

**Chemistry**  
**Applicable to students admitted in 2018-19**

**Major Programme Requirement**

Students are required to complete a minimum of 58 units (70 units for Enrichment Stream, 64 units for Testing and Accreditation Stream) of courses as follows:

|   | Units     |
|---|-----------|
| 1. Faculty Package (for Major, Enrichment Stream, and Testing and Accreditation Stream):<br>Group B: CHEM1070<br>Group C: MATH1520 (preferred) or 1010 or 1550<br>A course from the following<br>Group A: LSCI1000 or 1001 or 1002<br>Group D[a]: PHYS1001 or 1002 or 1111<br>Group E: STAT1011 or 1012   | 9         |
| 2. Required Courses:<br>CHEM2120, 2200, 2270, 2300, 2310, 2320, 2400, 2408, 2820, 2830, 2850, 3130, 3220, 3320, 3410, 3810, 3830, 3860, 3870  | 37        |
| 3. Elective Courses:<br>(a) One combination from: CHEM3230/3820 or CHEM3330/3840<br>(b) One capstone courses combination from: CHEM4030/4040 or CHEM4980/4990 (with approval from the Department)<br>(c) Two courses from the following lists, of which at most one non-CHEM course:<br><u>Undergraduate electives:</u><br>CHEM4100, 4200, 4280, 4302, 4400, 4430, 4440, 4471, 4630, 4640, 4710, 4730, 4780, 4784, 4785, 4786, 4788<br><u>CHEM courses at 5000 level</u> (with approval from the Department):<br>CHEM5080, 5301, 5302, 5530, 5540, 5550, 5560, 5620, 5630, 5642, 5660, 5680, 5780, 5781, 5782, 5783, 5784, 5785, 5910, 5920, 5930<br><u>Non-CHEM courses:</u><br>BCHE4010#, CMBI4002#, ENSC4525#, 4535#, ESSC3220#, PHYS3021#, 3022#, 4031# | 12        |
| <b>Total:</b>   | <b>58</b> |

**Enrichment Stream**

|   |    |
|---|----|
| 2. Required Courses:<br>CHEM2120, 2200, 2270, 2300, 2310, 2320, 2400, 2408, 2820, 2830, 2850, 3130, 3220, 3230, 3320, 3330, 3410, 3810, 3820, 3830, 3840, 3860, 3870, 4980/4990 (capstone courses)  | 49 |
| 3. Elective Courses:<br>Six courses from the following lists, of which at most two CHEM courses at 5000 level and at most one non-CHEM course:<br><u>Undergraduate electives:</u><br>CHEM4100, 4200, 4280, 4302, 4400, 4430, 4440, 4471, 4630, 4640, 4710, 4730, 4780, 4784, 4785, 4786, 4788<br><u>CHEM courses at 5000 level</u> (with approval from the Department): | 12 |

CHEM5080, 5301, 5302, 5530, 5540, 5550, 5560, 5620, 5630, 5642, 5660, 5680, 5780, 5781, 5782, 5783, 5784, 5785, 5910, 5920, 5930

Non-CHEM courses:

BCHE4010#, CMBI4002#, ENSC4525#, 4535#, ESSC3220#, PHYS3021#, 3022#, 4031#

**Total:** 

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 **70**

**Testing and Accreditation Stream**

2. Required Courses: 47  
 CHEM2120, 2200, 2270, 2300, 2310, 2320, 2400, 2408, 2820, 2830, 2850, 3130, 3220, 3320, 3410, 3810, 3830, 3860, 3870, 4400, 4430, 4440, 4470, 4788

3. Elective Courses: 8

(a) CHEM4780 or 4784[b]

(b) One capstone courses combination from: CHEM4030/4040 or CHEM4980/4990 (with topic related to laboratory testing and approval from the Department)

(c) One course from the following lists[b]:

Undergraduate electives:

CHEM3230, 3330, 4100, 4200, 4280, 4302, 4630, 4640, 4710, 4730, 4785, 4786

CHEM courses at 5000 level (with approval from the Department):

CHEM5080, 5301, 5302, 5530, 5540, 5550, 5560, 5620, 5630, 5642, 5660, 5680, 5780, 5781, 5782, 5783, 5784, 5785, 5910, 5920, 5930

Non-CHEM courses:

BCHE4010#, CMBI4002#, ENSC4525#, 4535#, ESSC3220#, PHYS3021#, 3022#, 4031#

**Total:** 

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 **64**

In addition to fulfilling the above Major Programme Requirement, students meeting the criteria as specified by the Faculty can take the following stream offered by the Faculty:

**Science, Technology And Research Stream**

Students are required to complete a minimum of 12 units of courses as follows:

|   | Units |
|---|-------|
| 1. Required Courses:  |       |
| (a) One Faculty Package Course:<br>Choose from the two remaining groups of the Faculty Package that have not been used to fulfill the Faculty Package Requirement | 3     |
| (b) Research Courses:<br>STAR2000, 3000, 4000[c]  | 6     |
| (c) Seminar Courses:<br>STAR2050, 3050, 4050  | 3     |
| 2. Experiential Learning:<br>At least 4 consecutive weeks of outside Hong Kong exposure[d]  | ---   |

**Total: 12**

Explanatory Notes:

1. CHEM courses at 2000 and above level as well as those labeled as # will be included in the calculation of Major GPA for honours classification.
  2. Potential students majoring in Chemistry are strongly recommended to take CHEM1870 as basic training to prepare for laboratory classes in upper years.
  3. A student in the final year of attendance may, under special circumstances and with written approval from the Department, select CHEM4480 and/or 4490 to substitute up to two units of any lecture or laboratory courses in the Chemistry Programme.
- [a] All Chemistry students are required to take at least one course from PHYS1001, 1002 and 1111, including the ones listed under the Faculty Package.
- [b] Students who have taken both CHEM4780 and 4784 can use one of the courses to fulfill the Elective Courses requirement as prescribed in 3(c).
- [c] Students may select research-oriented course(s), as approved by the Major Programme, to substitute up to 4 units for fulfillment of Research Courses requirement.
- [d] Students must complete any exchange/research/internship programme(s) offered by the University, Colleges, the Faculty of Science or Major Programme, as approved by the Major Programme, to fulfill the Experiential Learning requirement. Students are responsible for the extra costs incurred in the exchange/research/internship programme(s).

Chemistry — Science, Technology And Research Stream (STARS)

|                                  | <b>Recommended Course Pattern</b>  | <b>Units</b> |
|----------------------------------|--|--------------|
| <b>First Year of Attendance</b>  | 1 <sup>st</sup> term<br>Faculty Package: CHEM1070; PHYS1001 or 1002 or 1111<br>Major Required:<br>Major Elective(s):                   | 6            |
|                                  | 2 <sup>nd</sup> term<br>Faculty Package: MATH1520 or 1010 or 1550; a course from Group A or E<br>Major Required:<br>Major Elective(s): | 6            |
| <b>Second Year of Attendance</b> | 1 <sup>st</sup> term<br>Major Required: CHEM2120, 2200, 2310, 2820, 2850<br>Major Elective(s):<br>STARS: STAR2000, 2050                | 10<br><br>2  |
|                                  | 2 <sup>nd</sup> term<br>Major Required: CHEM2270, 2300, 2320, 2400, 2408, 2830<br>Major Elective(s):<br>STARS: STAR3050                | 11<br><br>1  |
|                                  | 1 <sup>st</sup> term<br>Major Required: CHEM3220, 3320, 3410, 3810, 3830, 3870<br>Major Elective(s):<br>STARS: STAR3000                | 12<br><br>2  |
| <b>Third Year of Attendance</b>  | 2 <sup>nd</sup> term<br>Major Required: CHEM3130, 3860<br>Major Elective(s): CHEM3230, 3820 (or 3330, 3840)<br>STARS: STAR4050         | 4<br>4<br>1  |

|   |   |           |
|---|---|-----------|
| <b>Fourth Year of Attendance</b>          | 1 <sup>st</sup> term<br>Major Required:<br>Major Elective(s): CHEM4030 (or 4980) <sup>@</sup> , one elective course | 2         |
|   | 2 <sup>nd</sup> term<br>Major Required:<br>Major Elective(s): CHEM4040 (or 4990) <sup>@</sup> , one elective course | 6         |
| <b>Total (including Faculty Package):</b> |   | <b>67</b> |

<sup>@</sup> Students may take CHEM4030/4040 or CHEM4980/4990 as a substitute for STAR4000.

| Chemistry (Enrichment Stream) — Science, Technology And Research Stream (STARS) |  |           |
|---|--|-----------|
|   | <b>Recommended Course Pattern</b>  | Units     |
| <b>First Year of Attendance</b>   | 1 <sup>st</sup> term<br>Faculty Package: CHEM1070; PHYS1001 or 1002 or 1111<br>Major Required:<br>Major Elective(s):                   | 6         |
|   | 2 <sup>nd</sup> term<br>Faculty Package: MATH1520 or 1010 or 1550; a course from Group A or E<br>Major Required:<br>Major Elective(s): | 6         |
| <b>Second Year of Attendance</b>  | 1 <sup>st</sup> term<br>Major Required: CHEM2120, 2200, 2310, 2820, 2850<br>Major Elective(s):<br>STARS: STAR2000, 2050                | 10<br>2   |
|   | 2 <sup>nd</sup> term<br>Major Required: CHEM2270, 2300, 2320, 2400, 2408, 2830<br>Major Elective(s):<br>STARS: STAR3050                | 11<br>1   |
| <b>Third Year of Attendance</b>   | 1 <sup>st</sup> term<br>Major Required: CHEM3220, 3320, 3410, 3810, 3830, 3870<br>Major Elective(s):<br>STARS: STAR3000                | 12<br>2   |
|   | 2 <sup>nd</sup> term<br>Major Required: CHEM3130, 3230, 3330, 3820, 3840, 3860<br>Major Elective(s):<br>STARS: STAR4050                | 12<br>1   |
| <b>Fourth Year of Attendance</b>  | 1 <sup>st</sup> term<br>Major Required:<br>Major Elective(s): CHEM4980 <sup>@</sup> , three elective courses                           | 6         |
|   | 2 <sup>nd</sup> term<br>Major Required:<br>Major Elective(s): CHEM4990 <sup>@</sup> , three elective courses                           | 10        |
| <b>Total (including Faculty Package):</b>                                       |  | <b>79</b> |

