



USM UNIVERSITI
SAINS
MALAYSIA



**Pusat
Pengajian
Sains Kimia**

SCHOOL OF CHEMICAL SCIENCES UNIVERSITI SAINS MALAYSIA

Bachelor of Science in Chemistry with Honours

Academic Session 2025/2026

<http://chem.usm.my>

WE LEAD

Transforming Higher Education for a Sustainable Tomorrow

PERSONAL DETAILS

STUDENT INFORMATION:

FULL NAME	:	
STUDENT ID	:	
EMAIL ADDRESS	:	
MOBILE NUMBER	:	
ENTRY CGPA	:	
HOME ADDRESS	:	

EMERGENCY CONTACT:

FULL NAME	:	
MOBILE NUMBER	:	

ACADEMIC ADVISOR INFORMATION:

FULL NAME	:	
MOBILE NUMBER	:	
EMAIL	:	

Main Administrative Staff



PROGRAMME EDUCATIONAL OBJECTIVES:

- 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 competent in digital and numerical skills and able to proactively acquire new knowledge to improve their skills in career advancement and demonstrate innovative resource and information management.

PROGRAMME LEARNING OUTCOMES:

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

PO1	Knowledge (of the discipline)	Apply fundamental knowledge of chemistry to chemistry-related practices.
PO2	Cognitive Skills	Demonstrate critical thinking and provide practical solutions to chemistry-related issues by employing appropriate and relevant chemistry knowledge and skills.
PO3	Practical Skills (of the discipline)	Perform safe handling of chemicals and proficient manipulation of laboratory apparatus and analytical instruments.
PO4	Interpersonal Skills	Lead and collaborate with diverse team members and demonstrate social responsibility for the well-being of society.
PO5	Communication Skills	Demonstrate effective communication skills.
PO6	Digital Skills	Demonstrate effective digital skills.
PO7	Numeracy Skills	Demonstrate effective numerical skills.
PO8	Leadership, Autonomy and Responsibility	Demonstrate the ability to work autonomously and show leadership and professionalism in managing different responsibilities.
PO9	Personal Skills	Manage information and seek new knowledge and skills independently.
PO10	Entrepreneurial Skills	Display relevant and appropriate managerial and entrepreneurial skills.
PO11	Ethics and Professionalism	Balance and uphold positive values, ethics and accountability in societal and professional engagement.

Bachelor of Science in Chemistry with Honours

PROGRAMME STRUCTURE

(i) Structure of Study Programme

Course Component	Unit Requirement
Core (T)	70
Elective (E)	32
University (U)	18
Total	120

For Bachelor of Science in Chemistry with Honours, 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 open elective courses.

(ii) Industrial Training

Students are highly encouraged to apply for Industrial Training (KIE461/9) after accumulating at least 111 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 Chemistry 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 theory courses offered by the School.

(iv) Assessment

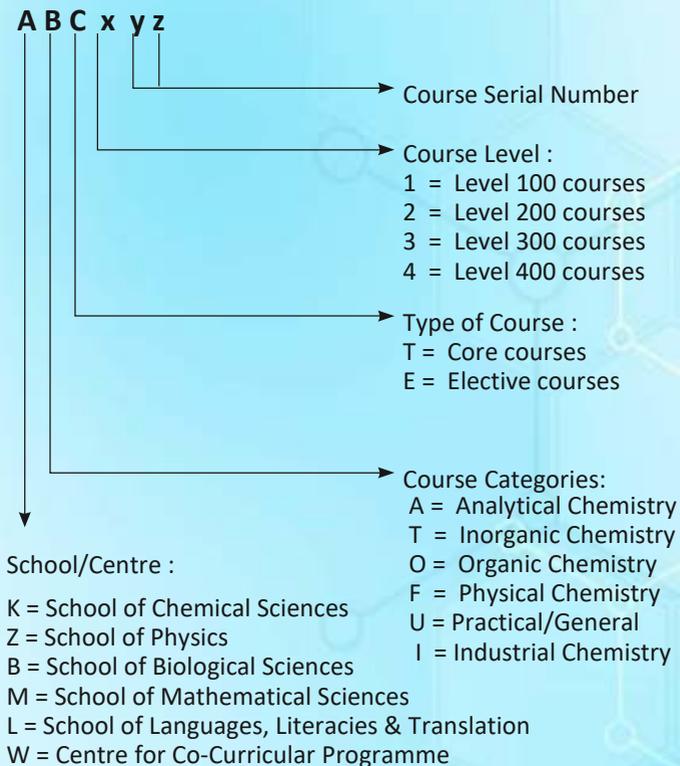
Course assessment will be based on:

- Examination
- Coursework

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

Course Code

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



LIST OF COURSES OFFERED - *Package 1*

Bachelor of Science in Chemistry with Honours		
(i) Core Courses (T) - 70 Credits		
Selection of 3 Credits		Pre-requisites
ZCT103/3	Vibrations, Waves and Optics	
BOI102/3	Ecology	
BOI101/3	Organisms Biodiversity	
Compulsory - 61 Credits		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	
KAT145/4	Analytical Chemistry I	
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), KFT234 (c)
KUT215/2	Analytical Chemistry Practical I	KUT101 (s), KAT249 (c)
KFT234/3	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	KFT234 (s)
Selection of 6 Credits		
KUE319/6 or 6 credits	Chemistry Project or Other theory courses from Analytical Chemistry, Industrial Chemistry or Pure Chemistry.	

(ii) Elective Courses (E) – 32 Credits		
(a) Selection of 18 Credits 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	KFT234 (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	
(b) Selection of 14 Credits or less		
<p>An additional 14 units or less to fulfill the elective component can be taken from any other Schools, not limited to School of Physics, Mathematical Sciences, Biological Sciences, or Centre for Global Archaeological Research, subject to the requirements imposed by the respective Schools.</p> <p>Recommended courses from School of Physics and School of Biological Sciences are:</p>		
ZCT104/3	Physics IV (Modern Physics)	
BOI107/2	Practical of Biodiversity and Ecology	BOI101(c)
BST212/3	Tropical Ecosystem	
BST327/3	Climate Change in the Tropics	BOI102(s)
BST419/3	Sustainable Management of Natural Resources	BOI102(s), BST212(s)

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

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

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

Package 2

Bachelor of Science in Chemistry with Honours		
(i) Core Courses (T) - 70 Credits		
Selection of 3 Credits		Pre-requisites
ZCT103/3	Vibrations, Waves and Optics	
BOI102/3	Ecology	
BOI101/3	Organisms Biodiversity	
Compulsory - 61 Credits		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	
KAT145/4	Analytical Chemistry I	
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), KFT234 (c)
KUT215/2	Analytical Chemistry Practical I	KUT101 (s), KAT249 (c)
KFT234/3	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	KFT234 (s)
Selection of 6 Credits		
KUE319/6 or 6 credits	Chemistry Project or Other theory courses from Analytical Chemistry, Industrial Chemistry or Pure Chemistry.	

(ii) Elective Courses (E) – 32 Credits		
(a) Selection of 12 credits or more		Pre-requisites
ZCT104/3	Physics IV (Modern Physics)	
BOI107/2	Practical of Biodiversity and Ecology	BOI101(c)
BST212/3	Tropical Ecosystem	
BST327/3	Climate Change in the Tropics	BOI102(s)
BST419/3	Sustainable Management of Natural Resources	BOI102(s), BST212(s)
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	KFT234 (s)
KAE445/3	Bioanalysis	KAT344 (s) or KAT249 (s)
KIE456/3	Food and Palm Oil Chemistry	
Open Elective		
(b) Selection of 20 credits or less		
<p>Select from any offered programme. All open elective courses offered by other Schools can be taken by students of School of Chemical Sciences, subject to the requirements imposed by the respective School which offers Open Elective programme.</p>		

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

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

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

BACHELOR OF SCIENCE IN CHEMISTRY WITH HONOURS - Package 1

YEAR 1					
COMPONENT	SEMESTER 1		SEMESTER 2		CREDIT
	CODE	CREDIT HOURS	CODE	CREDIT HOURS	
University Courses (U)	¹ WUS101	2	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*	
TOTAL CREDIT HOURS		14		16/19*	30/33*

Note: ¹Local students- WUS101/2; International students- SEA205E/4.

