

Curriculum Information Record for a Major/Degree

Department of Chemistry Effective from Semester A 2023/24 For Students Admitted/Changed to the Major with Catalogue Term Semester A 2021/22 and thereafter

The information provided on this form is the official record of the major/degree. It will be used for City University's database, various City University publications (including websites) and documentation for students and others as required.

In specifying the curriculum for a major/degree, "catalogue term" is used to determine the set of curriculum requirements that a student is following. By mapping the student record and the version of curriculum rules applicable, the graduation requirements of individual students will be evaluated accordingly. The catalogue terms of curriculum requirements that students will follow are summarized below (BUS/04/A5R):

<u>Requirements</u>	<u>Catalogue Term</u>
a) Common Requirements <ul style="list-style-type: none"> • Gateway Education • University Language • College/School requirement 	The same as student's admission term
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b) Major <ul style="list-style-type: none"> • For normative 4-year degree students who will join the majors allocation exercise • For advanced standing students and 4-year degree students who already have a major at the time of admission • For students who have changed major 	Effective term of the declared major The same as student's admission term Effective term of the changed major
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c) Stream	Follow the effective term of the associated major

Prepared / Last Updated by

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City University of Hong Kong

Curriculum Information Record for a Major/Degree

Department of Chemistry

Effective from Semester A 2023/24

For Students Admitted/Changed to the Major with Catalogue Term
Semester A 2021/22 and thereafter

Part I Major/Degree Overview

Major (in English) : Chemistry
(in Chinese) : 化學

Degree *(For students admitted to the University in 2015/16 and thereafter)*
(in English) : Bachelor of Science
(in Chinese) : 理學士

(For students admitted to the University in 2014/15 and before)
(in English) : Bachelor of Science (Honours)
(in Chinese) : 榮譽理學士

Award Title[#] *(For students admitted to the University in 2016/17 and thereafter)*
(in English) : Bachelor of Science in Chemistry
(in Chinese) : 理學士(化學)

(For students admitted to the University in 2015/16)
(in English) : Bachelor of Science in Applied Chemistry
(in Chinese) : 理學士(應用化學)

(For students admitted to the University in 2014/15 and before)
(in English) : Bachelor of Science (Honours) in Applied Chemistry
(in Chinese) : 應用化學榮譽理學士

Please make reference to the "Guidelines on Award Titles" approved by the Senate when proposing new award titles or changes to existing award titles (Senate/86/A5R).

Note 1: For students with recognised Advanced Level Examination or equivalent qualifications.

Note 2: For Associate Degree/Higher Diploma graduates admitted to the senior year.

1. Normal and Maximum Period of Study

	Normative 4-year Degree	Advanced Standing I (Note 1)	Advanced Standing II (Senior-year Entry) (Note 2)
Normal period of study	4 years	3 years	2 years
Maximum period of study	8 years	6 years	5 years

2. Minimum Number of Credit Units Required for the Award and Maximum Number of Credit Units Permitted

Degree Requirements	Normative 4-year Degree	Normative 4- year Degree (GREAT Stream)	Advanced Standing I	Advanced Standing II (Senior-year Entry)
Gateway Education requirement *	30 credit units	30 credit units	21 credit units	12 credit units
College/School requirement *	6 credit units	13-17 credit units	waived	waived
Major requirement	66 credit units (Core: 38 Elective: 28)	55-59 [#] credit units (Core: 38 Elective: 17-21)	57 credit units (Core: 38 Elective: 19)	45 credit units (Core: 38 Elective: 7)
Free electives / Minor (if applicable)	18 credit units	18-22 credit units	12 credit units	3 credit units
Minimum number of credit units required for the award	120 credit units	120 credit units	90 credit units	60 credit units
		[#] The major requirement, plus any college/ school requirement, should fall within the range of 54-72 credit units		

Maximum number of credit units permitted	144 credit units	144 credit units	114 credit units	84 credit units
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* For details, please refer to the Curriculum Information Record for Common Requirements.

3. Aims of Major

This major aims to provide students with a firm foundation in chemical sciences with a focus on analytical chemistry, environmental chemistry, inorganic chemistry, organic chemistry, and physical chemistry. It is designed to train and produce graduates who are able to pursue a developing career in local and regional industrial, commercial, government, education, and research sectors.

