

Bachelor of Science Program in Applied Mathematics (International Program)

1. Code and Program Title

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

2. Title of Degree and Field of Study

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

3. Major Subject (If Applicable) -

4. Career Opportunities after Graduation

- 1) Graduates can work in research and development in commercial sector and in academia.
- 2) Graduates can work as actuaries in insurance policy design.
- 3) Graduates can work as firm consultants in decision making position.
- 4) Graduates can work in government sector as statisticians and planners.
- 5) Graduates can work as cryptologists in national security department.

5. Total Credits Required

No less than 182 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

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| 1) Foundation Courses | Non-credit |
| 2) General Education Courses | 48 credits |
| - English Communication | 16 credits |
| - Natural Sciences | 8 credits |
| - Humanities and Languages | 12 credits |
| - Social Sciences | 8 credits |
| - Physical Education | 4 credits |
| 3) Major Courses | 126 credits |
| - Core Courses | 30 credits |
| - Major Required Courses | 68 credits |
| - Major Elective Courses | 28 credits |
| 4) Free Electives | 8 credits |

Foundation Courses

Non-credit

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|----------|-------------------------|---|
| 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

48 Credits

English Communication

16 Credits

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|----------|---|---|
| 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

8 Credits

● Scientific and Environmental Literacy

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|----------|----------------------|---|
| ICGN 101 | Decision Mathematics | 4 |
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| 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**

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| 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 Languages

12 Credits

Humanities

● **Logical and Ethical Literacy**

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|----------|---|---|
| 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**

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| 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 |

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| ICGH 113 | Moving Pictures: A History of Film | 4 |
| ICGH 114 | The Sound of Music: Form, Emotion, and Meaning | 4 |

Foreign Languages

● German

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

● Japanese

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

● French

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

● Chinese

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

● Spanish

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

● Thai

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| 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 and Entrepreneurial Literacy

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|----------|------------------------------------|---|
| ICGS 101 | Accounting for Young Entrepreneurs | 4 |
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| 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**

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|----------|--|---|
| 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**

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| 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

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|----------|---------------------------|---|
| 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 |

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| ICGP 113 | Social Dance | 1 |
| ICGP 114 | Swimming | 1 |
| ICGP 115 | Tennis | 1 |
| ICGP 116 | Volleyball | 1 |

Applied Mathematics Courses

126 credits

Core Courses

30 credits

| | | |
|----------|---|---|
| ICBI 101 | Biology | 4 |
| ICBI 102 | Integrated Laboratory in Biological Sciences I | 2 |
| ICCH 210 | General Chemistry I | 4 |
| ICCH 224 | Integrated Laboratory Techniques in Chemistry I | 2 |
| 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 |

Major Required Courses

68 credits

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|----------|---|---|
| ICCS 101 | Introduction to Computer Programming | 4 |
| ICCS 204 | Data Structures and Object-Oriented Programming | 4 |
| ICMA 200 | Principles and Mathematical Concepts | 4 |
| ICMA 214 | Ordinary Differential Equations | 4 |
| ICMA 216 | Calculus IIIA | 2 |
| ICMA 217 | Calculus IIIB | 2 |
| ICMA 223 | Linear Algebra A | 2 |
| ICMA 224 | Linear Algebra B | 2 |
| ICMA 242 | Discrete Mathematics | 4 |
| ICMA 253 | Statistics for Science II | 4 |
| ICMA 322 | Advanced Calculus | 4 |
| ICMA 323 | Partial Differential Equations | 4 |
| ICMA 335 | Complex Variables | 4 |
| ICMA 338 | Numerical Methods | 4 |
| ICMA 350 | Probability | 4 |
| ICMA 353 | Actuarial Mathematics I | 4 |
| ICMA 424 | Abstract Algebra | 4 |
| ICMA 445 | Seminar in Applied Mathematics | 2 |
| ICMA 446 | Research Project in Applied Mathematics | 6 |

Major Elective Courses**28 credits**

Three different tracks, namely Applied Mathematics, Financial Mathematics, and Statistics, are offered to students who want to pursue a specific area of Mathematics. Students are not required to select a track as they can graduate without one. Nevertheless, they still need to earn at least 28 credits from the Major Elective courses.

The following are the lists of track elective courses to fulfill the requirement of each track.

Applied Mathematics Track**(16 credits)**

| | | |
|----------|---------------------------------------|---|
| ICCS 161 | Introduction to Data Science | 4 |
| ICMA 222 | Introduction to Mathematical Software | 4 |
| ICMA 346 | Optimization | 4 |
| ICMA 354 | Actuarial Mathematics II | 4 |

Financial Mathematics Track**(20 credits)**

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|----------|------------------------------------|---|
| ICMB 213 | Financial Accounting | 4 |
| ICMB 214 | Managerial Accounting | 4 |
| ICMB 215 | Business Finance for Entrepreneurs | 4 |
| ICMF 316 | Financial Management | 4 |
| ICMF 322 | Risk Management and Derivatives | 4 |

Statistics Track**(16 credits)**

| | | |
|----------|------------------------------|---|
| ICCS 161 | Introduction to Data Science | 4 |
| ICMA 344 | Time Series Analysis | 4 |
| ICMA 432 | Multivariate Analysis | 4 |
| ICMA 435 | Regression Analysis | 4 |

Major Elective Courses

The following courses are available as Major Elective courses to all students in Applied Mathematics program.

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|----------|---|---|
| ICCS 161 | Introduction to Data Science | 4 |
| ICMA 222 | Introduction to Mathematical Software | 4 |
| ICMA 344 | Time Series Analysis | 4 |
| ICMA 346 | Optimization | 4 |
| ICMA 354 | Actuarial Mathematics II | 4 |
| ICMA 393 | Special Topics in Applied Mathematics I | 4 |
| ICMA 395 | Special Topics in Applied Mathematics II | 4 |
| ICMA 432 | Multivariate Analysis | 4 |
| ICMA 435 | Regression Analysis | 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 205 | Microeconomics | 4 |
| ICMB 206 | Macroeconomics | 4 |
| ICMB 213 | Financial Accounting | 4 |
| ICMB 214 | Managerial Accounting | 4 |
| ICMB 215 | Business Finance for Entrepreneurs | 4 |
| ICMF 316 | Financial Management | 4 |
| ICMF 322 | Risk Management and Derivatives | 4 |

AND

No more than 12 credits of Core or Required courses from other majors in Science.

Free Elective

8 credits

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