

Bachelor of Engineering Program in Computer Engineering (International Program)

1. Code and Program Title

In Thai : หลักสูตรวิศวกรรมศาสตรบัณฑิต สาขาวิชาวิศวกรรมคอมพิวเตอร์
(หลักสูตรนานาชาติ)

In English : Bachelor of Engineering Program in Computer Engineering
(International Program)

2. Degree Offered and Field of Study

In Thai Full Name : วิศวกรรมศาสตรบัณฑิต (วิศวกรรมคอมพิวเตอร์)
Abbreviation : วศ.บ. (วิศวกรรมคอมพิวเตอร์)

In English Full Name : Bachelor of Engineering (Computer Engineering)
Abbreviation : B.Eng. (Computer Engineering)

3. Major Subject (If Applicable) –

4. Total Credits Required No less than 170 credits

5. Graduates' advancement

Career opportunities	<p>Engineers who can take responsibilities in various fields of computing, e.g. AI</p> <ul style="list-style-type: none">- Artificial Intelligence (AI) or machine learning (ML) engineer- IoT or robotic engineer- Data scientist in the field of computing for academic institutions and international schools <p>Network and Cybersecurity</p> <ul style="list-style-type: none">- System and network administrator- Cybersecurity specialist or consultant- Security auditor- Computer forensic analyst- Exploitation analyst <p>Digital System</p> <ul style="list-style-type: none">- IT consultant and system auditor in various fields.- System analyst- Software engineer or DevOps engineer
----------------------	---

	<ul style="list-style-type: none"> - Frontend and/or backend developer - Data engineer <p>Entrepreneurship in computer/IT industries.</p>
Further fields of study	<p>Graduates can continue their studies for higher degrees in various fields of computing and related disciplines, either within the country or abroad. For example, they can pursue an M.Eng. or Ph.D. in computer engineering, an M.Sc. in related fields e.g. computer science, data science, information technology, or an MBA. To become a professional in specific areas of computer engineering, graduates can apply for international professional training programs and certifications in various fields such as cloud computing, network, security and AI.</p>

6. Curriculum Structure

1) Foundation Courses

2) General Education*

no less than 30 Credits

General Education Group	GC2 Track**	FE and GC Track**
1. English Communication	10	14
2. GE Literacies	12	12
- MU Literacy	2	2
- Health Literacy	2	2
- Science and Environmental Literacy	2	2
- Intercultural and Global Awareness Literacy	2	2
- Civic Literacy	2	2
- Finance and Management Literacy	2	2
3. GE Electives	8	4
Total	30	30

* Students may choose General Education courses provided by other programs/departments/faculties to fulfill the credit requirements.

**Students will be placed into specific tracks based on their achievement in the essay portion of the MUIC entrance exam.

3) Specific Courses

no less than 112 Credits

1. Core Courses	38 Credits
2. Major Required Courses	66 Credits
3. Major Elective Courses	8 Credits

4) I-Design Electives

no less than 20 Credits

5) Free Electives

no less than 8 Credits



Mahidol University
International College

1) Foundation Courses		Non-credit
ICMA100	Foundation Mathematics	0
ICMA101	Precalculus	0

Note I: For B.B.A. students, students whose Mathematics placement is below ICMB151 Business Mathematics are required to take ICMA100 Foundation Mathematics and pass the course with the grade of "S" before moving to ICMB151 Business Mathematics.

For B.Sc. and B.Eng. students, students whose Mathematics placement is below ICMA106 Calculus I and/or ICMA151 Statistics for Science I are required to take ICMA101 Precalculus and pass the course with the grade of "S" before moving to ICMA106 Calculus I and/or ICMA151 Statistics for Science I.

For B.A.Sc. students, students whose Mathematics placement is below ICMA106 Calculus I and ICMA151 Statistics for Science I are required to take ICMA101 Precalculus and pass the course with the grade of "S" before moving to ICMA106 Calculus I and ICMA151 Statistics for Science I.

ICME101	Foundation English: Communication Skills	0
---------	--	---

Note I: Based on their achievement on the essay portion of the MUIC entrance exam, students whose English placement is below ICGC104 English Studies I: The Writer's Toolkit will be placed into the "FE Track". These students will be required to take ICME101 Foundation English: Communication Skills and pass the course with the grade of "S" before moving to ICGC104 English Studies I: The Writer's Toolkit.

2) General Education Courses

30 Credits

English Communication

10 –14 Credits

Note I: Based on their achievement on the essay portion of the MUIC entrance exam, students will be placed into 3 following tracks: 'FE Track', 'GC Track' and 'GC2 Track'.

