Elective courses		Student Holistic Empowerment (SHE) Cluster 1: Thinking Matters: Mind & Intellect	2		Student Holistic Empowerment (SHE) Cluster 2: Emotional & Spiritual Intelligence: Heart & Soul	2	
	Total Credit				19			20

Year	Component	Semester I			Semester II		
		Code	Course	Credit	Code	Course	Credit
2	University courses				GKA/GKG KK/GKP/ GKS/GKU 1001	Co-Curriculum	2
	Core courses	SIC2016	Inorganic Chemistry II	3	SIC2022	Basic Analytical Chemistry	3
		SIC2017	Practical of Inorganic Chemistry II	2	SIC2023	Molecular Spectroscopy	3
		SIC2018	Organic Chemistry II	3	SIC2020	Physical Chemistry II	3
		SIC2019	Practical of Organic Chemistry II	2	SIC2021	Practical of Physical Chemistry II	2
		SIC1006	Computer Programming for the Sciences	3	SIC2025	Chemistry and Society	2
		SIC2024	Spectroscopic Methods in Organic Chemistry	2			
	Elective courses		Student Holistic Empowerment (SHE) Cluster 3: Technology/ Artificial Intelligence and Data Analytics: I-Technie	2		Student Holistic Empowerment (SHE) Cluster 4: Global Issue and Community Sustainability: Making the World a Better Place	2
	Total credit				17		

Year	Component	Semester I			Semester II		
		Code	Course	Credit	Code	Course	Credit
3	University courses						
	Core courses	SIC3022	Organic Chemistry III	2	SIC3020	Inorganic Chemistry III	2
		SIC3023	Practical of Organic Chemistry III	2	SIC3021	Practical of Inorganic Chemistry III	2
		SIC3024	Physical Chemistry III	2	SIC3027	Research Project (<i>Progressive</i>)	3
		SIC3025	Practical of Physical Chemistry III	2			
	Elective courses		Programme Elective**	8		Programme Elective**	10
Total Credit	16			17			

Year	Component	Semester I			Semester II		
		Code	Course	Credit	Code	Course	Credit
4	University courses						
	Core courses	SIC3027	Research Project (<i>Progressive</i>)	3	SIC3026	Industrial Training	8
	Elective courses		Programme Elective**	15			
	Total Credit	18			8		
Overall Total Credit	132						

*For non-Malaysian

** Minor package

- (1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.
 (2) For further information, student can refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

Programme Elective Courses follow the packages below.

Pure Chemistry Package		
Course Code	Course Name	Credit
SIC3028	Advanced Analytical Chemistry	3
SIC3029	Polymer Chemistry	3
SIC3030	Heterocyclic and Medicinal Chemistry	3
SIC3031	Electrochemistry	3
SIC3032	Environmental Chemistry	3
SIC3033	Natural Products and Biosynthesis	3
SIC3034	Organic Synthesis	2
SIC3035	Mechanistic Organic Chemistry	3
SIC3036	Physical Organic Chemistry	3
SIC3037	Bioinorganic Chemistry	2
SIC3038	Nuclear Chemistry	2
SIC3039	Materials Chemistry	3
SIC3040	Chemometrics	3
SIC3041	Computational Chemistry	3
SIC3042	Colloid Chemistry	3

OR

Applied Chemistry Package		
Course Code	Course Name	Credit
SIC3040	Chemometrics	3
SIC3041	Computational Chemistry	3
SIC3042	Colloid Chemistry	3
SIC3043	Analytical Chemistry and Instrumentation	3
SIC3044	Industrial Chemistry	3
SIC3045	Industrial Polymer Chemistry	3
SIC3046	Oleochemistry	3
SIC3047	Petrochemistry	3
SIC3048	Process Chemistry	3
SIC3049	Food Chemistry	2
SIC3050	Natural Products and Biotechnological Processes	2
SIC3051	Applied Electrochemistry	3
SIC3052	Catalysis	2
SIC3053	Quality Assurance in Chemical Laboratory	2
SIC3054	Environmental Pollution and Waste Management	3
SIC3055	Liquid Crystals	2

HEAD OF DEPARTMENT CHEMISTRY



Name

Associate Prof. Dr. Nor Kartini Abu Bakar

E-mail: kartini@um.edu.my

Phone No: 03-7967 4204

Room No:

