# BACHELOR OF APPLIED SCIENCE IN ANALYTICAL CHEMISTRY WITH HONOURS

## School of Chemical Sciences
## Academic Session 2025/2026

**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


**Assoc. Prof. Dr. Mazidatulakmam Miskam**
**Program Manager**
Analytical Chemistry

**Madam Rasslene Rass Rasalingam**
**Senior Assistant Registrar**

**Assoc. Prof. Ts. Dr. Noor Haida Mohd Kaus**
**Program Manager**
Physical Chemistry

**Prof. Dr. Mohd Hazwan Hussin**
**Program Manager**
Industrial Chemistry

**Dr. Yam Wan Sinn**
**Program Manager**
Organic & Inorganic Chemistry

**Mr. Mohd Zuaril Akimi Mohd Shaari**
**Senior Assistant Registrar**

**Prof. Dr. Mohamad Nasir Mohamad Ibrahim**
**Deputy Dean**
Research Innovation & Industry- Community Engagement

**Assoc. Prof. Dr. Mohd Rizal Razali**
**Dean**

**Dr. Ng Si Ling**
**Deputy Dean**
Academic, Career & International

**PROGRAMME EDUCATIONAL OBJECTIVES:**

PEO 1 : Analytical chemists who are able to apply the basic principles and practical skills of analytical chemistry based on conventional and modern chemical techniques.

PEO 2 : Ethical, pure-hearted, resilient analytical chemists who voluntarily involve in the community.

PEO 3 : Analytical chemists who demonstrate leadership skills and communicates effectively in a team to solve chemistry-related problems.

PEO 4 : Analytical chemists who are competent in digital and numerical skills, and able to respond consistently to the latest analytical chemistry techniques and demonstrate management and entrepreneurial skills.

**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 Applied Science in Analytical Chemistry with Honours**

## PROGRAMME STRUCTURE

### (i) Structure of Study Programme

| Course Component | Unit Requirements |
|---|---|
| Core (T) | 73 |
| Elective (E) | 30 |
| University (U) | 17 |
| **Total** | **120** |

For Bachelor of Applied Science in Analytical 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

For Bachelor of Applied Science in Analytical Chemistry with Honours, students are highly encouraged to enrol Industrial Training (KIE461/9). This course can be taken 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:

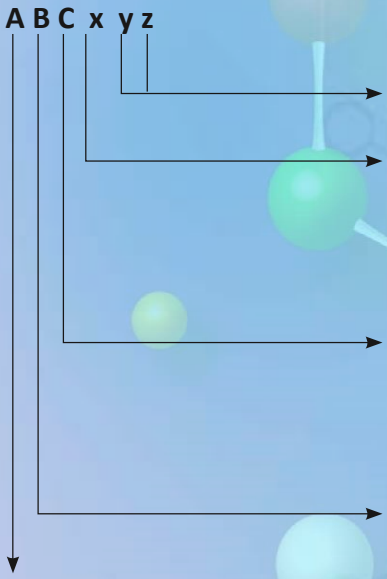
- Examination
- Coursework

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.

## SCHOOL OF CHEMICAL SCIENCES

### Course Code

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




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***

| **Bachelor of Applied Science in Analytical Chemistry with Honours** | | |
|---|---|---|
| **(i) Core Courses (T) - 73 credits** | | **Pre-requisites** |
| MAA101/4 | Calculus for Science Students 1 | |
| ZCT103/3 | Vibrations, Waves and Optics | |
| MAA161/4 | Statistics | |
| 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 | |
| KUT206/2 | Organic Chemistry Practical | KUT102 (s), KOT122 (s) |
| KTT212/3 | Inorganic Chemistry II | KTT112 (s) |
| KOT222/3 | Organic Chemistry II | KOT122 (s) |
| KFT234/3 | Physical Chemistry II | KFT133 (s) |
| KUT306/2 | Research Methodology in Chemistry | |
| KAT340/2 | Analytical Practical II | |
| KAT344/4 | Separation Methods | KAT145 (s) |
| KAT345/4 | Spectroscopic Methods | KAT145 (s) |
| KAT346/4 | Electroanalytical Methods | KAT145 (s) |
| KFT431/3 | Physical Chemistry III | KFT234 (s) |
| KAT442/4 | Environmental Pollution Chemistry | KAT344 (s), KAT345 (s) |
| KUE319/6<br>or<br>6 credits | Chemistry Project<br>or<br>Other theory courses from Analytical, Industrial or Pure Chemistry | |

| (ii) Elective Courses (E) – 30 credits | | |
|---|---|---|
| **(a) Selection of 18 credits or more** | | **Pre-requisites** |
| MAT181/4 | Programming for Scientific Applications | |
| KUT214/2 | Physical Chemistry Practical | KUT102 (s), KFT234 (c) |
| KIT257/3 | Materials Chemistry | |
| KAE348/2 | Chemical Processing | KTT112 (s), KOT122 (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 | Analytical Chemistry Practical III | KAT345 (s) |
| KIE461/9 | Industrial Training | |
| An additional **12 credits or less** to fulfil the elective component must be taken from any other schools not limited to School of Physics, Mathematical Sciences, Biological Sciences, or Centre for Global Archaeological Research. | | |

