

## Bachelor of Science Program in Chemistry (International Program)

### 1. Code and Program Title

In Thai	หลักสูตรวิทยาศาสตรบัณฑิต สาขาวิชาเคมี (หลักสูตรนานาชาติ)
In English	Bachelor of Science Program in Chemistry (International Program)

### 2. Title of Degree and Field of Study

In Thai	Full Title	วิทยาศาสตรบัณฑิต (เคมี)
	Abbreviation	วท.บ. (เคมี)
In English	Full Title	Bachelor of Science (Chemistry)
	Abbreviation	B.Sc. (Chemistry)

### 3. Major Subject (If Applicable) -

### 4. Career Opportunities after Graduation

Graduates of the international bachelor chemistry program can find employment in

- 1) Quality control or quality assurance positions or as a research scientist in local and multinational chemical, petrochemical, pharmaceutical and cosmetic science manufacturing and related industries
- 2) Research assistant in private sector and governmental services department.
- 3) Customer relations and as technical-support in sales and marketing team for local and international chemical, petrochemical, pharmaceutical and cosmetic science related companies
- 4) Entrepreneurship in applied chemical and cosmetic industries.
- 5) Establishing regional office for multinational science-related companies.

### 5. Total Credits Required

**No less than 184 credits**

Note: If students are placed into the 'Advanced Track' for their General Education requirement in English Communication, 4 credits of General Education in English Communication will be waived.

### 6. Program Structure

1) Foundation Courses	Non-credit
2) General Education Courses	<b>44 credits</b>
- English Communication	16 credits
- Natural Sciences	4 credits
- Humanities and Foreign Languages	12 credits
- Social Sciences	8 credits
- Physical Education	4 credits
3) Major Courses	<b>132 credits</b>

- Core Courses	42	credits
- Required Courses	62	credits
- Track Required Courses	16	credits
- Track Elective Courses	12	credits

**4) Free Electives** **8 credits**

#### Foundation Courses

**Non-credit**

ICID 100	Freshman Seminar	0
ICME 100	English Resource Skills	0
ICMA 100	Foundation Mathematics	0

Note I: All students must take ICID 100 Freshman Seminar, a non-credit course.

Note II: Students whose English placement is below ICGC 101 Academic Writing and Research I are required to take ICME 100 English Resource Skills and pass the course with the grade of "S" before moving to ICGC 101 Academic Writing and Research I

Note III: Students whose Mathematics placement is below ICMA 106 Calculus I or ICMA 151 Statistics for Science I are required to take ICMA 100 Foundation Mathematics and pass the course with the grade of "S" before moving to ICMA 106 Calculus I or ICMA 151 Statistics for Science I.

#### General Education

**44 Credits**

##### English Communication

**16 Credits**

ICGC 101	Academic Writing and Research I	4
ICGC 102	Academic Writing and Research II	4
ICGC 103	Public Speaking	4
ICGC 111	Academic Writing and Research I (Advanced)	4
ICGC 112	Academic Writing and Research II (Advanced)	4
ICGC 201	Global Realities	4
ICGC 202	Literary Analysis	4
ICGC 203	Creative Writing	4
ICGC 204	Advanced Oral Communication	4
ICGC 205	Linguistics	4
ICGC 206	Literature Into Film	4
ICGC 207	Diverse English Speaking Cultures	4
ICGC 208	Language and Culture	4
ICGC 209	The Story of English	4

ICGC 210	First and Second Language Acquisition	4
ICGC 211	Topics in Comparative Literature A: Poetry	4
ICGC 212	Topics in Comparative Literature B: The Short Story and the Novel	4
ICGC 213	Topics in Comparative Literature C: Drama	4

### Natural Sciences

4 Credits

- **Scientific and Environmental Literacy**

ICGN 101	Decision Mathematics	4
ICGN 102	Essential Mathematics	4
ICGN 103	Essential Statistics	4
ICGN 104	Mathematics and Its Contemporary Applications	4
ICGN 105	Ecology, Ecosystems and Socio-Economics in Southeast Asia	4
ICGN 106	Climate Change and Human Society	4
ICGN 107	The Chemistry of Everyday Life	4
ICGN 108	Essentials of Culinary Science for Food Business	4
ICGN 109	Food for Health	4
ICGN 110	Maker Workshop	4
ICGN 111	Physics for CEO	4
ICGN 112	Stargazer	4
ICGN 113	Plants, People and Poisons	4
ICGN 114	The Scientific Approach and Society	4
ICGN 115	Human Evolution, Diversity and Health	4