- 'FE Track' – Students who are placed into 'FE Track' will be required to take ICME101 (a non-credit course) and complete 14 credits in English Communication: ICGC104, ICGC105, ICGC106 in order, and finally, any 200+ level English courses.
- 'GC Track' – Students who are placed into 'GC Track' will be required to complete 14 credits in English Communication: ICGC104, ICGC105, ICGC106 in order, and finally, any 200+ level English courses.
- 'GC2 Track' – Students who are placed into 'GC2 Track' will be required to complete 10 credits in English Communication: ICGC105, ICGC106 in order, and finally, any 200+ level English courses.

ICGC104	English Studies I: The Writer's Toolkit	4
ICGC105	English Studies II: The Writer's Voice	4
ICGC106	English Studies III: Public Speaking	4
ICGC221	English Studies IV: The World of English - Global Realities	2
ICGC222	English Studies IV: The World of English - Literary Analysis	2
ICGC223	English Studies IV: The World of English - Creative Writing	2
ICGC224	English Studies IV: The World of English - Advanced Oral Communication	2
ICGC226	English Studies IV: The World of English - Literature Into Film	2
ICGC228	English Studies IV: The World of English - Language and Culture	2
ICGC230	English Studies IV: The World of English - First and Second Language Acquisition	2
ICGC231	English Studies IV: The World of English - Poetry	2
ICGC232	English Studies IV: The World of English - The Short Story and the Novel	2
ICGC233	English Studies IV: The World of English - Drama	2
ICGC234	English Studies IV: The World of English - Literary Non-fiction	2
ICGC235	English Studies IV: The World of English - Writing for Research	2

GE Literacies

12 Credits

Note I: Students must complete courses in the following six categories: MU Literacy, Health Literacy, Science & Environment Literacy, Intercultural & Global Awareness Literacy, and Finance & Management Literacy. Each category requires a minimum of 2 credits.

Note II: If a student selects a 4-credit course to fulfill a 2-credit literacy requirement, the excess 2 credits cannot be allocated or applied toward GE Elective or Free Elective credits. Instead, these excess credits will be entirely allocated to the literacy for which they were originally intended.

● MU Literacy

2 Credits

ICGB101	Project Management for Impacts	2
ICGB108	Event for Good	2
ICGN139	Scientific Inquiry and the Community	2
ICGS169	Learning by Doing	2
ICGS171	Digital Campaign for Gender Issues	2

ICGS172	Service Learning - Making Change	4
ICGS173	Service Learning - Campaigning for a Cause	4
ICGS175	Social Innovation and Sustainability	2
ICGS176	Sustainable Cooking	2
ICGS177	Social Innovation: Empowering Sustainable Communities	2
ICGT107	Innovation: Inside Out	2

• **Health Literacy**

2 Credits

ICGH136	Sound & Soul: A Journey of Music, Emotion, and Well-being	2
ICGH143	Flowers and Fragrances for Health	2
ICGN135	Personal Health and Well being	2
ICGP101	American Flag Football	1
ICGP102	Badminton	1
ICGP103	Basketball	1
ICGP104	Body Fitness	1
ICGP105	Cycling	1
ICGP106	Discover Dance	1
ICGP107	Golf	1
ICGP108	Mind and Body	1
ICGP109	Selected Topics in Sports	1
ICGP110	Self Defense (Striking)	1
ICGP111	Self Defense (Grappling)	1
ICGP112	Soccer	1
ICGP113	Social Dance	1
ICGP114	Swimming	1
ICGP115	Tennis	1
ICGP116	Volleyball	1
ICGP118	Health and Wellness	2
ICGP119	Mindful Food and Well-being	2
ICGP120	Mind and Body: Navigating the Interplay of Brain, Behavior, and Well-being	2
ICGS121	Abnormal Colleagues: how do I make this work?	4
ICGS126	Introduction to Psychology	4

ICGS155	Pathway to Purpose: Life Design and Self-Exploration	4
ICGS164	Positive Psychology	2
ICGS178	Unmasking Human Behaviour: Exploring Psychological Truths about Behaviour	2
ICGS179	Health and Society	2
ICLL100	Self Development	2