*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 Applied Science in Analytical Chemistry with Honours** | | |
|---|---|---|
| **(i) Core Courses (T) - 73 credits** | | **Pre-requisites** |
| MAA101/4 | Calculus for Science Students 1 | |
| ZCT103/3 | Vibrations, Waves and Optics | |
| MAA161/4 | Statistics | |
| 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 | |
| KUT206/2 | Organic Chemistry Practical | KUT102 (s), KOT122 (s) |
| KTT212/3 | Inorganic Chemistry II | KTT112 (s) |
| KOT222/3 | Organic Chemistry II | KOT122 (s) |
| KFT234/3 | Physical Chemistry II | KFT133 (s) |
| KAT340/2 | Analytical Practical II | |
| KAT344/4 | Separation Methods | KAT145 (s) |
| KAT345/4 | Spectroscopic Methods | KAT145 (s) |
| KAT346/4 | Electroanalytical Methods | KAT145 (s) |
| KUT306/2 | Research Methodology in Chemistry | |
| KFT431/3 | Physical Chemistry III | KFT234 (s) |
| KAT442/4 | Environmental Pollution Chemistry | KAT344 (s), KAT345 (s) |
| KUE319/6<br>or<br>6 credits | Chemistry Project<br>or<br>Other theory courses from Analytical, Industrial or Pure Chemistry | |

| (iii) Elective (E) – 30 credits | | |
|---|---|---|
| **Elective (E) Components** | | **Pre-requisites** |
| **(a) Selection of 10 credits** | | |
| MAT181/4 | Programming for Scientific Applications | |
| KUT214/2 | Physical Chemistry Practical | KUT102 (s), KFT 234 (c) |
| KIT257/3 | Materials Chemistry | |
| KAE348/2 | Analytical Chemistry Practical III | KAT345 (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) |
| **Open Elective** | | |
| **(b) Selection of 20 credits** | | |
| Select from any offered programme.<br>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. | | |

*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 APPLIED SCIENCE IN ANALYTICAL 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) | KTT112 | 4 | KOT122 | 4 | |
| | KUT102 | 2 | KUT101 | 2 | |
| | MAA101 | 4 | KAT145 | 4 | |
| | ZCT103 | 3 | KUT100 | 2 | |
| Elective (E) | | | | | |
| **TOTAL CREDIT HOURS** | | **15** | | **14** | **29** |

Note: [1]Local 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 | |
| | | | U | 2 | |
| Core Courses (T) | KUT206 | 2 | KTT212 | 3 | |
| | KOT222 | 3 | MAA161 | 4 | |
| | KFT133 | 4 | | | |
| Elective (E) | Elective | 5 | Elective | 6 | |
| **TOTAL CREDIT HOURS** | | **16** | | **17** | **33** |

Note: [3] HFE225/2- Local and International students.
[4] HFE224/2- Local students only.

| YEAR 3 | | | | | |
|---|---|---|---|---|---|
| COMPONENT | SEMESTER 5 | | SEMESTER 6 | | CREDIT |
| | CODE | CREDIT HOURS | CODE | CREDIT HOURS | |
| University Courses (U) | [5]LSP201 | 2 | [5]LSP301 | 2 | |
| Core Courses (T) | KFT234 | 3 | KAT345 | 4 | |
| | KAT340 | 2 | KAT346 | 4 | |
| | KAT344 | 4 | KUE319 | 3 | |
| | KUT306 | 2 | | | |
| Elective (E) | Elective | 5 | Elective | 2 | |
| **TOTAL CREDIT HOURS** | | **18** | | **15** | **33** |

Note: [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 4 | | | | | |
|---|---|---|---|---|---|
| COMPONENT | SEMESTER 7 | | SEMESTER 8 | | CREDIT |
| | CODE | CREDIT HOURS | CODE | CREDIT HOURS | |
| University Courses (U) | U | 3 | | | |
| Core Courses (T) | KUE319 | 3 | KIE461: Industrial Training for 1 Semester (18 weeks) with Industry/ Government Agency/ Private Company | 9 | |
| | KFT431 | 3 | | | |
| | KAT442 | 4 | | | |
| Elective (E) | Elective | 3 | | | |
| **TOTAL CREDIT HOURS** | | **16** | | **9** | **25** |
| **GRAND TOTAL CREDIT HOURS** | | | | | **120** |