For the stream of Comprehensive Chemistry:

The Comprehensive Chemistry stream aims to provide students with a broad and balanced appreciation of key chemical concepts, a range of practical skills to work safely in the laboratory and the ability to apply standard methodology to the solution of problems in chemistry. It is designed to facilitate students who are determined to work for a degree that is accredited by the Royal Society of Chemistry (RSC).

For the stream of Cosmetic Chemistry:

The Cosmetic Chemistry stream is designed to provide students with solid foundation, in-depth knowledge and professional training in the area of cosmetic chemistry. It aims to produce graduates interested in pursuing a career in the cosmetic industry.

For the stream of Forensic Chemistry:

The Forensic Chemistry stream is designed to provide students with solid foundation, in-depth knowledge and professional training in the area of forensic chemistry. It aims to produce graduates interested in pursuing a career in this specific field of applied chemistry.

For the stream of Global Research Enrichment and Technopreneurship Programme (GREAT):

The GREAT stream is designed for students who have a good and solid foundation in Chemistry. It aims to produce graduates interested in pursuing a career in scientific research or starting business ventures that involve the use of new scientific discoveries and innovative technologies.

4. Intended Learning Outcomes of Major (MILOs)

(Please state what the student is expected to be able to do on completion of the major according to a given standard of performance.)

Upon successful completion of this major, students should be able to:

No.	MILOs	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
		A1	A2	A3
	Describe the general chemical principles appropriate to the study of chemistry.			
1.	• Explain the important aspects of chemical terminology, nomenclature, convention and units.	√		
2.	• Describe the structure and properties of atoms, ions, molecules and materials.	√		
3.	• Apply the principles of thermodynamics and kinetics to chemistry.	√	√	
4.	• Apply the principles and procedures used in chemical analysis and characterization.	√	√	
	Competently perform a wide range of laboratory and technical procedures in chemistry.			
5.	• Handle chemicals in a professional manner, through knowledge and adherence to chemical safety legislation.	√	√	
6.	• Operate laboratory procedures in synthetic and analytical chemistry.		√	
7.	• Evaluate experimental data through testing hypotheses, defining problems and creating innovative and practical solutions.		√	
8.	• Communicate and cooperate with other personnel and participate as an effective team member.	√	√	

	<i>Critically evaluate experiments in chemistry as reported in the literature and synthesize information in a constructive manner.</i>			
9.	• Demonstrate the ability in oral and written presentations and recognize the limitations inherent in hypotheses.		√	
10.	• Develop strategies for creating, updating, maintaining and enhancing knowledge in chemistry.		√	√
	<i>Identify, analyze and reflect upon the responsibilities of chemists by applying chemical knowledge to society, commerce and the environment.</i>			
11.	• Apply knowledge of synthetic chemistry for the discovery and design of compounds with new and interesting properties.		√	√
12.	• Apply the concepts and principles of chemical analysis to environmental, industrial, biological and food sciences.		√	√
13.	• Apply chemical knowledge to address ethical and social issues in the work environment.			√

A1: *Attitude*

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: *Ability*

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: *Accomplishments*

Demonstrate accomplishments of discovery/innovation/creativity through producing/constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Part II Major Requirement

(The catalogue term of the major requirement that students will follow will be the effective term of the declared/allocated major.

For normative 4-year degree students who will join the majors allocation exercise, the catalogue term of major requirement will be one year after admission.

For advanced standing students and 4-year degree students who already have a major at the time of admission, the catalogue term of major requirement will be the same as their admission term.)

1. Core Courses (38 credit units)

Course Code	Course Title	Level	Credit Units	Remarks
MA2172	Applied Statistics for Sciences and Engineering	B2	3	
CHEM2004	Principles of Analytical Chemistry	B2	4	
CHEM2006	Principles of Inorganic Chemistry	B2	4	
CHEM2007	Principles of Organic Chemistry	B2	4	
CHEM2008	Principles of Physical Chemistry	B2	4	
CHEM2073	Entrepreneurship Programme In Chemistry 1	B2	3	
CHEM3014	Inorganic Chemistry	B3	4	

CHEM3015	Organic Chemistry	B3	4	
CHEM3016	Physical Chemistry	B3	4	
CHEM3027	Analytical Chemistry	B3	4	

2. Electives

Normative 4-year Degree: 28 credit units

Advanced Standing I: 19 credit units

Advanced Standing II: 7 credit units

Choose electives from both Group A and Group B.