HOD room, General office

PROGRAMME COORDINATOR

BACHELOR OF SCIENCE IN CHEMISTRY



Name

Dr. Lim Siew Huah

E-mail: shlim80@um.edu.my

Phone No: 03-7967 4048

Room No:

Block A
C108

ACADEMIC ADVISORY PANEL

BACHELOR OF SCIENCE IN CHEMISTRY



Name
Professor Dr. Khalijah Awang

E-mail: khalijah@um.edu.my

Phone No: 03-7967 4161

Room No:
Block D
D203



Name
Professor Dr. Sharifuddin Md Zain

E-mail: smzain@um.edu.my

Phone No: 03- 7967 4442

Room No:
BMK
L3-36



Name
Associate Prof. Dr. Azizah Mainal

E-mail: azizah_mainal@um.edu.my

Phone No: 03-7967 4399

Room No:
BMK
L6-22



Name
Associate Prof. Dr. Cheng Sit Foon

E-mail: sfcheng@um.edu.my

Phone No: 03-7967 7172

Room No:
BMK
L2-36



Name
Associate Prof. Dr. Faridah Sonsudin

E-mail: sfaridah@um.edu.my

Phone No: 03- 7967 4204

Room No:
Block B
K022



Name
Associate Prof. Dr. Hairul Anuar Tajuddin

E-mail: hairul@um.edu.my

Phone No: 03-7967 4053

Room No:
Block B
K002



Name
Associate Prof. Dr. Low Kah Hin

E-mail: lowkayin@um.edu.my

Phone No: 03-7967 7022 (Ext 2543)

Room No:
BMK
L5-28



Name
Associate Prof. Dr. Low Yun Yee

E-mail: yylow@um.edu.my

Phone No: 03-7967 5165

Room No:
Block A
C214

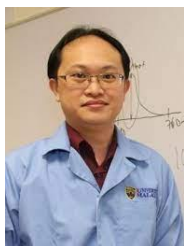


Name:
Associate Prof. Dr. Noor Idayu Mat Zahid

E-mail: nooridayu@um.edu.my

Phone No: 03-7967 7022 (Ext 2545)

Room No:
BMK
L6-23



Name
Associate Prof. Dr. Tay Kheng Soo

E-mail: khengsoo@um.edu.my

Phone No: 03- 7967 7022 (Ext 2145)

Room No:
BMK
L5-27



Name
Associate Prof. Dr. Teo Yin Yin

E-mail: yinyinteo@um.edu.my

Phone No: 03- 7967 7022 (Ext 2546)

Room No:
BMK
L7-25



Name

Dr. Arniza Khairani Mohd Jamil

E-mail: arnizakhairani@um.edu.my

Phone No: 03- 7967 7022 (Ext 4122)

Room No:

BMK
L2-43



Name

Dr. Azeana Zahari

E-mail: azeanazahari@um.edu.my

Phone No: 03- 7967 7022 (Ext 2522)

Room No:

BMK
L2-31



Name

Dr. Azman Ma'amor

E-mail: azman2111@um.edu.my

Phone No: 03- 7967 7022 (Ext 2547)

Room No:

BMK
L7-26



Name

Dr. Desmond Ang Teck Chye

E-mail: desmond860108@um.edu.my

Phone No: 03- 7967 7022 (Ext 2542)

Room No:

BMK
L4-22



Name

Dr. Leong Sze Wei

E-mail: leongszwei@um.edu.my

Phone No: 03- 7967 4262

Room No:

BMK
L3-41



Name

Dr. Mazdida Sulaiman

E-mail: mazdidas@um.edu.my

Phone No: 03- 7967 4204

Room No:

Block B
K024



Name

Dr. Muhammad Ameerullah Sahudin

E-mail: ameerullah@um.edu.my

Phone No: 03- 7967 4204

Room No:

Block B
B024



Name

Dr. Muhammad Nidzhom Zainol Abidin

E-mail: nidzhom@um.edu.my

Phone No: 03- 7967 4204

Room No:

Block B
B004



Name

Dr. Nazzatush Shimar Jamaludin

E-mail: shimar@um.edu.my

Phone No: 03- 7967 7022 (Ext 2141)

Room No:

