

# B.Sc. (Hons.) (Chemistry)

School of Chemical Sciences



# MAIN ADMINISTRATIVE STAFF

## DEAN



**Prof. Dr. Rohana Adnan**

## DEPUTY DEANS



**Assoc. Prof. Dr. Melati Khairuddean**  
(Academic, Career & International)



**Assoc. Prof. Dr. Oo Chuan Wei**  
(Research, Innovation & Industry-Community Engagement)

## PROGRAMME MANAGERS



**Assoc. Prof. Dr. Ng Eng Poh**  
(Physical Chemistry)



**Assoc. Prof. Dr. Mohd Rizal Razali**  
(Organic & Inorganic Chemistry)



**Assoc. Prof. Dr. Faiz Bukhari Mohd Suah**  
(Analytical Chemistry)



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

## ADMINISTRATIVE OFFICERS



**Dr. Subramaniam A/L Govindan**  
*Principal Assistant 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)	32/12
Minor (M)	0/20
University (U)	18
Total	120

#### (ii) Industrial Training

Students are encouraged to apply for Industrial Training (KIE361/4) after the 6<sup>th</sup> semester.

#### (iii) Chemistry Project

Students are encouraged to register for Chemistry Project (KUE409/6) during their final year of study. 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 (KUE409/6) may fulfill the 6 units requirement by registering other theory courses offered by the School.

#### (iv) Assessment

Course assessment will be based on:

- (i) Examination
- (ii) Coursework

The assessment will cover knowledge, applications, analytical, communication and writing skills. Skills will be assessed through the coursework in the form of assignments, quizzes, tests, presentations and/or laboratory reports.

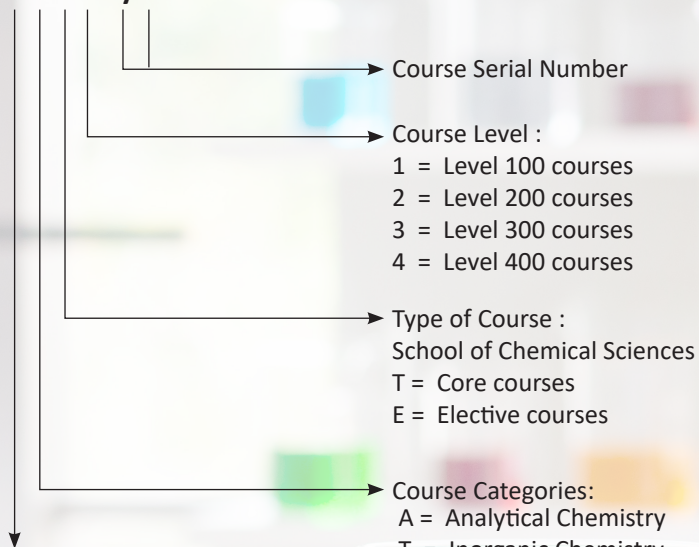


## SCHOOL OF CHEMICAL SCIENCES

### 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 :

School of Chemical Sciences

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

### B.Sc. (Hons.) (Chemistry)

#### (i) Core Courses (T) - 70 units

Selection of 3 or 4 units		Pre-requisites
ZCT103/3	Physics III (Vibrations, Waves and Optics)	
BOI102/3	Ecology	
BOI115/3	Plant and Animal Biodiversity	
Compulsory - 61 units		Pre-requisites
MAA101/4	Calculus for Science Student 1	
MAA102/4	Calculus for Science Student 2	
KUT101/2	General Chemistry Practical I	
KUT102/2	General Chemistry Practical II	
KTT112/4	Inorganic Chemistry I	
KOT122/4	Organic 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)
KFT233/4	Physical Chemistry I	KTT112 (s) or KOT122 (s)
KAT245/4	Analytical Chemistry I	KTT112 (s) or KOT122 (s)
KUT304/2	Physical Chemistry Practical	KUT102 (s)
KUT305/2	Analytical Chemistry Practical I	KUT101 (s), KAT349 (c)
KTT313/3	Inorganic Chemistry III	KTT212 (s)
KFT332/3	Physical Chemistry II	KFT233 (s)
KAT349/3	Analytical Chemistry II	KAT245 (s), KUT305 (c)
KUT407/2	Inorganic and Analytical Chemistry Practical	KUT203 (s), KUT305 (s)
KUT408/2	Physical and Organic Chemistry Practical	KUT206 (s), KUT304 (s)
KOT423/3	Organic Chemistry III	KOT222 (s)
KFT431/3	Physical Chemistry III	KFT332 (s)
Selection of 6 units		
KUE409/6	Chemistry Project	
or	or	
6 units	Other theory courses from Analytical Chemistry, Industrial Chemistry and Pure Chemistry.	

