

Bachelor of Science Program in Applied Mathematics (International Program)

1. Code and Program Title

In Thai : หลักสูตรวิทยาศาสตรบัณฑิต สาขาวิชาคณิตศาสตร์ประยุกต์ (หลักสูตรนานาชาติ)
In English : Bachelor of Science Program in Applied Mathematics
(International Program)


2. Degree Offered and Field of Study

In Thai Full Name : วิทยาศาสตรบัณฑิต (คณิตศาสตร์ประยุกต์)
Abbreviation : วท.บ. (คณิตศาสตร์ประยุกต์)
In English Full Name : Bachelor of Science (Applied Mathematics)
Abbreviation : B.Sc. (Applied Mathematics)

3. Major Subject (If Applicable) –

4. Total Credits Required No less than 160 credits

5. Graduates' advancement

Career opportunities	 1) Pursue roles in research and development across various sectors, driving innovation and academic discovery. 2) Become actuaries or insurance advisors, applying mathematical models to forecast and manage risk. 3) Excel in strategic decision-making and risk analysis for corporations and consultancies. 4) Serve as statisticians and urban planners in public and private sectors, shaping policies and development. 5) Analyze market trends and customer behavior as data analysts in e-commerce and tech industries. 6) Work as quantitative analysts in finance, crafting algorithms for trading and investment strategies. 7) Engage as operations research analysts, optimizing business processes and resource allocation. 8) Specialize in cryptography or data security, protecting information integrity in an era of digital transactions. 9) Educate future generations as instructors or delve into scholarly research in educational institutions.
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	10) Contribute to healthcare advancements as bioinformaticians, decoding complex biological data
Further fields of study	1) Master of Science or Doctorate in Mathematics, exploring advanced theoretical concepts and applications. 2) Graduate studies in Applied Mathematics, focusing on practical mathematical techniques for real-world problems. 3) Advanced degrees in Statistics, diving deep into data analysis, probability, and predictive modeling. 4) Specialization in Financial Mathematics at the graduate level, for careers in quantitative finance and risk management.

6. Curriculum Structure

1) Foundation Courses

2) General Education

no less than 30 Non-Credit 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 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 102 Credits

1. Basic Science Courses

30 Credits

2. Major Required Courses

56 Credits

3. Major Elective Courses

16 Credits

4) I-Design Electives

no less than 20 Credits

5) Free Electives

no less than 8 Credits

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
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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 102 Credits

1. Basic Science Courses

30 Credits

Mandatory Basic Science Courses

26 Credits

Students are required to complete 26 credits from the following list of courses. These courses are designed to provide a solid foundation in applied mathematics and are compulsory for all students in the program.

ICCS 102	Coding for All	4
ICCS 111	Programming and Abstractions	4
ICMA 106	Calculus I	4
ICMA 151	Statistics for Science I	4
ICMA 213	Calculus II	4
ICPY 101	Physics I	4
ICPY 105	Integrated Laboratory in Physics I	2

Elective Basic Science Courses

4 Credits

Students must complete 4 credits from the following list of courses. These courses allow students to tailor their education to their interests and career goals within the field of applied mathematics.

ICBI 105	Molecules to Living Cells	4
ICCH 101	General Chemistry I	4
ICPY 102	Physics II	4

2. Major Required Courses

56 Credits

Students are required to complete 48 credits from the following list of courses. These courses are designed to provide a broad and comprehensive foundation in applied mathematics, covering a wide range of essential topics.

ICMA 120	Mathematical Foundations and Proof Techniques	4
ICMA 214	Ordinary Differential Equations	4
ICMA 218	Multivariable Calculus	4
ICMA 240	Linear Algebra I	4
ICMA 241	Linear Algebra II	4
ICMA 242	Discrete Mathematics	4
ICMA 253	Statistics for Science II	4
ICMA 322	Advanced Calculus	4
ICMA 335	Complex Variables	4
ICMA 338	Numerical Methods	4
ICMA 346	Optimization	4
ICMA 350	Probability	4

Capstone Experience Courses

8 Credits

Students must complete 8 credits as part of the Capstone Experience. There are two options available:

Option 1: Senior Project

8 Credits

Students who choose this option will undertake a significant research project under the guidance of a faculty advisor. This project involves independent research, application of mathematical theories, and the presentation of findings.

ICMA 445	Seminar in Applied Mathematics	2
ICMA 447	Research Project in Applied Mathematics A	3
ICMA 448	Research Project in Applied Mathematics B	3

Note: This option is ideal for students interested in pursuing research or academic careers.

Option 2: Cooperative Education

8 Credits

Students who choose this option will participate in a co-op program, gaining practical experience by working in an industry setting. This involves applying mathematical skills in real-world scenarios and gaining professional experience.

ICCS 431	Cooperative and Work integrated Education Seminar	2
ICCS 432	Cooperative and Work integrated Education I	3
ICCS 433	Cooperative and Work integrated Education II	3

Note: This option is ideal for students seeking to enter the workforce immediately after graduation.

3. Major Elective Courses

no less than 16 Credits

In addition to the Major Required Courses, students must complete at least 16 credits from the following list of Major Elective Courses. These courses allow students to further specialize in areas of interest within applied mathematics, providing flexibility to tailor their education to their career goals.

ICCS 261	Principles of Data Science	4
ICIC 355	Judgment and Decision Making	4
ICIC 358	Behavioral Economics	4
ICMA 313	Number Theory and Cryptography	4
ICMA 316	Graph Theory	4
ICMA 319	Combinatorics	4
ICMA 321	Game Theory	4
ICMA 323	Partial Differential Equations	4
ICMA 344	Time Series Analysis	4
ICMA 353	Actuarial Mathematics I	4
ICMA 354	Actuarial Mathematics II	4
ICMA 356	Decision Analysis	4
ICMA 393	Special Topics in Applied Mathematics I	4

ICMA 395	Special Topics in Applied Mathematics II	4
ICMA 410	Stochastic Processes	4
ICMA 412	Heuristic Optimization	4
ICMA 424	Abstract Algebra	4
ICMA 425	Differential Geometry	4
ICMA 432	Multivariate Analysis	4
ICMA 435	Regression Analysis	4
ICMA 450	Mathematical Modeling	4
ICMA 452	Mathematical Finance and Derivatives	4
ICMA 484	Special Topics in Applied Mathematics III	4
ICMA 485	Special Topics in Applied Mathematics IV	4
ICMA 486	Special Topics in Applied Mathematics V	4
ICMA 487	Special Topics in Applied Mathematics VI	4
ICMB 253	Microeconomics	4
ICMB 254	Macroeconomics	4
ICMB 255	Management of Business Information	4
ICMB 256	Principles of Financial Accounting	4
ICMB 257	Business Finance for Entrepreneurs	4
ICMF 331	Financial Management	4
ICMF 332	Financial Markets	4
ICMF 334	Risk Management and Derivatives	4

Note: Select any combination of courses from the above list to fulfill the Major Elective Courses requirement. Consult with your academic advisor to ensure your choices align with your academic and career objectives.

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.



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