BMK
L2-33



Name

Dr. Noordini Mohamad Salleh

E-mail: dini@um.edu.my

Phone No: 03- 7967 7022 (Ext 2528)

Room No:

BMK
L2-40



Name

Dr. Nurdianai Nordin

E-mail: ndiana13@um.edu.my

Phone No: 03- 7967 7022 (Ext 2525)

Room No:

BMK
L3-42



Name

Dr. Rozie Sarip

E-mail: rozie@um.edu.my

Phone No: 03- 7967 7022 (Ext 2534)

Room No:

BMK
L3-4



Name

Dr. Shameer Hisham

E-mail: shameerh@um.edu.my

Phone No: 03- 7967 4081

Room No:

Block B
B023



Name

Dr. Siti Munirah Saharin

E-mail: bond@um.edu.my

Phone No: 03- 7967 7022 (Ext 2523)

Room No:

BMK
L2-30

Address:
Department of Chemistry
Faculty of Science
Universiti Malaya
50603 Kuala Lumpur
MALAYSIA

Phone number: +603 7967 4204

Fax number: +603 7967 4193

E-mail: ketua_kimia@um.edu.my

Website: <https://fs.um.edu.my/department-of-chemistry>



**UNIVERSITI
MALAYA**

Department of Geology Universiti Malaya

Bachelor of Science in Applied Geology

Department of Geology,
Faculty of Science,
Universiti Malaya,
50603, Kuala Lumpur,
Malaysia.

Phone Number: +603-7967 4203
Fax Number: +603-7967 5149
Email: ketua_geologi@um.edu.my

DEPARTMENT OF GEOLOGY

The Department of Geology is the oldest geology department in the country. It was founded in Singapore in 1956 and relocated to Kuala Lumpur in 1960. From its modest beginning, the Department has expanded and evolved into a multidisciplinary department, committed to the development of academic excellence in teaching and research with 13 academic staffs, and 20 supporting staffs. From early on in its history, the Department has been actively engaged in postgraduate research. Master and doctorate graduates have gone on to become leaders in industries, government agencies and universities. Currently there are more than 30 local and foreign postgraduate students in the department. The fields of research being pursued range from fundamental geology to more applied fields such as geophysics, geochemistry, hydrogeology and petroleum geology. The department also offers MSc. Petroleum Geoscience by coursework every year.

In line with the Department's pursuit of educational excellence, the facilities are continuously being upgraded. In 1998, a new wing was built to house new laboratories and additional lecturer offices. The Department has a computer laboratory, a map laboratory, a library with a comprehensive collection of geological and geophysical books, and a range of modern and sophisticated equipment to aid in our teaching, research and consultancy work. The Department also houses a Geological Museum showcasing diverse collection of geological items ranging from common rocks and fossils found in Malaysia to tektites and replicas of skulls.

The Department is also the hub for the exchange, discussion and dissemination of geological knowledge in the country and the region. It houses the Secretariat of the Geological Society of Malaysia (GSM). GSM is a body that actively organizes workshops, seminars, conferences and fieldworks to promote geology and geophysics both regionally and internationally. The Department also engage with Institute Geology Malaysia (IGM) to improve professional practice in geology.

Through the academic staff and alumni, the Department have established a good rapport with the petroleum, mining and engineering industries as well as with other universities (local and foreign). Apart from excellent career opportunities for our graduates, these efforts and contacts have opened up avenues for joint research, funding, industrial training and consultancy work for our staff and students.