Group A (at least 3 credit units or above)

Course Code	Course Title	Level	Credit Units	Remarks
CHEM3042	Directed Studies in Biology/Chemistry/Environmental Sciences	B3/B4	1-4	Exclusive from Group B, i.e. students can choose this course in either Group A <u>or</u> Group B.
CHEM4036	Project	B4	6	Students of the GREAT stream cannot take this course.
CSCI4002 <u>or</u> CSCI4005	Industrial Attachment Scheme for Science Students Overseas Internship Scheme for Science Students	B3	3	

Note:

Students who have completed exchange studies with credit transfer (at least 3 credit units) are considered as having fulfilled Group A requirement.

Group B

Course Code	Course Title	Level	Credit Units	Remarks
CS2204	Fundamentals of Internet Applications Development	B2	3	
CS2360	Java Programming	B2	3	
CSCI3001	Grand Challenges in the World	B3	3	
MA2008	Mathematical and Statistical Laboratory	B2	3	Not offered to Year 2 students of normative 4-year degree and Year 1 students of Advanced Standing I. Course offered in alternate years from 2015/16.
CHEM2003	Biochemistry	B2	3	BMS2004 Biochemistry is an equivalent course offered to students from 2017/18.

CHEM2005	Principles of Environmental Chemistry	B2	4	
CHEM3012	Genetics	B3	4	BMS3203 Genetics is an equivalent course offered to students from 2022/23.
CHEM3038	Environmental Sampling and Risk Assessment	B3	4	
CHEM3042	Directed Studies in Biology/ Chemistry/ Environmental Sciences	B3/B4	1-4	Exclusive from Group A, i.e. students can choose this course in either Group A <u>or</u> Group B.
CHEM3081	Chemical Biology of DNA and RNA	B3	3	
CHEM3084	Forensic Imaging	B3	3	
CHEM3085	Gemological Science	B3	3	
CHEM4021	Environmental Pollution	B4	4	
CHEM4022	Environmental Toxicology	B4	4	
CHEM4037	Seminar Series	B4	3	
CHEM4041	Selected Topics in Chemistry	B4	4	
CHEM4088	Entrepreneurship Programme In Chemistry 2	B4	6	
CHEM3052	Chemistry Beyond the Molecule: Supramolecular Chemistry	B3	3	Course offered in alternate years.
CHEM3053	Computational Chemistry	B3	3	Course offered in alternate years.
CHEM3055	Green Chemistry	B3	3	Course offered in alternate years.
CHEM3082	Graphene: Fundamentals and Emergent Applications	B3	3	Course offered in alternate years.
CHEM3083	Cosmetic Chemistry	B3	3	Course offered in alternate years.
CHEM4029	Advanced Analytical Chemistry	B4	4	Course offered in alternate years.
CHEM4030	Advanced Inorganic Chemistry	B4	4	Course offered in alternate years.
CHEM4031	Advanced Organic Chemistry	B4	4	Course offered in alternate years.
CHEM4033	Industrial Chemistry	B4	4	Course offered in alternate years.
CHEM4034	Environmental Control and Waste Treatment	B4	4	Course offered in alternate years.
CHEM4035	Environmental Measurements	B4	4	Course offered in alternate years.
CHEM4043	Food Chemistry	B4	3	Course offered in alternate years.
CHEM4045	Medicinal Chemistry	B4	3	Course offered in alternate years.
CHEM4051	Forensic Chemistry	B4	3	Course offered in alternate years.
CHEM4054	Chemical Bonding and Molecular Spectroscopy	B4	3	Course offered in alternate years.
CHEM4084	Crystallography/Solid-state Inorganic Chemistry	B4	4	Course offered in alternate years.
CHEM4085	Testing and Certification Sciences	B4	4	Course offered in alternate years.
CHEM4089	Techniques and Instrumentation for Chemical Biology	B4	4	Course offered in alternate years.