² Local students- LKM400/2; International students- LKM100/2.

YEAR 2					
COMPONENT	SEMESTER 3		SEMESTER 4		CREDIT
	CODE	CREDIT HOURS	CODE	CREDIT HOURS	
University Courses (U)	³ HFF225	2	⁴ HFE224	2	
	⁵ LSP201	2	U	2	
Core Courses (T)	KOT222	3	KTT212	3	
	KAT249	3	KFT234	3	
	KUT203	2	KUT206	2	
	KUT215	2	KUT214	2	
Elective (E)	Elective	3	Elective	3	
TOTAL CREDIT HOURS		17		17	34

Note: ³ HFE225/2- Local and International students.

⁴ HFE224/2- Local students only.

⁵ If MUET Band 2.5 & below or TOEFL 45 & below or IELTS 5 & below : LSP101/2 as Code Z, Band 3-3.5 or TOEFL 46- 78 or IELTS 5.5-6.0 : LSP201/2 as Code U.

YEAR 3					
COMPONENT	SEMESTER 5		SEMESTER 6		CREDIT
	CODE	CREDIT HOURS	CODE	CREDIT HOURS	
University Courses (U)	⁵ LSP301	2	U	2	
Core Courses (T)	KTT313	3	KOT323	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 CREDIT HOURS		12/15*		18	30/33*

Note: *Students can choose either ZCT103/3 or BOI102/3.

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

BACHELOR OF SCIENCE IN CHEMISTRY WITH HONOURS - Package 2

YEAR 1					
COMPONENT	SEMESTER 1		SEMESTER 2		CREDIT
	CODE	CREDIT HOURS	CODE	CREDIT HOURS	
University Courses (U)	¹ WUS101	2	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*	
TOTAL CREDIT HOURS		14		16/19*	30/33*

Note: ¹Local students- WUS101/2; International students- SEA205E/4.

² Local students- LKM400/2; International students- LKM100/2.

YEAR 2					
COMPONENT	SEMESTER 3		SEMESTER 4		CREDIT
	CODE	CREDIT HOURS	CODE	CREDIT HOURS	
University Courses (U)	³ HFF225	2	⁴ HFE224	2	
	⁵ LSP201	2			
Core Courses (T)	KOT222	3	KTT212	3	
	KAT249	3	KFT234	3	
	KUT203	2	KUT206	2	
	KUT215	2	KUT214	2	
Elective (E)	Elective	4	Elective	4	
TOTAL CREDIT HOURS		18		16	34

Note: ³ HFE225/2- Local and International students.

⁴ HFE224/2- Local students only.

⁵ If MUET Band 2.5 & below or TOEFL 45 & below or IELTS 5 & below : LSP101/2 as Code Z, Band 3-3.5 or TOEFL 46- 78 or IELTS 5.5-6.0 : LSP201/2 as Code U.

YEAR 3					
COMPONENT	SEMESTER 5		SEMESTER 6		CREDIT
	CODE	CREDIT HOURS	CODE	CREDIT HOURS	
University Courses (U)	⁵ LSP301	2	U	2	
Core Courses (T)	KTT313	3	KUE319	3	
	KUT317/ KUT318	2	KUT306	2	
	BOI102/ ZCT103* (Optional)	3*			
Elective (E)	Elective	4	Elective	4	
	Elective	3	Elective	3	
TOTAL CREDIT HOURS		14/17*		14	28/31*

Note: *Students can choose either ZCT103/3 or BOI102/3.