BACHELOR OF SCIENCE IN APPLIED GEOLOGY ACADEMIC SESSION 2022/2023 (134 CREDITS)			
University Courses (14 Credits)			
Course Code	Course Name	Pre-Requisite	Credit
GLT1012/GLT1015	English Course	-	4
GKA/GKI/GKK/ GKP/GKS/GKU	Co-curriculum	-	4
GIG1012/ GLT1017	Philosophy and Current Issues (Local Student)/ Basic Malay Language (only for international students)	-	2
GIG1013	Appreciation of Ethics and Civilisations	-	2
GIG1003	Basic Entrepreneurship Culture	-	2
Programme Core Courses (80 Credits) [TP]			
Course Code	Course Name	Pre-Requisite	Credit
LEVEL 1 (22 CREDITS)			
SIX1015	Science, Technology and Society		2
SIX1016	Statistics		3
SIC1006	Computer Programming for Science		3
SII1001	Introduction to the Earth		2
SII1002	Earth Surface Processes		2
SII1003	Structures and Geological Maps		3
SII1004	Mineralogy		3
SII1005	Basic Geological Field Methods		2
SII1006	Safety and Geological Code of Practice		2
LEVEL 2 (36 CREDITS)			
Course Code	Course	Pre-requisite	Credit
SII2002	Applied Geology Field Course	<i>SII1005</i>	8
SII2003	Structural Geology	<i>SII1003</i>	3
SII2004	Sedimentology	<i>SIG1002</i>	4
SII2005	Igneous and Metamorphic Petrology	<i>SII1004</i>	3
SII2006	Paleontology	<i>SII1001, SII1002</i>	3
SII2007	Introduction to Geophysics	<i>SII1001, SII1002</i>	3
SII2008	Geology and Society	<i>SII1002, SII1002</i>	3
SII2009	Geochemistry	<i>SII1001, SII1004</i>	3
SII2010	GIS Applications in Geosciences	<i>SII1003</i>	3
SII2011	Geological Laboratory Analysis Method	<i>SII1004</i>	3

LEVEL 3 (22 CREDITS)			
Course Code	Course	Pre-requisite	Credit
SII3009	Mineral Resources	SII1004	3
SII3010	Geological Research Project	SIG2002, SII2011	8
SII3011	Geology of Malaysia	SII1001	3
SII3012	Industrial Attachment	SII2002, SII2011	8
Elective Courses (40 Credits)			
Elective Student Holistic Empowerment (8 Credits)			
≠ One course MUST be taken from each cluster			
Cluster		Course Code	Credit
Cluster 1	Thinking Matters: Mind & Intellect		2
Cluster 2	Emotional & Spiritual Intelligence: Heart & Soul		2
Cluster 3	Technology/Artificial Intelligence and Data Analytics: Technology		2
Cluster 4	Global Issue and Community Sustainability: Making the World a Better Place		2
Programme Elective Courses or/and Minor Package **			
(32 Credit)			
Choose from all elective courses or/and Minor Packages that are offered			
Course Code	Course	Pre-requisite	Credit
SII2012	Geological Data Analysis	SIX1016	3
SII2013	Marine Geology	SII1002	2
SII2014	Landscape and Karst Conservation	SII1002	2
SII2015	Climate Change and Adaptation	SII1002	3
SII2016	Engineering Geology	SII1003	3
SII2017	Groundwater Resources	SII1002	3
SII2018	Environmental Geology	SII1001	3
SII3013	Advanced Geophysics	SII2007	3
SII3006	Geohazard	SII1001	3
SII3015	Quaternary Geology	SII1002	3
SII3016	Stratigraphic Methods	SII2004	3
SII3017	South East Asia Geology	SII1001	2
SII3018	Petroleum Geology	SII2004	4
SII3019	Organic Petrology	SII2004	3
SII3020	Industrial Mineral	SII3009	2
SII3021	Tectonic and Earth History	SII2006	2
SII3022	Mining and Mineral Exploration	SII2009	3
SII3023	Geological Site Investigation	SII2016	2
SII3024	Unconventional Resources of Oil and Gas	SII2004	3
SIM1001	Basic Mathematics		4
SIM1002	Calculus 1		4

** Minor package

- (1) Students are required to complete a minimum of 25 credits under the same minor package in order to be displayed on the transcript.
- (2) For further information, student can refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

**LIST OF COURSES ACCORDING TO SEMESTER (PLANNING OF COURSES)
BACHELOR OF SCIENCE IN APPLIED GEOLOGY**

Year	Component	Semester I			Semester II		
		Code	Course	Credit	Code	Course	Credit
1	University Courses	GIG1012/ GLT1017	Philosophy and Current Issues (Local Student)/ Basic Malay Language (only for international students)	2	GKA/GKI/ GKK/ GKP/ GKS/GKU 1001	Co-curriculum	2
		GIG1013	Appreciation of Ethics and Civilisations	2	GIG1003	Basic Entrepreneurship Culture	2
		GLTXXXX	English Language	2	GLTXXXX	English Language	2
	Core Courses	SIX1016	Statistics	3	SIX1015	Science, Technology and Society	2
		SII1001	Introduction to the Earth	2	SIC1006	Computer Programming for Science	3
		SII1002	Earth Surface Processes	2	SII1004	Mineralogy	3
		SII1003	Structures and Geological Maps	3	SII1005	Basic Geological Field Methods	2
					SII1006	Safety and Geological Code of Practice	2
	Elective Courses		<i>Student Holistic Empowerment (SHE) Cluster 1: Thinking Matters: Mind & Intellect</i>	2			
	Total Credit			18			18

