

B.Sc. (Hons.) (Chemistry)

School of Chemical Sciences

2022/2023

MAIN ADMINISTRATIVE STAFF

DEAN



Prof. Dr. Rohana Adnan

DEPUTY DEANS



Assoc. Prof. Dr. Mohd Rizal Razali
(Academic, Career & International)



Assoc. Prof. Dr. Ng Eng Poh
(Research, Innovation & Industry-Community Engagement)

PROGRAMME MANAGERS



Dr. Ng Si Ling
(Physical Chemistry)



Assoc. Prof. Dr. Oo Chuan Wei
(Organic & Inorganic Chemistry)



Dr. Mardiana Saaid
(Analytical Chemistry)



Assoc. Prof. Dr. Noor Hana Hanif Abu Bakar
(Industrial Chemistry)

ADMINISTRATIVE OFFICERS



Mr. Muhamad Tarmizi Rahim
Deputy Registrar
(HR & Postgraduates)



Mr. Mohd Zuaril Akimi Mohd Shaari
Senior Assistant Registrar
(Academic)

B.Sc. (Hons.) (Chemistry)

PROGRAMME STRUCTURE

(i) Structure of Study Programme

Course Component	Unit Requirement B.Sc. (Hons.)
Core (T)	70
Elective (E) or Minor (M)	32
University (U)	18
Total	120

For Bachelor of Science (Hons.) (Chemistry), students are allowed to choose between **two (2)** packages offered by the School of Chemical Sciences. **Package 1** is designed to allow the students to register for Industrial Training in the final semester (Semester 8) while **Package 2** is for the students who prefer to take Minor programme.

(ii) Industrial Training

Students are highly encouraged to apply for Industrial Training (KIE461/9) after accumulating at least 95 units.

(iii) Chemistry Project

Students are encouraged to register for Chemistry Project (KUE319/6) during their third year of studies. This involves conducting research work for 2 semesters and submitting a Final Year Project report.

Students who do not wish to register for the Chemistry Project (KUE319/6) may fulfil the 6 credits requirement by registering for other Elective courses offered by the School.

(iv) Assessments

The cognitive, psychomotor and/or affective skills will be assessed in coursework (assignments, quizzes, test, presentations, laboratory reports and practical tests) and examination.

SCHOOL OF CHEMICAL SCIENCES

Course Code

Each course has a course code which is made up of 3 alphabets and 3 numbers.

A B C x y z

→ Course Serial Number

→ Course Level :

1 = Level 100 courses

2 = Level 200 courses

3 = Level 300 courses

4 = Level 400 courses

→ Type of Course :

T = Core courses

E = Elective courses

→ Course Categories:

A = Analytical Chemistry

T = Inorganic Chemistry

O = Organic Chemistry

F = Physical Chemistry

U = Practical/General

I = Industrial Chemistry

School/Centre :

K = School of Chemical Sciences

Z = School of Physics

B = School of Biological Sciences

M = School of Mathematical Sciences

L = School of Languages, Literacies & Translation

W = Centre for Co-Curricular Programme

LIST OF COURSES OFFERED

Package 1

B.Sc. (Hons.) (Chemistry)

(i) Core Courses (T) - 70 units

Selection of 3 Units		Pre-requisites
ZCT103/3	Physics III (Vibrations, Waves and Optics)	
BOI102/3	Ecology	
BOI101/3	Organisms Biodiversity	
Compulsory - 61 units		Pre-requisites
MAA101/4	Calculus for Science Students 1	
KUT100/2	Safety and Security for Chemical Sustainability	
KUT101/2	General Chemistry Practical I	
KUT102/2	General Chemistry Practical II	
KTT112/4	Inorganic Chemistry I	
KOT122/4	Organic Chemistry I	
KFT133/4	Physical Chemistry I	KTT112 (s) or KOT122 (s)
KAT145/4	Analytical Chemistry I	KTT112 (s) or KOT122 (s)
KUT203/2	Inorganic Chemistry Practical	KUT101 (s)
KUT206/2	Organic Chemistry Practical	KUT102 (s), KOT122 (s)
KTT212/3	Inorganic Chemistry II	KTT112 (s)
KOT222/3	Organic Chemistry II	KOT122 (s)
KUT214/2	Physical Chemistry Practical	KUT102 (s), KFT231 (c)
KUT215/2	Analytical Chemistry Practical I	KUT101 (s), KAT249 (c)
KFT231/3	Physical Chemistry II	KFT133 (s)
KAT249/3	Analytical Chemistry II	KAT145 (s)
KTT313/3	Inorganic Chemistry III	KTT212 (s)
KUT306/2	Research Methodology in Chemistry	
KUT317/2	Inorganic and Analytical Chemistry Practical	KUT203 (s), KUT215 (s)
KUT318/2	Physical and Organic Chemistry Practical	KUT206 (s), KUT214 (s)
KOT323/3	Organic Chemistry III	KOT222 (s)
KFT431/3	Physical Chemistry III	KFT231 (s)
Selection of 6 units		
KUE319/6 or 6 units	Chemistry Project or Other theory courses from Analytical Chemistry, Industrial Chemistry and Pure Chemistry.	