For the Comprehensive Chemistry stream:**Core Course (23-24 credit units)**

Course Code	Course Title	Level	Credit Units	Remarks
CHEM1300	Principles of General Chemistry	B1	3	
CHEM4030	Advanced Inorganic Chemistry	B4	4	
CHEM4031	Advanced Organic Chemistry	B4	4	
CHEM4054	Chemical Bonding and Molecular Spectroscopy	B4	3	
CHEM4036	Project	B4	6	To be taken in Year 4*
<i>Choose at least one of the following two courses:</i>				
CHEM3042	Directed Studies in Biology/Chemistry/Environmental Sciences	B3/B4	3 or 4	To be taken in Year 4*
CHEM4037	Seminar Series	B4	3	To be taken in Year 4*

* These courses with independent investigative methodology are required to account for 25% of the final year work load.

For the Cosmetic Chemistry stream:**Electives (13 – 16 credit units)**

Course Code	Course Title	Level	Credit Units	Remarks
CHEM3083	Cosmetic Chemistry	B3	3	
CSCI4002	Industrial Attachment Scheme for Science Students	B4	3	Project titles to be agreed by the Hong Kong Society of Cosmetic Chemists (HKSCC)
<i>Choose at least one out of the following three courses:</i>				
CHEM4030	Advanced Inorganic Chemistry	B4	4	
CHEM4031	Advanced Organic Chemistry	B4	4	
CHEM4045	Medicinal Chemistry	B4	3	
<i>Choose one out of the following two courses:</i>				
CHEM3042	Directed Studies in Biology/Chemistry/Environmental Sciences	B3/B4	4	Project in CHEM3042 and CHEM4036 shall be related to Cosmetic Chemistry.
CHEM4036	Project	B4	6	

For the Forensic Chemistry stream:**Electives (16 – 17 credit units)**

Course Code	Course Title	Level	Credit Units	Remarks
CHEM2003	Biochemistry	B2	3	

CHEM2809	Science Versus Crime	B2	3	
CHEM3084	Forensic Imaging	B3	3	
CHEM4051	Forensic Chemistry	B4	3	
Choose at least one out of the following two courses:				
CHEM3017	Molecular Biology	B3	4	
CHEM3081	Chemical Biology of DNA and RNA	B3	3	
Choose one out of the following two courses:				
CHEM3042	Directed Studies in Biology/ Chemistry/Environmental Sciences	B3/B4	4	Project in CHEM3042 shall be related to Forensic Science.
CHEM4089	Techniques and Instrumentation for Chemical Biology	B4	4	

For the GREAT stream:

1. Core Courses (38 credit units)

Course Code	Course Title	Level	Credit Units	Remarks
CHEM3014	Inorganic Chemistry	B3	4	
CHEM3015	Organic Chemistry	B3	4	
CHEM3016	Physical Chemistry	B3	4	
CHEM3027	Analytical Chemistry	B3	4	
CHEM4086	Independent Research I	B4	8	
CHEM4087	Independent Research II	B4	8	
MGT2324	Introduction to Entrepreneurship	B2	3	
MGT4305	Developing and Presenting a Business Plan	B4	3	

2. Electives (17-21 credit units)

Course Code	Course Title	Level	Credit Units	Remarks
Students can select any electives from the current major electives listed under Group A and B as above <u>except</u> CHEM4036 Project.				
CSCI4007	Patent Application and Technopreneurship	B4	3	

Part III Admission Requirements for Entry to the Major, if any

(Admission requirements here refers to specific requirements for students already admitted to the College/School/Department with an undeclared major. Academic units can state the prerequisites required for admission to the major.)

Nil

Part IV Accreditation by Professional / Statutory Bodies

Nil

Part V Additional Information

Nil

Part VI Curriculum Map

(The curriculum map shows the mapping between courses and the MILOs. It should cover all courses designed specifically for the major.)