Year	Component	Semester I			Semester II		
		Code	Course	Credit	Code	Course	Credit
2	University Courses	GKA/GKI/ GKK/ GKP/ GKS/GKU 1001	Co-Curriculum	2			
	Core Courses	SII2002	Applied Geology Field Course	4	SII2002	Applied Geology Field Course	4
		SII2005	Igneous and Metamorphic Petrology	3	SII2009	Geochemistry	3
		SII2003	Structural Geology	3	SII2010	GIS Applications in Geosciences	3

Faculty of Science Booklet, Academic Session 2022/2023

		SII2004	Sedimentology	4	SII2011	Geological Laboratory Analysis Method	3
		SII2007	Introduction to Geophysics	3	SII2006	Paleontology	3
					SII2008	Geology and Society	3
	Elective courses						
	Total Credit			19			19

Year	Component	Semester I			Semester II		
		Code	Course	Credit	Code	Course	Credit
3	University Courses						
	Core Courses	SII3009	Mineral Resources	3	SII3010	Geological Research Project	4
		SII3011	Geology of Malaysia	3			
	Elective courses		<i>Student Holistic Empowerment (SHE) Cluster 2: Emotional & Spiritual Intelligence: Heart & Soul</i>	2		<i>Student Holistic Empowerment (SHE) Cluster 3: Technology/ Artificial Intelligence and Data Analytics: I-technie</i>	2
			Program Elective*	10		Program Elective*	12
Total Credit			18			18	

Year	Component	Semester I			Semester II		
		Code	Course	Credit	Code	Course	Credit
4	University Courses						
	Core Courses	SII3010	Geological Research Project	4	SII3012	Industrial Attachment	8
	Elective courses		<i>Student Holistic Empowerment (SHE) Cluster 4: Global Issue and Community Sustainability: Making the World a Better Place</i>	2			
			Program Elective*	10			
Total Credit			16			8	
Total Credit Hours		134					

* For Minor Package courses offered please refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>

HEAD OF DEPARTMENT



Associate Prof. Dr. Meor Hakif Amir
Hassan
Email: meorhakif@um.edu.my
Contact no: 03-79674233

PROGRAMME COORDINATOR



Dr. Noer El Hidayah Ismail
Email: noerelhidayah@um.edu.my
Contact no: 03-79677199

PANEL OF ACADEMIC ADVISOR

BACHELOR OF SCIENCE IN APPLIED GEOLOGY

	<p>Professor Dr. Azman Abdul Ghani Email: azmangeo@um.edu.my Contact no: 03-79674230</p>
	<p>Professor Dr. Ismail Yusoff Email: ismaily70@um.edu.my Contact no: 03-79674142</p>
	<p>Associate Prof. Dr. Meor Hakif Amir Hassan Email: meorhakif@um.edu.my Contact no: 03-79674233</p>
	<p>Associate Prof. Dr. Ng Tham Fatt Email: ntf@um.edu.my Contact no: 03-79674153</p>
	<p>Associate Prof. Dr. Masatoshi Sone Email: masatoshi.sone@um.edu.my Contact no: 03-79674229</p>
	<p>Dr. Ahmad Farid Abu Bakar Email: a_farid@um.edu.my Contact no: 03-79674226</p>
	<p>Dr. Hijaz Kamal Hasnan Email: hijazzains@um.edu.my Contact no: 03-79674155</p>
	<p>Dr. Jasmi Hafiz Abdul Aziz Email: jasmihafiz@um.edu.my Contact no: 03-79672571</p>

	Dr. Khairul Azlan Mustapha Email: azlan_0401@um.edu.my Contact no: 03-79674157
	Dr. Lin Chin Yik Email: chinyik@um.edu.my Contact no: 03-79674029
	Dr. Muhammad Hatta Roselee Email: hattageo87@um.edu.my Contact no: 03-79674227
	Dr. Noer El Hidayah Ismail Email: noerelhidayah@um.edu.my Contact no: 03-79677199
	Dr. Ros Fatihah Muhammad Email: rosfmuhammad@um.edu.my Contact no: 03-79677126

Department information:

Address:

Geology Department
Faculty of Science
University Malaya
50603 Kuala Lumpur MALAYSIA.