● **Science & Environment Literacy**

2 Credits

ICGH131	Unraveling the Anthropocene: A Philosophical Critique of Earth's Shifts and Humanity's Roles	2
ICGH142	Fantasy Literature's Environmental Message	2
ICGH144	A Candle in the Dark: How to Tell Fact from Fiction	2
ICGN105	Ecology, Ecosystems and Socio-Economics in Southeast Asia	4
ICGN107	The Chemistry of Everyday Life	4
ICGN108	Essentials of Culinary Science for Food Business	4
ICGN111	Physics for CEO	4
ICGN113	Plants, People and Poisons	4
ICGN114	The Scientific Approach and Society	4
ICGN115	Human Evolution, Diversity and Health	4
ICGN116	Understanding and Visualizing Data	4
ICGN119	Computer Essentials	4
ICGN123	The Earth's Dynamic Structure	4
ICGN124	Climate Change and Human Society	4
ICGN126	Plant Society	2
ICGN127	Practical Mathematics	2
ICGN128	Climate Emergency, Biodiversity Crisis, and Humanity at Risk	2
ICGN129	Programming for Problem Solving	4
ICGN130	Cryptography: The Science of Making and Breaking Codes	2
ICGN134	Introduction to Artificial Intelligence	2
ICGN136	Creator Workshop	2
ICGN137	Star Wanderer	2
ICGN138	Cosmetics Chemistry	2
ICGN140	Food Energy for Health	2

ICGN141	Life in the Sea	2
ICGN142	Energy and the Environment	2
ICGN143	Gaia: Life on Earth	2
ICGT101	Technology-Enhanced Learning: Harnessing AI & Digital Tools for Academic Success	2
ICGT102	Digital Document Management	2
ICGT103	Computational Thinking	2
ICGT104	Tell a Great Story with Data	2
ICGT105	No-Code Application Development	2
ICGT106	Data and Spreadsheets	2
ICLL102	Skills for a Digital World	2

● **Intercultural & Global Awareness Literacy**

2 Credits

ICGH107	Contemporary Art and Visual Culture	4
ICGH109	Creative Thinking Through Art and Design	4
ICGH110	Drawing as Visual Analysis	4
ICGH115	Cinematic Language and Applications	4
ICGH116	World Cinemas	4
ICGH117	Drawing as Creative Expression	4
ICGH118	Photography Visualizing in the Digital Age	4
ICGH120	Thai and ASEAN Cinema	4
ICGH124	Life Drawing and Anatomy	4
ICGH128	Internet Celebrity, Culture and the Media	4
ICGH130	The Logic Lab: Crafting Coherent Arguments	2
ICGH132	The Rise and Fall of Ancient Athens	2
ICGH135	The Horror Film	2
ICGH137	Apocalypse Now, or Never, or Maybe?	2
ICGH139	Spirituality, Sustainability, Ecosystems	2
ICGH141	SPQR—Glimpses of Rome	2
ICGH145	Essentials to Photography, Skills and Practices	2
ICGH146	Acting for Self-Discovery and Empathizing with Others	2
ICGH147	Myth and the Masks of the Divine	2
ICGH148	Quest for Global Justice: A Philosophical Inquiry	2

ICGL101	Elementary German I	4
ICGL102	Elementary German II	4
ICGL103	Elementary German III	4
ICGL111	Elementary Japanese I	4
ICGL112	Elementary Japanese II	4
ICGL113	Elementary Japanese III	4
ICGL121	Elementary French I	4
ICGL122	Elementary French II	4
ICGL123	Elementary French III	4
ICGL131	Elementary Chinese I	4
ICGL132	Elementary Chinese II	4
ICGL133	Elementary Chinese III	4
ICGL141	Elementary Spanish I	4
ICGL142	Elementary Spanish II	4
ICGL143	Elementary Spanish III	4
ICGL160	Introduction to Thai Language and Culture	4
ICGL161	Elementary Thai I	4
ICGL162	Elementary Thai II	4
ICGL163	Elementary Thai III	4
ICGL164	Thai Writing for Specific Purposes in Workplace *for native Thai students	2
ICGL171	Diversities in Multilingual Societies	2
ICGL172	Chinese Influence in Thai Society	2
ICGL173	Introduction to Japanese Societies	2
ICGL174	From Siesta to Fiesta: Introduction to Spanish and Latin American Culture	2
ICGL201	Pre-Intermediate German I	4
ICGL202	Pre-Intermediate German II	4
ICGL203	Pre-Intermediate German III	4
ICGL211	Pre-Intermediate Japanese I	4
ICGL212	Pre-Intermediate Japanese II	4
ICGL213	Pre-Intermediate Japanese III	4
ICGL221	Pre-intermediate French I	4