**BACHELOR OF APPLIED SCIENCE IN ANALYTICAL 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) | KTT112 | 4 | KOT122 | 4 | |
| | KUT102 | 2 | KUT101 | 2 | |
| | MAA101 | 4 | KAT145 | 4 | |
| | ZCT103 | 3 | KUT100 | 2 | |
| Elective (E) | | | Elective | 2 | |
| **TOTAL CREDIT HOURS** | | **15** | | **14** | **29** |

Note: [1]Local 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 | |
| Core Courses (T) | KUT206 | 2 | KTT212 | 3 | |
| | KOT222 | 3 | MAA161 | 4 | |
| | KFT133 | 4 | | | |
| Elective (E) | Elective | 4 | Elective | 4 | |
| | | | Elective | 4 | |
| **TOTAL CREDIT HOURS** | | **15** | | **17** | **32** |

Note: [3] HFE225/2- Local and International students.
[4] HFE224/2- Local students only.

| YEAR 3 | | | | | |
|---|---|---|---|---|---|
| COMPONENT | SEMESTER 5 | | SEMESTER 6 | | CREDIT |
| | CODE | CREDIT HOURS | CODE | CREDIT HOURS | |
| University Courses (U) | [5]LSP201 | 2 | [5]LSP301 | 2 | |
| Core Courses (T) | KFT234 | 3 | KAT345 | 4 | |
| | KAT340 | 2 | KAT346 | 4 | |
| | KAT344 | 4 | KUE319 | 3 | |
| | KUT306 | 2 | | | |
| Elective (E) | Elective | 2 | Elective | 4 | |
| **TOTAL CREDIT HOURS** | | **15** | | **17** | **32** |

Note: [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 4 | | | | | |
|---|---|---|---|---|---|
| COMPONENT | SEMESTER 7 | | SEMESTER 8 | | CREDIT |
| | CODE | CREDIT HOURS | CODE | CREDIT HOURS | |
| University Courses (U) | U | 3 | U | 2 | |
| Core Courses (T) | KUE319 | 3 | | | |
| | KFT431 | 3 | | | |
| | KAT442 | 4 | | | |
| Elective (E) | Elective | 4 | Elective | 4 | |
| | | | Elective | 4 | |
| **TOTAL CREDIT HOURS** | | **17** | | **10** | **27** |
| **GRAND TOTAL CREDIT HOURS** | | | | | **120** |

## UNIVERSITY COURSE REQUIREMENTS

Students are required to take 17 credits for the following University courses/options for University needs:

<table>
<tr><th colspan="3" rowspan="2">UNIVERSITY COURSE REQUIREMENTS</th><th colspan="2">TOTAL CREDIT</th></tr>
<tr><th>Local Students</th><th>International Students</th></tr>
<tr><td colspan="3">General Studies (MPU)</td><td></td><td></td></tr>
<tr><td>U1</td><td colspan="2"><u>Local Students</u><br>▪ HFF225 (Philosophy and Current Issues) (2 credits)<br>▪ HFE224 (Appreciation of Ethics and Civilisations) (2 credits)<br>▪ LKM400 (Malay Language IV) (2 credits)<br><u>International Students of Science and Technology</u><br>▪ HFF225 (Philosophy and Current Issues) (2 credits)<br>▪ Malay Language course (2 credits)</td><td>6</td><td>4</td></tr>
<tr><td>U2 (Local students)<br>AND<br>U3 (International students)</td><td colspan="2"><u>Local Students</u><br>▪ WUS101 (Core Entrepreneurship) (2 credits)<br>▪ English Language Courses (4 credits)<br><u>International Students</u><br>▪ SEA205E (Malaysian Studies) (4 credits)<br>▪ English Language Courses (4 credits)</td><td>6</td><td>8</td></tr>
<tr><td>U4</td><td><u>Local Students</u><br>WAR122 (Integrity and Anti-Corruption Course) / Co-Curricular Courses</td><td><u>International Students</u><br>Co-Curricular Courses</td><td>2</td><td>2</td></tr>
<tr><td>Options</td><td colspan="2">Students can/have to choose any of the following:<br>▪ Co-curricular courses<br>▪ Skill courses/Foreign Language Courses/ Other courses offered by other schools</td><td>3</td><td>3</td></tr>
<tr><td></td><td colspan="2">TOTAL CREDIT</td><td>17</td><td>17</td></tr>
</table>

**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 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 | Unit | II | Unit | I | Unit | II | Unit | I | Unit | II | Unit | I | Unit | II | Unit | |
| CORE (T) | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | |
| 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 SIGNITURE | | |
| STUDENT'S SIGNATURE | | |
| DATE | | |

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

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

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

https://chem.usm.my/

https://chem.usm.my/index.php/others/current-undergraduate


**SCHOOL OF CHEMICAL SCIENCES**

Universiti Sains Malaysia
11800 USM, Pulau Pinang,
Malaysia
Contact No. : +604-6533262
Fax : +604-6574854