

Bachelor of Science Program in Computer Science (International Program)

1. Code and Program Title

In Thai	หลักสูตรวิทยาศาสตรบัณฑิต สาขาวิทยาการคอมพิวเตอร์ (หลักสูตรนานาชาติ)
In English	Bachelor of Science Program in Computer Science (International Program)

2. Title of Degree and Field of Study

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

3. Major Subject (If Applicable) -

4. Career Opportunities after Graduation

- 1) Software developer/engineer capable of designing, implementing, and deploying solutions from the ground up
- 2) Data scientists and data platform engineers
- 3) Continue their studies for a higher degree in various fields of computing and related disciplines, including robotics and bioinformatics
- 4) Owners of IT companies/startups
- 5) Research and development in the commercial sector and in academia
- 6) IT consultants and solution engineers in various fields, such as innovative agriculture and smart medicine.
- 7) Faculty position, teaching, or teaching assistant in the field of computing for academic institutions and international schools
- 8) Customer relations in the IT sector, such as sales and customer service

5. Total Credits Required

No less than 176 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	40 credits
- English Communication	16 credits
- Humanities and Foreign Languages, Social Sciences, and Physical Education	16 credits
- Natural Sciences	8 credits
3) Major Courses	128 credits

- Core Courses 34 credits
- Required Courses 66 credits
- Elective Courses 28 credits

4) Free Electives

8 credits

Foundation Courses

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.

Note IV: At least 16 credits of general education must come from any combination of courses from the following categories: Foreign Languages, Humanities, Social Sciences, and Physical Education. In addition, at least 8 credits must come from Natural Sciences although they cannot be ICT and Digital Literacy courses.

General Education

English Communication

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

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
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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

- Financial, Economic Scientific and Environmental 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

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

Natural Sciences

- 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

*Students in the Computer Science major are not allowed to register for any course in this category.

- 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

Major Course

Major Core Courses

at least 34 credits

ICCS 205	Numerical Computation	4
ICCS 206	Discrete Mathematics	4
ICCS 309	Scientific Research and Presentations	4
ICMA 106	Calculus I	4
ICMA 151	Statistics for Science 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

Major Required Courses

at least 74 credits

Every computer science student has to complete at least 74 credits of required major courses from breadth and capstone categories. The student has to complete all breadth courses to cover core CS knowledge, and finish one of the two capstone options to gain experience working on a sizable research/development project.

Breadth Required Courses

ICCS 100	Computer Fundamentals and Concepts	4
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ICCS 101	Introduction to Computer Programming	4
ICCS 121	System Skills and Low-level Programming	4
ICCS 161	Introduction to Data Science	4
ICCS 204	Data Structures and Object-Oriented Programming	4
ICCS 225	Database Foundations	4
ICCS 227	Principles of Computer Systems and Architecture	4
ICCS 271	Interaction Design	4
ICCS 311	Functional and Parallel Programming	4
ICCS 312	Algorithms and Tractability	4
ICCS 370	Software System Construction	4
ICMA 216	Calculus IIIA	2
ICMA 223	Linear Algebra A	2

Capstone Required Courses

Option 1: Senior Project

ICCS 407	Senior Project I	6
ICCS 408	Senior Project II	6
ICCS 409	Senior Project III	6

Option 2: Cooperative Education

ICCS 380	Cooperative Education Seminar	2
ICCS 381	Cooperative Education I	8
ICCS 382	Cooperative Education II	8

Major Elective Courses

at least 28 credits

Every computer science student has to complete at least 28 credits of elective major courses pursuing one of the following two modules:

Computer Science Module: Students in this module can customize the areas of knowledge they wish to pursue by creating a combination of courses from the following two categories:

1. At least four CS elective courses listed in the table at the end of this section.

2. No more than two courses from the Topics series (ICCS 412, ICCS 413, ICCS 423, ICCS 424, and ICCS 463 through ICCS 495).
3. At most two major courses from another major that meet all of the following criteria:
 - They must belong to an academic program at MUIC as listed below, but these two courses do not have to belong to the same program.
 - Biological Science
 - Business Economics
 - Chemistry
 - Communication Design
 - Computer Engineering
 - Environmental Science
 - Finance
 - Food Science and Technology
 - Intercultural Studies and Languages
 - International Business
 - International Hospitality Management
 - Marketing
 - Media and Communication Arts
 - Physics
 - Social Science
 - They have no equivalent CS courses.

Data Analytics and Software Engineering (DASE) Module: Students in this module are required to fulfill their major elective requirements using at least 20 credits from the following list:

- ICBI 380 Introduction to System Biology and Bioinformatics 4 (4-0-8)
- ICCS 302 Human Computer Interaction and Visualization 4 (4-0-8)
- ICCS 315 Applied Algorithms 4 (4-0-8)
- ICCS 361 Data Mining 4 (4-0-8)
- ICCS 371 Scalable Systems 4 (4-0-8)
- ICCS 372 Software Engineering 4 (4-0-8)
- ICCS 461 Machine Learning 4 (4-0-8)
- ICCS 463 Special Topics in Machine Learning I 4 (4-0-8)
- ICCS 464 Special Topics in Machine Learning II 4 (4-0-8)

For the other 8 credits, students can customize their selection but have to follow rules (2) and (3) of the Computer Science module.

The following courses count towards computer science major elective courses:

ICBI 325	Special Topics in Bioinformatics and Molecular Genetics	4
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ICBI 380	Introduction to System Biology and Bioinformatics	4
ICCS 302	Human Computer Interaction and Visualization	4
ICCS 303	Competitive Programming	4
ICCS 315	Applied Algorithms	4
ICCS 320	Computer Networks	4
ICCS 322	Operating Systems Design and Implementation	4
ICCS 323	IoT Electronics	4
ICCS 340	Web Application Development	4
ICCS 361	Data Mining	4
ICCS 371	Scalable Systems	4
ICCS 372	Software Engineering	4
ICCS 404	Computer Graphics and Augmented Reality	4
ICCS 412	Topics in Theory I	4
ICCS 413	Topics in Theory II	4
ICCS 418	Computer System Security	4
ICCS 423	Topics in Systems I	4
ICCS 424	Topics in Systems II	4
ICCS 444	E-Commerce	4
ICCS 448	Mobile Application Programming	4
ICCS 461	Machine Learning	
ICCS 463	Special Topics in Machine Learning I	4
ICCS 464	Special Topics in Machine Learning II	4
ICCS 471	Topics in Software Technology I	4
ICCS 472	Topics in Software Technology II	4
ICCS 491	Topics in Computer Science I	4
ICCS 492	Topics in Computer Science II	4
ICCS 493	Topics in Computer Science III	4
ICCS 494	Topics in Computer Science IV	4

ICCS 495	Topics in Computer Science V	4
ICMA 214	Ordinary Differential Equations	4
ICMA 217	Calculus IIIB	2
ICMA 224	Linear Algebra B	2
ICMA 322	Advanced Calculus	4
ICMA 346	Optimization	4
ICMA 350	Probability	4
ICMA 424	Abstract Algebra	4
ICPY 492	Electronics	4

Free Elective Courses

8 credits

Computer Science students can take courses offered by MUIC, or courses offered by other faculties with permission from the advisor, as free electives, except courses in the Natural Science- ICT and Digital Literacy category, namely:

ICGN 116	Understanding and Visualizing Data	4 (3-2-7)
ICGN 117	Technology Behind E-Business and Digital Strategies	4 (3-2-7)
ICGN 118	Everyday Connectivity	4 (4-0-8)
ICGN 119	Computer Essentials	4 (4-0-8)

Mahidol University
International College