- **ICT and Digital Literacy**

ICGN 116	Understanding and Visualizing Data	4
ICGN 117	Technology behind E-Business and Digital Strategies	4
ICGN 118	Everyday Connectivity	4
ICGN 119	Computer Essentials	4

## Humanities and Foreign Languages

12 Credits

### Humanities

- **Logical and Ethical Literacy**

ICGH 101	Biotechnology: from Science to Business	4
ICGH 102	Famous Arguments and Thought Experiments in Philosophy	4
ICGH 103	Logic, Analysis and Critical Thinking: Good and Bad Arguments	4
ICGH 104	Moral Reasoning: How can we know what is good?	4
ICGH 105	Technology, Philosophy and Human Kind: Where Are We Now?!	4
ICGH 106	The Greeks: Crucible of Civilization	4

- **Arts and Media Literacy**

ICGH 107	Contemporary Art and Visual Culture	4
ICGH 108	Creative Drawing Expression	4
ICGH 109	Creative Thinking Through Art and Design	4
ICGH 110	Drawing as Visual Analysis	4
ICGH 111	Media Literacy: Skills for 21st Century Learning	4
ICGH 112	Photography	4
ICGH 113	Moving Pictures: A History of Film	4
ICGH 114	The Sound of Music: Form, Emotion, and Meaning	4

### Foreign Languages

- **German**

ICGL 101	Elementary German I	4
ICGL 102	Elementary German II	4
ICGL 103	Elementary German III	4

- **Japanese**

ICGL 111	Elementary Japanese I	4
ICGL 112	Elementary Japanese II	4
ICGL 113	Elementary Japanese III	4

- **French**

ICGL 121	Elementary French I	4
ICGL 122	Elementary French II	4
ICGL 123	Elementary French III	4

- **Chinese**

ICGL 131	Elementary Chinese I	4
ICGL 132	Elementary Chinese II	4
ICGL 133	Elementary Chinese III	4

- **Spanish**

ICGL 141	Elementary Spanish I	4
ICGL 142	Elementary Spanish II	4
ICGL 143	Elementary Spanish III	4

- **Thai**

ICGL 160	Introduction to Thai Language and Culture	4
ICGL 161	Elementary Thai I	4
ICGL 162	Elementary Thai II	4
ICGL 163	Elementary Thai III	4

**Social Sciences**

**8 Credits**

- **Financial, Economic, Business Entrepreneurial Literacy**

ICGS 101	Accounting for Young Entrepreneurs	4
ICGS 102	Business Sustainability and the Global Climate Change	4
ICGS 103	Economics in Modern Business	4
ICGS 104	Essentials of Entrepreneurship	4
ICGS 105	Personal Financial Management	4
ICGS 106	Fashion and Society	4
ICGS 107	MICE 101	4
ICGS 108	Money Matters	4

- **Global and Multicultural Literacy**

ICGS 109	American History, Film and Modern Life	4
ICGS 110	Development and Conflicts	4
ICGS 111	Exploring Religions	4
ICGS 112	Geography of Human Activities	4
ICGS 113	Perspectives on the Thai Past	4
ICGS 114	Power, Money and Behavior of Powerful States	4
ICGS 115	Sociology in the Modern World	4
ICGS 116	Power and Politics	4
ICGS 117	Overcoming Stereotypes, Prejudice and Discrimination	4
ICGS 118	Skills in Dealing with People Across Cultures	4

ICGS 119	World Politics	4
ICGS 120	Global Awareness	4

- **Psychological Literacy**

ICGS 121	Abnormal Colleagues: how do I make this work?	4
ICGS 122	Propaganda, Nudge Theory and Marketing: How to resist?	4