Tel: 03-79674203

Fax: 03-79675149

Website: <http://geology.um.edu.my>

Email: ketua_geologi@um.edu.my

DEPARTMENT OF PHYSICS



Email: ketua_fizik@um.edu.my

Website: <http://www.fizik.um.edu.my>

DEPARTMENT OF PHYSICS

The Department of Physics in the Faculty of Science, University of Malaya was established in 1961. From the beginning, education in Physics was meant to be a union of theoretical and practical aspects. The Department of Physics, under the current leadership of the Head of Department, Prof. Dr. Zamri bin Zainal Abiddin, endeavour to impart a thorough knowledge of the fundamental principles of Physics, as mathematically and experimentally demonstrated to younger generation. Academics and researchers of the Department of Physics are conducting internationally relevant and competitive research, they also collaborate on joint projects with the industry to contribute to the development of knowledge and innovation-based economy, as well as other components to strengthen multidisciplinary and inter-disciplinary research. Their scientific work is connected with innovative teaching techniques, thus providing a creative and stimulating environment for the education of future generations of physicists.

The Department offers Bachelor of Science in Physics Program. Our academics are committed to the flexible delivery of learning and teaching methods. Depending on the course, students will enjoy a variety of teaching modes, such as tutorials, problem-based learning, online learning, practical experience and laboratory work. At level three, students will also undergo industrial training and complete a final year project to strengthen the knowledge and skills obtained and adapt to the ever-advancing knowledge in science and technology.

The Department offers graduate study leading to the Master of Science (M.Sc.) and Doctor of Philosophy (Ph.D.). Details are available in the Graduate Program Guidebook of Faculty of Science. Students who graduate with the Bachelor of Science degree from the Department of Physics are encouraged to pursue their studies to the higher degree levels in the field of Physics or other related fields.

Research facilities determine the ways in which nature could be understood. The Department of Physics has centralised facilities laboratory to support a wide range of research activities. Major facilities include TEM, FE-SEM, SEM-EDX, XRD, AFM, FT-IR, PL, TLD Reader, OMA, ⁶⁰Co irradiator and HpGe Gamma spectrometer, TGA, DSC, DMA, UV-VIS-NIR Spectrometer, Field Emission Auger Microprobe, Flame Hydrolysis Deposition system, Mask Aligner, 1 m grazing incidence Spectrometer, DC sputtering system etc.

DEGREE PROGRAM

The Bachelor of Science in Physics.

Bachelor of Science in Physics Program consists of three levels, namely Introductory, Intermediate and Advanced levels. The program starts with introductory courses in Physics while the Intermediate level builds strong fundamentals in Physics through courses such as Mechanics, Quantum Mechanics, Electromagnetism, Mathematical Methods, Statistical Physics, Optics, Numerical and Computation Methods etc. In the Advanced level, students choose ten elective courses from a total of at least seventeen electives of specialised fields and required to carry out a final year project in any one of these fields. Industrial training is also a compulsory course.