(ii) Elective Courses (E) - 32 units

(a) Selection of 18 units or more		Pre-requisites
KIT257/3	Materials Chemistry	
KAT345/4	Spectroscopic Methods	KAT145 (s)
KIT358/3	Polymer Chemistry	KOT122 (s)
KIE359/3	Green Chemistry and Technology	
KTE411/3	Selected Topics in Inorganic Chemistry	KTT212 (s)
KOE423/3	Selected Topics in Organic Chemistry	KOT222 (s)
KFE441/3	Applied Surface Chemistry	KFT231 (s)
KAE445/3	Bioanalysis	KAT344 (s) or KAT249 (s)
KIE456/3	Food and Palm Oil Chemistry	
KIT458/3	Chemical Processing	KTT112 (s), KOT122 (s)
KIE461/9	Industrial Training	

An additional **14 units or less** to fulfil the elective component must be taken from any other schools not limited to School of Physics, Mathematical Sciences, Biological Sciences, Industrial Technology, or Centre for Global Archaeological Research.

Recommended courses from School of Physics and School of Biological Sciences are:

ZCT104/3	Physics IV (Modern Physics)
BOI117/3	Biodiversity and Ecology Practicals
BST308/3	Tropical Ecosystem & Climate Change (Prerequisite: BOI102)
BST405/3	Conservation Ecology and Natural Resources (Prerequisite: BST308)

(s) = sequential (Course must be taken earlier)

(c) = concurrent (Course must be taken concurrently)

Package 2

B.Sc. (Hons.) (Chemistry)

(i) Core Courses (T) - 70 Units

Selection of 3 units		Pre-requisites
ZCT103/3	Physics III (Vibrations, Waves and Optics)	
BOI102/3	Ecology	
BOI101/3	Organisms Biodiversity	
Compulsory - 61 units		Pre-requisites
MAA101/4	Calculus for Science Students 1	
KUT100/2	Safety and Security for Chemical Sustainability	
KUT101/2	General Chemistry Practical I	
KUT102/2	General Chemistry Practical II	
KTT112/4	Inorganic Chemistry I	
KOT122/4	Organic Chemistry I	
KFT133/4	Physical Chemistry I	KTT112 (s) or KOT122 (s)
KAT145/4	Analytical Chemistry I	KTT112 (s) or KOT122 (s)
KUT203/2	Inorganic Chemistry Practical	KUT101 (s)
KUT206/2	Organic Chemistry Practical	KUT102 (s), KOT122 (s)
KTT212/3	Inorganic Chemistry II	KTT112 (s)
KOT222/3	Organic Chemistry II	KOT122 (s)
KUT214/2	Physical Chemistry Practical	KUT102 (s), KFT231(c)
KUT215/2	Analytical Chemistry Practical I	KUT101 (s), KAT249 (c)
KFT231/3	Physical Chemistry II	KFT133 (s)
KAT249/3	Analytical Chemistry II	KAT145 (s)
KUE306/2	Research Methodology in Chemistry	
KTT313/3	Inorganic Chemistry III	KTT212 (s)
KUT317/2	Inorganic and Analytical Chemistry Practical	KUT203 (s), KUT215 (s)
KUT318/2	Physical and Organic Chemistry Practical	KUT206 (s), KUT214 (s)
KOT332/3	Organic Chemistry III	KOT222 (s)
KFT431/3	Physical Chemistry III	KFT231 (s)
Selection of 6 units		
KUE319/6 or 6 units	Chemistry Project or Other theory courses from Analytical Chemistry, Industrial Chemistry and Pure Chemistry.	