ICGL222	Pre-intermediate French II	4
ICGL223	Pre-intermediate French III	4
ICGL231	Pre-Intermediate Chinese I	4
ICGL232	Pre-Intermediate Chinese II	4
ICGL233	Pre-Intermediate Chinese III	4
ICGL241	Pre-Intermediate Spanish I	4
ICGL242	Pre-Intermediate Spanish II	4
ICGL243	Pre-Intermediate Spanish III	4
ICGN125	Games and Learning	2
ICGS112	Geography of Human Activities	4
ICGS128	Global Gastronomy and Cuisines	4
ICGS131	Introduction to International Studies	4
ICGS132	Career Preparation in a Globalized World	4
ICGS133	Foundation of Mediterranean Cultures	4
ICGS137	Witchcraft and Gender Representation	4
ICGS143	Introduction to Air Transport and Tourism	4
ICGS156	Fashion and Society	2
ICGS157	Asian Religious Traditions	2
ICGS159	The Self and Modern Media	2
ICGS161	Skills in Dealing with People Across Cultures	2
ICGS162	Arts, Culture and Tourism Development	2
ICGS165	Tea Studies	2
ICGS167	Coffee Studies	2
ICGS168	Faith a Lifestyle	2
ICGS180	Cafe Story and Slow food	2
ICGS181	Cuisine and Culture	2
ICGS182	Humor Horizons	2

● **Civic Literacy**

2 Credits

ICGH126	Behavioral Ethics: Why Good People Do Bad Things	2
ICGH129	Searching for Meaning	2
ICGH133	Socrates, His Predecessors and Successors	2
ICGH134	Digital Media Literacy: Skills for 21st Century Learning	2

ICGH138	The Philosophies of Asia	2
ICGH140	Ethics and Evolution	2
ICGH149	Law, Technology, and Society	2
ICGH150	Global Perspectives on Free Expression in the Digital Age	2
ICGN131	Digital Search Literacy	2
ICGN132	Digital Security and Privacy	2
ICGN144	Environmental Ethics	2
ICGN145	Food Integrity and Food Fraud: When a Food Product Is Not What It Seems	2
ICGS134	Is Democracy Good?	4
ICGS136	Social and Health Issues in Thailand	4
ICGS140	Fake News, Censorship and the Politics of Truth	4
ICGS147	Women in Leadership	4
ICGS158	Contemporary Issues in Thailand	2
ICGS160	Self and Society	2
ICGS163	Popular Media and Conflicts	2
ICGS166	Power and Politics	2
ICGS170	Civic Action in Thailand	2
ICGS183	Media and Community	2

● Finance & Management Literacy

2 Credits

ICGB102	Navigating the Market Landscape	2
ICGB103	Decoding Economic News	2
ICGB104	Entrepreneurship in a Disruptive Environment	2
ICGB105	Personal Finance Literacy	2
ICGB106	The Business of Fashion	2
ICGB107	Tourism Management Perspectives	2
ICGB109	Business Event Essentials	2
ICGB110	Management Styles of Effective Leaders	2
ICGB111	Leadership in a Global Society	2
ICGB112	The Art of Pricing	2
ICGB113	Crisis Management in Service Businesses	2
ICGB114	Cultural Strategies for Success: Unveiling Eastern Business Dynamics	2

ICGB115	Money: Deciphering Currencies of Value	2
ICGB116	Managing Self and Working with Others	2
ICGH101	Biotechnology: from Science to Business	4
ICGS102	Business Sustainability and the Global Climate Change	4
ICGS135	Entrepreneurial Accounting	4
ICGS153	Social Media Management for Service Sector	2
ICGS174	The Art of Leadership in Practice: Inspiration	2
ICGS184	Healthy Habits, Happy Shoppers: Exploring Health Literacy in Consumer Decisions	2
ICLL101	Professional Development	2

General Education Elective Courses

4-8 Credits

Students need to take remaining courses in any GE category to fulfill their 30 credits requirement of GE:4 credits for students whose English Communication track are placed into 'FE track' or 'GC Track' and 8 credits for students whose English Communication track are placed into 'GC2 Track'. Partial credits of GE course that exceed the GE requirements cannot be counted towards Free Electives.