<sup>@</sup> Students may take CHEM4980/4990 as a substitute for STAR4000.

| Chemistry (Testing and Accreditation Stream) — Science, Technology And Research Stream (STARS) |                                   |       |
|--|-----------------------------------|-------|
|  | <b>Recommended Course Pattern</b> | Units |

|                                  |   |             |
|----------------------------------|---|-------------|
| <b>First Year of Attendance</b>  | 1 <sup>st</sup> term<br>Faculty Package: CHEM1070; PHYS1001 or 1002 or 1111<br>Major Required:<br>Major Elective(s):                    | 6           |
|                                  | 2 <sup>nd</sup> term<br>Faculty Package: MATH1520 or 1010 or 1550; a course from Group A or E<br>Major Required:<br>Major Elective(s):  | 6           |
| <b>Second Year of Attendance</b> | 1 <sup>st</sup> term<br>Major Required: CHEM2120, 2200, 2310, 2820, 2850<br>Major Elective(s):<br>STARS: STAR2000, 2050                 | 10<br>2     |
|                                  | 2 <sup>nd</sup> term<br>Major Required: CHEM2270, 2300, 2320, 2400, 2408, 2830<br>Major Elective(s):<br>STARS: STAR3050                 | 11<br>1     |
|                                  | 1 <sup>st</sup> term<br>Major Required: CHEM3220, 3320, 3410, 3810, 3830, 3870<br>Major Elective(s):<br>STARS: STAR3000                 | 12<br>2     |
|                                  | 2 <sup>nd</sup> term<br>Major Required: CHEM3130, 3860<br>Major Elective(s): one elective course<br>STARS: STAR4050                     | 4<br>2<br>1 |
| <b>Fourth Year of Attendance</b> | 1 <sup>st</sup> term<br>Major Required: CHEM4400, 4440, 4470<br>Major Elective(s): CHEM4030 (or 4980) <sup>@</sup> , CHEM4780 (or 4784) | 6<br>2      |
|                                  | 2 <sup>nd</sup> term<br>Major Required: CHEM4430, 4788<br>Major Elective(s): CHEM4040 (or 4990) <sup>@</sup>                            | 4<br>4      |
|                                  | <b>Total (including Faculty Package):</b>   |             |

<sup>@</sup> Students may take CHEM4030/4040 or CHEM4980/4990 as a substitute for STAR4000.