Course			MILOs													DEC		
Code	Title	Credit	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	A1	A2	A3
Core Courses																		
MA2172	Applied Statistics for Sciences and Engineering	3							✓								✓	
CHEM1300	Principles of General Chemistry (applied to the Comprehensive Chemistry Stream only)	3	✓	✓	✓		✓		✓	✓	✓					✓	✓	
CHEM2004	Principles of Analytical Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
CHEM2006	Principles of Inorganic Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CHEM2007	Principles of Organic Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	
CHEM2008	Principles of Physical Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓						✓	✓	
CHEM2073	Entrepreneurship Programme In Chemistry 1	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	
CHEM3014	Inorganic Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓
CHEM3015	Organic Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓							✓	✓
CHEM3016	Physical Chemistry	4	✓	✓	✓	✓		✓		✓							✓	✓
CHEM3027	Analytical Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
CHEM4086	Independent Research I	8					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4087	Independent Research II	8					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MGT2324	Introduction to Entrepreneurship	3								✓	✓	✓	✓	✓	✓		✓	✓
MGT4305	Developing and Presenting a Business Plan	3								✓	✓	✓	✓	✓	✓		✓	✓
Electives																		
CS2204	Fundamentals of Internet Applications Development	3							✓								✓	
CS2360	Java Programming	3							✓								✓	
CSCI3001	Grand Challenges in the World	3					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CSCI4007	Patent Application and Technopreneurship	3							✓	✓	✓	✓	✓	✓	✓		✓	✓
MA2008	Mathematical and Statistical Laboratory	3							✓								✓	
CHEM2003	Biochemistry	3	✓	✓	✓	✓	✓		✓							✓	✓	
CHEM2005	Principles of Environmental Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CHEM2809	Science Versus Crime	3				✓					✓			✓	✓		✓	✓
CHEM3012	Genetics	4	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
CHEM3017	Molecular Biology	4				✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓

CHEM3038	Environmental Sampling and Risk Assessment	4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM3042	Directed Studies in Biology/ Chemistry/ Environmental Sciences	1-4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM3081	Chemical Biology of DNA and RNA	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM3084	Forensic Imaging	3					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM3085	Gemological Science	3				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4021	Environmental Pollution	4					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4022	Environmental Toxicology	4					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4036	Project	6					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4037	Seminar Series	3								✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4041	Selected Topics in Chemistry	4	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4088	Entrepreneurship Programme In Chemistry 2	6					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM3052 [#]	Chemistry Beyond the Molecule: Supramolecular Chemistry	3	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM3053 [#]	Computational Chemistry	3	✓	✓	✓												✓	✓
CHEM3055 [#]	Green Chemistry	3	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM3082 [#]	Graphene: Fundamentals and Emergent Applications	3	✓	✓	✓	✓					✓	✓	✓				✓	✓
CHEM3083 [#]	Cosmetic Chemistry	3				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4029 [#]	Advanced Analytical Chemistry	4	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM4030 [#]	Advanced Inorganic Chemistry	4	✓	✓	✓	✓					✓	✓	✓		✓	✓	✓	✓
CHEM4031 [#]	Advanced Organic Chemistry	4	✓	✓	✓	✓							✓		✓	✓	✓	✓
CHEM4033 [#]	Industrial Chemistry	4	✓		✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓
CHEM4034 [#]	Environmental Control and Waste Treatment	4							✓	✓	✓	✓		✓	✓	✓	✓	✓
CHEM4035 [#]	Environmental Measurements	4				✓		✓	✓	✓	✓			✓	✓	✓	✓	✓
CHEM4043 [#]	Food Chemistry	3	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
CHEM4045 [#]	Medicinal Chemistry	3		✓	✓						✓		✓		✓	✓	✓	✓
CHEM4051 [#]	Forensic Chemistry	3				✓					✓		✓	✓	✓	✓	✓	✓
CHEM4054 [#]	Chemical Bonding and Molecular Spectroscopy	3	✓	✓	✓	✓							✓	✓		✓	✓	✓
CHEM4084 [#]	Crystallography/Solid-state Inorganic Chemistry	4	✓	✓	✓	✓							✓	✓		✓	✓	✓
CHEM4085 [#]	Testing and Certification Sciences	4	✓	✓	✓	✓			✓		✓	✓		✓	✓	✓	✓	✓

CHEM4089#	Techniques and Instrumentation for Chemical Biology	4					✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
CSCI4002 or CSCI4005	Industrial Attachment Scheme for Science Students Overseas Internship Scheme for Science Students	3					✓	✓	✓	✓	✓	✓	✓	✓	✓			✓

#Courses offered in alternate years.

- A1: *Attitude*
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.
- A2: *Ability*
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.
- A3: *Accomplishments*
Demonstrate accomplishments of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.