BACHELOR OF SCIENCE IN PHYSICS			
SESSION 2022/2023			
(135 CREDITS)			
General Courses (14 Credits)			
Course Code	Course Title	Credits	
GIG1003	Basic Entrepreneurship Culture	2	
GIG1012/ GLT1017	Philosophy & Current Issue (Local students) / Basic Malay Language (only for international students)	2	
GIG1013	Ethical Appreciation and Civilization	2	
GKA/GKI/GKK/GK P/ GKS/GKU1001	Co-Curriculum	4	
GLT####	English 1 & 2	4	
Core Courses (83 Credits)			
Course Code	Course Title	Pre-requisite	Credits
LEVEL 1 (25 credits)			
SIF1003	Thermal Physics		2
SIF1005	Electronics I		2
SIF1006	Practical Physics 1		2
SIF1014	Vibrations and Waves		3
SIF1015	Quantum Physics		2
SIF1016	Mechanics I		2
SIF1017	Mathematical Methods I		3
SIF1018	Mathematical Methods II	SIF1017	4
SIX1015	Science, Technology and Society		2
SIX1016	Statistics		3
LEVEL 2 (31 credits)			
SIF2001	Quantum Mechanics I	SIF1017 & SIF1015	3
SIF2002	Electromagnetism I	SIF1017 & SIF1014	3
SIF2003	Electromagnetism II	SIF1018 & SIF2002	3
SIF2005	Statistical Physics	SIF1017 & SIF1003	3
SIF2007	Numerical and Computational	SIF1017	3
SIF2009	Electronics Practical	SIF1005	2
SIF2010	Physics Practical II	SIF1006	2
SIF2026	Mechanics II	SIF1016	3
SIF2027	Optics	SIF1014	3
SIF2028	Mathematical Methods III	SIF1018	4
SIF2029	Applied Physics Practical	SIF1006	2
LEVEL 3 (11 credits)			
SIF3001	Nuclear Physics	SIF2001	3
SIF3002	Atoms and Molecular Physics	SIF2001	3
SIF3003	Solid State Physics	SIF2001	3
SIF3018	Physics for Work	SIF2029	2

LEVEL 4 (16 credits)			
SIF4001	Project	SIF2001, SIF2003, SIF2005 & SIF3018	8
SIF4002	Industrial Training	SIF3018, SIF2007 & SIF2009	8
Elective Courses (38 credits)			
(I) Program Elective Courses or/and Minor Package ** (30 credits)			
Choose from all elective courses or/and Minor Packages that are offered			
Course Code	Course Title	Pre-requisite	Credits
SIF2012	Modern Optics and Laser Physics	SIF1014	3
SIF2013	Photonics	SIF1014	3
SIF2015	Astrophysics	SIF1016	3
SIF2016	Materials Science	SIF1003	3
SIF2018	Radiation Physics	SIF1015	3
SIF2019	Gas Discharge Physics	SIF1003	3
SIF2020	Electronics II	SIF1005	3
SIF2021	Digital Electronics	SIF2020	3
SIF3006	Optoelectronics	SIF2027	3
SIF3007	Elementary Particle Physics	SIF2001 & SIF3021	3
SIF3008	Condensed Matter Physics	SIF3003	3
SIF3009	Plasma Physics and Technology	SIF2002	3
SIF3011	Quantum Mechanics II	SIF2001 & SIF2028	3
SIF3012	Computational Physics	SIF2007	3
SIF3019	Semiconductor Devices	SIF1005 & SIF3003	3
SIF3020	Quantum Optics and Technology	SIF2001 & SIF2027	3
SIF3021	Cosmology and General Relativity	SIF1018 & SIF2026	3
(II) Student Holistic Empowerment (SHE) Elective Courses (8 credits)			
Course Code	Course Title	Credits	
‡ One course is compulsory to be taken from each cluster			
Cluster 1	Thinking Matters: Mind & Intellect	2	
Cluster 2	Emotional & Spiritual Intelligence: Heart & Soul.	2	
Cluster 3	Technology/Artificial Intelligence and Data Analytics: I- technie	2	
Cluster 4	Global Issue and Community Sustainability: Making the World a Better Place	2	

**LIST OF COURSES ACCORDING TO SEMESTER
(PLANNING OF COURSES)**

BACHELOR OF SCIENCE IN PHYSICS SESSION 2022/2023

COMPONENT	YEAR 1			
	SEMESTER 1		SEMESTER 2	
	COURSE	CREDIT	COURSE	CREDIT
University Courses	GIG1013 Ethical appreciation and civilization	2	GIG1003 Basic Entrepreneurship Culture	2
	GKA/GKI/GKK/GKP/ GKS/GKU1001 Co-Curriculum	2	GIG1012/ GLT1017 Philosophy & Current Issue (Local students) / Basic Malay Language (only for international students)	2
	GLT#### English 1	2	GKA/GKI/GKK/GKP/ GKS/GKU1001 Co-Curriculum	2
			GLT#### English 2	2
Core Courses	SIF1005 Electronics I	2	SIF1003 Thermal Physics	2
	SIF1006 Practical Physics 1	2	SIF1016 Mechanics I	2
	SIF1014 Vibrations and Waves	3	SIF1018 Mathematical Methods II	4
	SIF1015 Quantum Physics	2	SIX1016 Statistics	3
	SIF1017 Mathematical Methods I	3	SIF2009 Electronics Practical or SIF2010 Physics Practical II	2
	SIX1015 Science, Technology and Society	2		
Elective courses				
Total Credits		20		21