### Course List

| <i>Course Code</i> | <i>Course Title</i>                                 | <i>Unit(s)</i> |
|--------------------|---|----------------|
| CHEM1070           | Principles of Modern Chemistry                      | 3              |
| CHEM1072           | General Chemistry                                   | 3              |
| CHEM1280           | Introduction to Organic Chemistry and Biomolecules  | 3              |
| CHEM1380           | Basic Chemistry for Engineers                       | 3              |
| CHEM1870           | General Chemistry Laboratory                        | 2              |
| CHEM2120           | Main Group Chemistry                                | 2              |
| CHEM2200           | Organic Functional Groups: Structure and Reactivity | 3              |
| CHEM2270           | Student Oriented Teaching                           | 1              |
| CHEM2300           | Thermodynamics and Chemical Equilibrium             | 3              |
| CHEM2310           | Atoms and Molecules                                 | 3              |
| CHEM2320           | Fundamentals of Spectroscopic Analysis              | 2              |
| CHEM2382           | Chemistry of Life                                   | 2              |
| CHEM2400           | Analytical Chemistry                                | 2              |
| CHEM2408           | Analytical Chemistry Laboratory I                   | 2              |
| CHEM2820           | Organic Chemistry Laboratory I                      | 2              |
| CHEM2822           | Introductory Organic Chemistry Laboratory           | 1              |
| CHEM2830           | Physical Chemistry Laboratory I                     | 2              |
| CHEM2850           | Inorganic Chemistry Laboratory I                    | 2              |
| CHEM3130           | Transition Metal Chemistry                          | 3              |
| CHEM3220           | Organic Reactions: Reactivity and Selectivity       | 2              |
| CHEM3230           | Conjugated Molecules and Synthetic Polymers         | 2              |
| CHEM3320           | Chemical Kinetics                                   | 3              |
| CHEM3330           | Molecular Spectroscopy                              | 2              |
| CHEM3410           | Instrumental Analysis                               | 3              |
| CHEM3810           | Organic Chemistry Laboratory II                     | 2              |
| CHEM3820           | Organic Chemistry Laboratory III                    | 2              |
| CHEM3830           | Physical Chemistry Laboratory II                    | 2              |
| CHEM3840           | Physical Chemistry Laboratory III                   | 2              |
| CHEM3860           | Inorganic Chemistry Laboratory II                   | 2              |
| CHEM3870           | Analytical Chemistry Laboratory II                  | 2              |
| CHEM4030           | Problem-based Learning I                            | 0              |
| CHEM4040           | Problem-based Learning II                           | 4              |
| CHEM4100           | Advanced Inorganic Chemistry                        | 3              |
| CHEM4200           | Bioorganic Chemistry and Chemical Biology           | 2              |
| CHEM4280           | Chemistry in Biofuel                                | 2              |
| CHEM4302           | Statistical Thermodynamics                          | 2              |
| CHEM4400           | Advanced Analytical Chemistry                       | 2              |
| CHEM4430           | Accreditation of Laboratory Tests                   | 2              |
| CHEM4440           | Food Testing and Environmental Analysis             | 3              |
| CHEM4470           | Internship in Accredited Laboratory                 | 2              |
| CHEM4471           | Internship  | 2              |
| CHEM4480           | Undergraduate Special Project I                     | 1              |
| CHEM4490           | Undergraduate Special Project II                    | 1              |
| CHEM4630           | Asymmetric Organic Synthesis                        | 2              |
| CHEM4640           | Pharmaceutical Chemistry                            | 2              |
| CHEM4710           | Quantum Chemistry                                   | 2              |
| CHEM4730           | Special Topics in Chemistry                         | 2              |
| CHEM4780           | Mass Spectrometry                                   | 2              |

|          |  |   |
|----------|--|---|
| CHEM4784 | Bioanalytical Methods                                      | 2 |
| CHEM4785 | Industrial Chemistry                                       | 2 |
| CHEM4786 | Principles and Applications of Coating Chemistry           | 2 |
| CHEM4788 | Chemical Applications in Forensic Science                  | 2 |
| CHEM4960 | Research in Chemical Science I                             | 2 |
| CHEM4970 | Research in Chemical Science II                            | 2 |
| CHEM4980 | Undergraduate Thesis I                                     | 0 |
| CHEM4990 | Undergraduate Thesis II                                    | 4 |
| CHEM5080 | Introduction to Macromolecules                             | 2 |
| CHEM5301 | Colloids and Surface Chemistry                             | 2 |
| CHEM5302 | Statistical Mechanics                                      | 2 |
| CHEM5530 | Advanced Organometallic Chemistry                          | 2 |
| CHEM5540 | Advanced Bioinorganic Chemistry                            | 2 |
| CHEM5550 | Organometallic Chemistry of f-Block Elements               | 2 |
| CHEM5560 | Organometallic Chemistry and Catalysis of d-Block Elements | 2 |
| CHEM5620 | Synthetic Methods in Organic Chemistry                     | 2 |
| CHEM5630 | Synthesis of Natural Products                              | 2 |
| CHEM5642 | Supramolecular Chemistry                                   | 2 |
| CHEM5660 | Advanced Organic Chemistry: Structures and Mechanisms      | 2 |
| CHEM5680 | Advanced Chemical Biology                                  | 3 |
| CHEM5780 | Mass Spectrometry of Biomolecules                          | 2 |
| CHEM5781 | Advanced NMR Spectroscopy                                  | 2 |
| CHEM5782 | Principles of Biomolecular NMR Spectroscopy                | 2 |
| CHEM5783 | Introduction to Laser Spectroscopy                         | 2 |
| CHEM5784 | Instrumental Analysis of Biomolecules                      | 2 |
| CHEM5785 | Electrochemical Energy Conversion and Storage              | 2 |
| CHEM5910 | Current Topics in Chemistry                                | 2 |
| CHEM5920 | Computational Chemistry                                    | 2 |
| CHEM5930 | Molecular Quantum Mechanics                                | 2 |
| STAR2000 | Undergraduate Research in Science I                        | 1 |
| STAR2050 | Seminar I  | 1 |
| STAR3000 | Undergraduate Research in Science II                       | 2 |
| STAR3050 | Seminar II   | 1 |
| STAR4000 | Undergraduate Research in Science III                      | 3 |
| STAR4050 | Seminar III  | 1 |