YEAR 4					
COMPONENT	SEMESTER 7		SEMESTER 8		CREDIT
	CODE	CREDIT HOURS	CODE	CREDIT HOURS	
University Courses (U)	U	2	U	2	
Core Courses (T)	KUE319	3	KOT323	3	
	KFT431	3	KUT317/ KUT318	2	
Elective (E)	Elective	3	Elective	3	
	Elective	4			
TOTAL CREDIT HOURS		15		10	25
GRAND TOTAL CREDIT HOURS					120

UNIVERSITY COURSE REQUIREMENTS

Students are required to take 18 credits for the following University courses/options for University needs:

UNIVERSITY COURSE REQUIREMENTS		TOTAL CREDIT		
		Local Students	International Students	
General Studies (MPU)				
U1	<u>Local Students</u> <ul style="list-style-type: none"> ▪ HFF225 (Philosophy and Current Issues) (2 credits) ▪ HFE224 (Appreciation of Ethics and Civilisations) (2 credits) ▪ LKM400 (Malay Language IV) (2 credits) <u>International Students of Science and Technology</u> <ul style="list-style-type: none"> ▪ HFF225 (Philosophy and Current Issues) (2 credits) ▪ Malay Language course (2 credits) 	6	4	
U2 (Local students) AND U3 (International students)	<u>Local Students</u> <ul style="list-style-type: none"> ▪ WUS101 (Core Entrepreneurship) (2 credits) ▪ English Language Courses (4 credits) <u>International Students</u> <ul style="list-style-type: none"> ▪ SEA205E (Malaysian Studies) (4 credits) ▪ English Language Courses (4 credits) 	6	8	
U4	<u>Local Students</u> WAR122 (Integrity and Anti-Corruption Course) / Co-Curricular Courses	<u>International Students</u> Co-Curricular Courses	2	2
Options	Students can/have to choose any of the following: <ul style="list-style-type: none"> ▪ Co-curricular courses ▪ Skill courses/Foreign Language Courses/ Other courses offered by other schools 	4	4	
TOTAL CREDIT		18	18	

OUR VISION

To realise the aspiration of Universiti Sains Malaysia in Transforming Higher Education for a Sustainable Tomorrow.

OUR MISSION

To produce chemistry graduates who are knowledgeable, highly skilled, well mannered and possess excellent work ethics suited for the requirements of the public and industrial sectors.

- To provide quality chemistry students with quality education.
- To instil awareness among chemistry students towards the welfare of the society.
- To provide modern facilities for chemistry teaching and research.
- To attract excellent students from Malaysia and overseas to embrace chemistry at USM.

GRADE POINT AVERAGE SYSTEM (GPA)

GRADE	GRADE POINT
A	4.00
A-	3.67
B+	3.33
B	3.00
B-	2.67
C+	2.33
C	2.00
C-	1.67
D+	1.33
D	1.00
D-	0.67
F	0.00

PNG > 2.00: ACTIVE

CREDIT PER SEMESTER:

- Minimum : 9 Units
- Maximum : 20 Units

PNG < 1.99: P1, P2, FO

- Not allowed for e-registration
- P1 : Maximum : 12 Units
- P2 : Maximum : 10 Units

SCHOOL OF CHEMICAL SCIENCES, UNIVERSITI SAINS MALAYSIA

YEAR	1				2				3				4				TOTAL
SEMESTER	I	Units	II	Units													
CORE (T)																	
ELECTIVE (E)																	
UNIVERSITY (U)																	
TOTAL																	
PNG																	
PNG-AT																	
PNGK																	
STUDENT'S SIGNATURE																	

YEAR 1	SEMESTER I	SEMESTER II
COMMENTS BY ACADEMIC ADVISOR		
ACADEMIC ADVISOR'S SIGNATURE		
STUDENT'S SIGNATURE		
DATE		

YEAR 2	SEMESTER I	SEMESTER II
COMMENTS BY ACADEMIC ADVISOR		
ACADEMIC ADVISOR'S SIGNATURE		
STUDENT'S SIGNATURE		
DATE		

YEAR 3	SEMESTER I	SEMESTER II
COMMENTS BY ACADEMIC ADVISOR		
ACADEMIC ADVISOR'S SIGNATURE		
STUDENT'S SIGNATURE		
DATE		

YEAR 4	SEMESTER I	SEMESTER II
COMMENTS BY ACADEMIC ADVISOR		
ACADEMIC ADVISOR'S SIGNATURE		
STUDENT'S SIGNATURE		
DATE		



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SCHOOL OF CHEMICAL SCIENCES

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