**Physical Education**

**4 Credits**

ICGP 101	American Flag Football	1
ICGP 102	Badminton	1
ICGP 103	Basketball	1
ICGP 104	Body Fitness	1
ICGP 105	Cycling	1
ICGP 106	Discover Dance	1
ICGP 107	Golf	1
ICGP 108	Mind and Body	1
ICGP 109	Selected Topics in Sports	1
ICGP 110	Self Defense (Striking)	1
ICGP 111	Self Defense (Grappling)	1
ICGP 112	Soccer	1
ICGP 113	Social Dance	1
ICGP 114	Swimming	1
ICGP 115	Tennis	1
ICGP 116	Volleyball	1

**Chemistry Major Courses**

**132 Credits**

**Chemistry Core Courses**

**42 Credits**

ICBI 101	Biology	4
ICBI 102	Integrated Laboratory in Biological Sciences I	2
ICBI 103	Biology II	4
ICCH 210	General Chemistry I	4
ICCH 224	Integrated Laboratory Techniques in Chemistry I	2
ICMA 106	Calculus I	4
ICMA 213	Calculus II	4
ICPY 101	Physics I	4
ICPY 102	Physics II	4
ICPY 105	Integrated Laboratory in Physics I	2
ICCH 309	Scientific Research and Presentations	4
ICMA 151	Statistics for Science I	4

**Chemistry Required Courses****62 credits**

ICCH 211	General Chemistry II	4
ICCH 221	Organic Chemistry I	4
ICCH 222	Organic Chemistry II	4
ICCH 311	Analytical Chemistry	4
ICCH 316	Modern Methods of Analysis	4
ICCH 321	Organic Spectroscopy	4
ICCH 329	Integrated Laboratory Techniques in Chemistry II	2
ICCH 333	Physical Chemistry I	4
ICCH 371	Biochemistry I	4
ICCH 372	Biochemistry II	4
ICCH 373	Biochemistry Laboratory	2
ICCH 390	Organic Chemistry Laboratory Techniques	2
ICCH 441	Inorganic Chemistry I	4
ICCH 445	Integrated Laboratory Techniques in Chemistry III	2
ICCH 446	Chemical Unknown Detective	2
ICCH 454	Seminar in Chemistry	2
ICCH 455	Senior Project in Chemistry	6
ICCS 161	Introduction to Data Science	4

**Tracks Required Courses****16 credits****Chemistry Track**

ICCH 322	Advanced Organic Chemistry	4
ICCH 334	Physical Chemistry II	4
ICCH 391	Material Science	4
ICCH 442	Inorganic Chemistry II	4

**Cosmetic Chemistry Track**

ICCH 393	Dermatology	4
ICCH 394	Colloid and Emulsion Chemistry	4
ICCH 395	Cosmetic Science	4
ICCH 396	Pharmaceutical Science	4

Students in consultation their academic advisers must declare their track (Chemistry or Cosmetic) to the division secretary by the end of their third regular trimester. Changes at later date are allowed at the end of each regular trimester by the approval of the PD of Chemistry.

**Track Elective Courses****12 credits**

Available to both Tracks

ICBI 211	Genetics and Molecular Biology I	4
ICBI 380	Introduction to System Biology and Bioinformatics	4
ICCH 336	Computational Chemistry	4
ICCH 337	Applied Computational Methods and Cheminformatics	4
ICCH 381	Mathematics for Chemists	4
ICCH 425	Current Topics in Organic Chemistry I	4
ICCH 426	Current Topics in Organic Chemistry II	4
ICCH 427	Current Topics in Applied Chemistry I	4
ICCH 428	Current Topics in Applied Chemistry II	4
ICCH 429	Current Topics in Physical Chemistry	4
ICCH 430	Current Topics in Inorganic Chemistry	4
ICCH 433	Current Topics in Biochemistry	4
ICFS 314	Food Analysis	4
ICPY 496	Biophysics	4

And

**For Chemistry Track**

Cosmetic Science Track Required Courses can be elective courses

**For Cosmetic Chemistry Track**

Chemistry Track Required Courses can be elective courses

**Free Elective Courses**

**8 Credits**

Chemistry students can take any course offered by Mahidol University International College as a free elective, except the GE-Natural Science courses.





# Mahidol University

## International College