## (ii) Elective Courses (E) - 32 units

### (a) Selection of 5 units or more

ZCT104/3	Physics IV (Modern Physics)
BOI117/2	Biodiversity and Ecology Practical
BST308/3	Tropical Ecosystem & Climate Change
BST405/3	Conservation Ecology and Natural Resources (Pre-requisite: BST308)
KUE306/2	Research Methodology in Chemistry - ( <i>Compulsory</i> )

### (b) Selection of 9 units

### Pre-requisites

KTE411/3	Selected Topics in Inorganic Chemistry	KTT212 (s)
KOE423/3	Selected Topics in Organic Chemistry*	KOT222 (s)
KFE432/3	Selected Topics in Physical Chemistry	KFT332 (s)

### (c) Selection of 18 units or more

**KIE361/4 Industrial Training**

Additional of 14 or 18 units to fulfill the elective component must be taken from Analytical Chemistry, Industrial Chemistry and other courses from the School of Physics, Mathematical Sciences, Biological Sciences, Industrial Technology or Centre for Global Archaeological Research.

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

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

\* = offered in alternate year



**(iii) Minor (M) & Elective (E) Programmes – 32 units****Elective (E) Components**

<b>(a) Selection of 12 units</b>		<b>Pre-requisite</b>
ZCT104/3	Physics IV (Modern Physics)	
BOI117/2	Biodiversity and Ecology Practical	
BST308/3	Tropical Ecosystem & Climate Change	
BST405/3	Conservation Ecology and Natural Resources	BST308
KIT257/3	Materials Chemistry	
KUE306/2	Research Methodology in Chemistry – ( <i>Compulsory</i> )	
KAT345/4	Spectroscopic Methods	KAT245 (s)
KIT358/3	Polymer Chemistry	KOT122 (s)
KIE361/4	Industrial Training	
KTE411/3	Selected Topics in Inorganic Chemistry	KTT212 (s)
KOE423/3	Selected Topics in Organic Chemistry*	KOT222 (s)
KFE432/3	Selected Topics in Physical Chemistry	KFT332 (s)
KAE445/3	Bioanalysis	KAT344 (s) or KAT349 (s)
KIE456/3	Food and Palm Oil Chemistry	KOT122 (s)
KIE458/3	Selected Topics in Industrial Chemistry	
KIT458/3	Chemical Processing	KTT112 (s), KOT122 (s)

**Minor (M) Components****(c) 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 the Chemistry Students subjected to the requirements imposed by the School which offers the Minor Programmes such as Management, Computer, 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 concurrent)

\* = offered in alternate year

## Proposed Schedule by Semester

### B.Sc. (Hons.) (Chemistry)

YEAR 1					
COMPONENT	SEMESTER 1		SEMESTER 2		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	U	3	U	3	
	WUS101	2			
Core Courses (T)	KTT112	4	KOT122	4	
	KUT101	2	KUT102	2	
	MAA101	4	MAA102	4	
<b>TOTAL UNITS</b>		<b>15</b>		<b>13</b>	<b>28</b>

YEAR 2					
COMPONENT	SEMESTER 3		SEMESTER 4		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	*HFF225	2	*HFE224	2	
Core Courses (T)	KOT222	3	KTT212	3	
	KAT245	4	KFT233	4	
	KUT203	2	KUT206	2	
	ZCT103 (option)	3	BOM114 (option)	4	
Elective (E) or Minor (M) Courses	Elective / Minor	3	Elective / Minor	4	
<b>TOTAL UNITS</b>		<b>17/14</b>		<b>15/19</b>	<b>32/33</b>

**Note:** \*HFF225/2 (Falsafah dan Isu Semasa ) and HFE224/2 (Penghayatan Etika dan Peradaban)



YEAR 3					
COMPONENT	SEMESTER 5		SEMESTER 6		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)	LSP300	2	LSP402	2	
	**KAT349	3	**KFT332	3	
Core Courses (T)	KTT313	3	KUT304	2	
	KUT305	2			
2 Elective (E) or Minor (M) Courses	KUE306	2	Elective / Minor	9	
	BOM111 / BOM112 (option)	4	ZCT104 (option)	3	
<b>TOTAL UNITS</b>		<b>16/12</b>		<b>16/19</b>	<b>32/31</b>

**Note:** \*\*KAT349 can be registered with or without KUT305 and KFT332 can be registered with or without KUT304

YEAR 4					
COMPONENT	SEMESTER 7		SEMESTER 8		UNITS
	CODE	UNITS	CODE	UNITS	
University Courses (U)			LSP402	2	
Core Courses (T)	KUE409	3	KUE409	3	
	KFT431	3	KOT423	3	
	KUT408 / KUT407	2	KUT407 / KUT408	2	
Elective (E) or Minor (M) Courses	Elective / Minor	3	Elective / Minor	4	
	KIE361 / Elective / Minor	4			
<b>TOTAL UNITS</b>		<b>15</b>		<b>14</b>	<b>29</b>
<b>GRAND TOTAL UNITS</b>					<b>121</b>

## 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) 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:

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





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 SCAN ME

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