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COMPONENT	YEAR 2			
	SEMESTER 3		SEMESTER 4	
	COURSE	CREDIT	COURSE	CREDIT
University Courses				
Core Courses	SIF2001 Quantum Mechanics I	3	SIF2003 Electromagnetism II	3
	SIF2002 Electromagnetism I	3	SIF2007 Numerical and Computational Methods	3
	SIF2005 Statistical Physics	3	SIF2029 Applied Physics Practical	2
	SIF2009 Electronics Practical or SIF2010 Physics Practical II	2	SIF2026 Mechanics II	3
	SIF2028 Mathematical Methods III	4	SIF2027 Optics	3
Elective Courses	SIF#### Program Elective Course *	3	SIF#### Program Elective Course*	3
	SHE#### Student Holistic Empowerment (SHE) Cluster 1: Thinking Matters: Mind & Intellect	2	SHE#### Student Holistic Empowerment (SHE) Cluster 2: Emotional & Spiritual Intelligence: Heart & Soul	2
Total Credits		20		19

COMPONENT	YEAR 3			
	SEMESTER 5		SEMESTER 6	
	COURSE	CREDIT	COURSE	CREDIT
University Courses				
Core Courses	SIF3001 Nuclear Physics	3	SIF3002 Atomics and Molecular Physics	3
	SIF3003 Solid State Physics	3	SIF3018 Physics for Work	2
Elective Courses	SIF#### Program Elective Course *	12	SIF#### Program Elective Course*	12
	SHE#### Student Holistic Empowerment (SHE) Cluster 3: Technology/ Artificial Intelligence and Data Analytics: I-technie	2	SHE#### Student Holistic Empowerment (SHE) Cluster 4: Global Issue and Community Sustainability: Making the World a Better Place	2
Total Credits		20		19

COMPONENT	YEAR 4			
	SEMESTER 7		SEMESTER 8	
	COURSE	CREDIT	COURSE	CREDIT
University Courses				
Core Courses	SIF4001 Project	8	SIF4002 Industrial Training	8
Elective Courses				
Total Credits		8		8

TOTAL CREDITS: 135 CREDITS

* For Minor Package courses offered please refer to UMSiS Guide via this link : <https://umsitsguide.um.edu.my/>



Head of Department

Name	E-mail	Phone No.
	zzaa@um.edu.my	7967 4206
		Room No. HOD room General office
Professor Dr. Zamri Bin Zainal Abiddin		

PROGRAM COORDINATOR

Name	E-mail	Phone No.
	mhburaidah @um.edu.my	7967 7140
		Room No. C310, Block C, Department of Physics
Associate Prof. Dr. Mohd Hamdi Bin Ali @ Buraidah		

PANEL OF ACADEMIC ADVISORS

Name	E-mail	Phone
	Associate Prof. Dr. Azzuliani Binti Supangat azzuliani@um.edu.my	79672737
	Associate Prof. Dr. Mohd Hamdi Bin Ali @ Buraidah mhburaidah@um.edu.my	79677140



Associate Prof. Dr.
Thamil Selvi A/P
Velayutham

t_selvi@um.edu.my

79672733



Dr Woo Haw Jiunn

woohj@um.edu.my

79672732



Dr Richard Ritikos

richardr@um.edu.my

79674147



Dr Siti Fairus Binti
Abdul Sani

s.fairus@um.edu.my

79674285

Website: <http://fizik.um.edu.my>
E-learning platform, Spectrum: <http://spectrum.um.edu.my/>
Helpdesk: <http://helpdesk.um.edu.my/>

**Faculty of Science
University of Malaya
50603 Kuala Lumpur
MALAYSIA**

UNDERGRADUATE



+6037967 4277/4379/7147



tdid_sains@um.edu.my