(ii) Minor (M) Programme – 32 Units

Elective (E) Components

(a) Selection of 12 Units

Pre-requisites

ZCT104/3	Physics IV (Modern Physics)	
BOI117/2	Biodiversity and Ecology Practicals	
BST308/3	Tropical Ecosystem & Climate Change	
BST405/3	Conservation Ecology and Natural Resources	BST308 (s)
KIT257/3	Materials Chemistry	
KAT345/4	Spectroscopic Methods	KAT145 (s)
KIT358/3	Polymer Chemistry	KOT122 (s)
KIE356/3	Green Chemistry and Technology	
KTE411/3	Selected Topics in Inorganic Chemistry	KTT212 (s)
KOE423/3	Selected Topics in Organic Chemistry	KOT222 (s)
KFE441/3	Applied Surface Chemistry	KFT231 (s)
KAE445/3	Bioanalysis	KAT344 (s) or KAT249 (s)
KIE456/3	Food and Palm Oil Chemistry	
KIT458/3	Chemical Processing	KTT112 (s), KOT122 (s)

Minor (M) Components

(b) Selection of 20 Units

Select from any minor programme. Please refer to the book of Minor Programme Guideline.

All Minor Programmes offered by other Schools can be taken by students of School of Chemical Sciences, subject to the requirements imposed by the School which offers Minor Programmes such as Management, Computer Science, Communication, Psychology, English or other Sciences.

*All the courses offered are subjected to changes when the need arises.

(s) = sequential (Course must be taken earlier)

(c) = concurrent (Course must be taken concurrently)

B.Sc. (Hons.) (Chemistry) – Package 1

YEAR 1					
COMPONENT	SEMESTER 1		SEMESTER 2		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	WUS101	2	LKM400	2	
Core Courses (T)	KAT145	4	KFT133	4	
	KTT112	4	KOT122	4	
	KUT101	2	KUT102	2	
	KUT100	2	MAA101	4	
			BOI101* (Optional)	3*	
Elective (E)					
TOTAL UNITS		14		16/19*	30/33*

YEAR 2					
COMPONENT	SEMESTER 3		SEMESTER 4		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	*HFF225	2	*HFE224	2	
Core Courses (T)	LSP300	2	U	2	
	KOT222	3	KTT212	3	
	KAT249	3	KFT231	3	
	KUT203	2	KUT206	2	
	KUT215	2	KUT214	2	
	Elective (E)	Elective	3	Elective	3
TOTAL UNITS		17		17	34

Note: *HFF225/2 (Philosophy and Current Issues) and HFE224/2 (Appreciation of Ethics and Civilisations)

YEAR 3					
COMPONENT	SEMESTER 5		SEMESTER 6		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	LSP402	2	U	2	
Core Courses (T)	KTT313	3	KOT322	3	
	KUT317/ KUT318	2	KUT317/ KUT318	2	
	BOI102/ ZCT103 (Optional)	3**	KUE319	3	
			KUT306	2	
Elective (E)	Elective	2	Elective	3	
	Elective	3	Elective	3	
TOTAL UNITS				18	30/33**

Note: **Students can choose other science courses between ZCT103/3 or BOI102/3

YEAR 4						
COMPONENT	SEMESTER 7		SEMESTER 8		UNITS	
	CODE	UNITS	CODE	UNITS		
University Courses (U)	U	2	KIE461 : Industrial Training for 1 Semester (18 weeks) in Industry/ Government Agency/ Private Company	9		
Core Courses (T)	KUE319	3				
	KFT431	3				
Elective (E)	Elective	3				
	Elective	3				
TOTAL UNITS		14		9	23	
GRAND TOTAL UNITS					120	

B.Sc. (Hons.) (Chemistry) – Package 2

YEAR 1					
COMPONENT	SEMESTER 1		SEMESTER 2		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	WUS101	2	LKM400	2	
Core Courses (T)	KAT145	4	KFT133	4	
	KTT112	4	KOT122	4	
	KUT100	2	KUT102	2	
	KUT101	2	MAA101	4	
			BOI101* (Optional)	3*	
Elective (E)					
TOTAL UNITS		14		16/19*	30/33*

YEAR 2					
COMPONENT	SEMESTER 3		SEMESTER 4		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	*HFF225	2	*HFE224	2	
Core Courses (T)	LSP300	2			
	KOT222	3	KTT212	3	
	KAT249	3	KFT231	3	
	KUT203	2	KUT206	2	
	KUT215	2	KUT214	2	
Elective (E)/ Minor (M)	Minor	4	Minor	4	
TOTAL UNITS		18		16	34