3) Specific Courses

no less than 112 Credits

1. Core Courses

38 Credits

ICMA 106	Calculus I	4
ICMA 213	Calculus II	4
ICPY 101	Physics I	4
ICPY 102	Physics II	4
EGCI 113	Fundamental Computer Programming	3
EGCI 201	Discrete Mathematics	4
EGCI 211	Advanced Computer Programming	3
EGCI 230	Electric Circuit Analysis	4
EGCI 232	Engineering Electronics	4
EGCI 305	Statistics for Research in Computer Engineering	4

2. Major Required Courses

66 Credits

ICMA 240	Linear Algebra I	4
EGCI 202	Engineering Mathematics for Signal and System	4

EGCI 213	Programming Paradigms	4
EGCI 221	Data Structures and Algorithms	4
EGCI 231	Digital Circuit Design	4
EGCI 233	Digital Circuit Design Lab	1
EGCI 252	System Programming	4
EGCI 321	Database Systems	4
EGCI 330	Microprocessor and Interfacing	4
EGCI 332	Embedded Systems	4
EGCI 333	Computer Architecture	4
EGCI 340	Software Design	2
EGCI 341	Software Engineering	4
EGCI 351	Operating Systems	4
EGCI 371	Computer Networks and Information Security	4
EGCI 419	Computer Engineering Internship	8
EGCI 491	Computer Engineering Seminar	1
EGCI 492	Computer Engineering Project	2

3. Major Elective Courses

no less than 8 Credits

- Normal track students must have to complete at least 8 credits of major elective courses
- To earn specialization in each field, students must complete at least 12 major elective course credits or 12 I-Design course credits from each track.

Computer Engineering Tracks		
Track 1: Cybersecurity		
EGCI 470	Reverse Engineering	4
EGCI 471	Blockchain	4
EGCI 476	Cryptography and Computer Security	4
EGCI 477	Penetration Testing and Prevention	4
EGCI 478	Wireless Communication	4
EGCI 494	Fundamental of Digital Forensics	4

Track 2: Artificial Intelligence		
EGCI 425	Data Mining	4
EGCI 461	Artificial Intelligence	4
EGCI 463	Pattern Recognition	4
EGCI 466	Big Data Processing	4
EGCI 467	Natural Language and Speech Processing	4
EGCI 486	Image Processing	4
EGCI 487	Computer Vision	4
Track 3: Digital System		
EGCI 406	Mechatronics	4
EGCI 407	Human-Robot Interaction (HRI)	4
EGCI 427	Web Programming	4
EGCI 428	Mobile Device Programming	4
EGCI 429	Web Application Architecture	4
EGCI 451	Cloud Computing	4
EGCI 452	System Engineering	4
EGCI 453	Open Source Software Engineering	4
EGCI 466	Big Data Processing	4
EGCI 471	Blockchain	4
EGCI 474	Internetworking Technologies I	4
EGCI 475	Internetworking Technologies II	4
EGCI 488	Metaverse	4

Elective Courses for Study Experience (no track)

EGCI 495	Regional Study Experience	1
EGCI 496	International Study Experience	2

Advanced Topics

EGCI 382	Special Topics in Computer Engineering (Course Title I)	4
----------	---	---

EGCI 383	Special Topics in Computer Engineering (Course Title II)	4
EGCI 384	Special Topics in Computer Engineering (Course Title III)	4
EGCI 385	Special Topics in Computer Engineering (Course Title IV)	4
EGCI 386	Special Topics in Computer Engineering (Course Title V)	4
EGCI 394	Special Topics in Computer Engineering (Course Title VI)	4
EGCI 395	Special Topics in Computer Engineering (Course Title VII)	4
EGCI 396	Special Topics in Computer Engineering (Course Title VIII)	4
EGCI 397	Special Topics in Computer Engineering (Course Title IX)	4
EGCI 398	Special Topics in Computer Engineering (Course Title X)	4

4) I-Design Electives

20 Credits

The purpose of the I-Design electives is to promote multidisciplinary learning. Students are encouraged to explore courses offered by diverse disciplines across MUIC, Mahidol University, and partner institutions. The I-Design electives can be satisfied upon the completion of the following course categories:

1. Minor courses offered by any program in MUIC
2. Certificate courses offered by any program in MUIC
3. Any major courses offered by any program in MUIC
4. Any major courses offered in Mahidol University (including undergraduate and graduate level courses). Courses must be approved by the student's advisor.
5. Any major courses offered at partner institutions (who have MOU with Mahidol University and/or MUIC). Courses must be approved by the student's advisor.

5) Free Electives

8 Credits

Students can take any courses offered by MUIC / Mahidol University or any major courses offered by the partner institutions (with MOU) as free elective courses with the approval from the advisor.