Note: *HFF225/2 (Philosophy and Current Issues) and HFE224/2 (Appreciation of Ethics and Civilisations)

YEAR 3					
COMPONENT	SEMESTER 5		SEMESTER 6		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	LSP402	2	U	2	
Core Courses (T)	KTT313	3	KUE319	3	
	KUT317/ KUT318	2	KUT306	2	
	BOI102/ ZCT103 (Optional)	3**			
Elective (E)/ Minor (M)	Elective	3	Elective	3	
	Minor	4	Minor	4	
TOTAL UNITS		14/17*		14	28/31*

Note: *Students can choose other science courses between ZCT103/3 or BOI102/3

YEAR 4					
COMPONENT	SEMESTER 7		SEMESTER 8		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	U	2	U	2	
Core Courses (T)	KUE319	3	KOT322	3	
	KFT431	3	KUT317/ KUT318	2	
Elective (E)/ Minor (M)	Elective	3	Elective	3	
	Minor	4			
TOTAL UNITS		15		10	25
GRAND TOTAL UNITS					120

LANGUAGE REQUIREMENT:

ENGLISH LANGUAGE :

- All Bachelor's degree students must take four (4) units from the English Language courses and pass with a minimum Grade 'C' to fulfil the University requirement for graduation.
 - LSP300/2 : Academic English
 - LSP402/2 : Scientific and Medical English
- Students with MUET Bands 2 & 3 / IELTS 5.0 & 5.5 need to take LMT100/2 (Code Z) : Preparatory English.
 - Pass with minimum Grade 'C' in order to register for LSP300.
 - LMT100 is a pre-requisite course. The unit is not counted for graduation.

MALAY LANGUAGE :

- All Bachelor's degree students must take LKM400/2 – Malay Language IV and pass with minimum Grade 'C' to fulfil the University requirement for graduation.
- LKM400/2 is compulsory for local students.

Programme Objective:

Bachelor of Science (Honours) (Chemistry) programme of USM aims to support the university aspiration to become a pioneering and trans-disciplinary research intensive university through offering the chemical science programme relevant to research and industrial sectors so as to produce knowledgeable, skilful, professional, ethical, leading and passionate chemists for socio-economic and nation development betterment.

Programme Educational Objectives:

In line with the mission of the School of Chemical Sciences, Bachelor of Science (Honours) (Chemistry) programme offers high-quality science education with the aim to produce:

PEO 1: Chemists who are able to apply the knowledge and practical skills acquired to improve the practice of chemistry in the public and private sectors.

PEO 2: Chemists who can integrate ethical and professional values in their professional and social relationships.

PEO 3: Chemists who can take on the roles of leaders and team members in providing solutions to chemistry-related issues and problems through effective communications with industry and society.

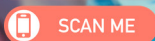
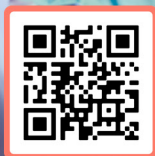
PEO 4: Chemists who are able to proactively acquire new knowledge to improve their skills in career advancement and demonstrate innovative resource and information management.

Program Learning Outcomes: Upon completion of this programme, students will be able to:

PLO 1	Knowledge (of the discipline)	Apply fundamental knowledge of chemistry to chemistry-related practices.
PLO 2	Practical Skills (of the discipline)	Perform safe handling of chemicals and proficient manipulation of laboratory apparatus and analytical instruments.
PLO 3	Cognitive Skills	Demonstrate critical thinking and provide practical solutions to chemistry-related issues by employing appropriate and relevant chemistry knowledge and skills.
PLO 4	Communication Skills	Demonstrate effective communication.
PLO 5	Interpersonal Skills	Lead and collaborate with diverse team members and demonstrate social responsibility for the well-being of society.
PLO 6	Ethics and Professionalism	Balance and uphold positive values, ethics and accountability in societal and professional engagement.
PLO 7	Personal Skills	Manage information and seek new knowledge and skills independently.
PLO 8	Entrepreneurial Skills	Display relevant and appropriate managerial and entrepreneurial skills.
PLO 9	Leadership, Autonomy and Responsibility	Demonstrate the ability to work effectively as a leader
PLO 10	Digital Skills	Demonstrate the ability to use digital effectively
PLO 11	Numeracy Skills	Demonstrate the ability to use numerical effectively



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School of Chemical Sciences

Universiti Sains Malaysia,
11800 USM, Pulau Pinang,
Malaysia

Tel: +604 - 653 3262

Fax: +604 - 657 4854