MU Degree Profile

Bachelor's degree Program

1. Program Title
 	
     (In Thai)   วิทยาศาสตรบัณฑิต สาขาวิชาคณิตศาสตร์อุตสาหการและวิทยาการข้อมูล (หลักสูตรนานาชาติ)
 	
     (In English) Bachelor of Science Program in Industrial Mathematics and Data Science
 	
                (International Program)
 	
 2. Degree Offered
 	
     (In Thai)   วิทยาศาสตรบัณฑิต (คณิตศาสตร์อุตสาหการและวิทยาการข้อมูล)
 	
     (In English)   Bachelor of Science (Industrial Mathematics and Data Science)

General Information of the Program	
Type of program	Bachelor's Degree (International Program), Academic Program
Number of Credits	**Plan A** – no less than 120 credits from Mahidol University **Plan B** – no less than 84 credits from Mahidol University and no less than 300 credits from Curtin University (equivalent to 36 credits at Mahidol University) **Plan C** – no less than 97 credits of courses taken while studying at Faculty of Science, Mahidol University and no less than 200 credits of courses taken while studying at Curtin University (equivalent to 23 credits at Mahidol University). Student may take courses with a total of no less than 400 credits at Curtin University for M.Sc. in Industrial Optimization offered by Curtin University
Study Duration / Program Cycle	4-Year Program
Program Status and Program Schedule	1. Revised Program (2024) 2. Program start: Semester 1 Academic Year 2024
Degree Granting	**Plan A** – one degree (B.Sc. In Industrial Mathematics and Data Science offered by Mahidol University, Thailand) **Plan B** – double degree (B.Sc. In Industrial Mathematics and Data Science offered by Mahidol University, Thailand and B.Sc. in Industrial Optimization or B.Sc. in Data Science offered by Curtin University, Australia)

	Plan C – dual degrees (B.Sc. In Industrial Mathematics and Data Science offered by Mahidol University, Thailand and M.Sc. in Industrial Optimization offered by Curtin University, Australia)
Degree-granting Institutions (MOU with other institutions)	**Plan A** - Mahidol University, Thailand **Plan B** - Mahidol University, Thailand and Curtin University, Australia **Plan C** – Mahidol University, Thailand and Curtin University, Australia
Accreditation Institution	-
Specific information of the program	
Goals & Objectives	**Goals:** To produce the B.Sc. graduated students who enter the profession which requires the knowledge and skills to apply the optimization techniques in industry and data science to international standards. Graduates will have specialized knowledge of their interests. Moreover, they will be able to possess MU graduate attributes (T-Shaped, Globally Talented, Socially Contributing, Entrepreneurially Minded) and 21st century skills to meet future employment opportunities, graduate study requirements, and social needs. **Objectives:** To produce graduates who have the characteristics, knowledge and skills as described below: 1. 8BIntegrate and apply knowledge in optimization mathematics, which can be applied to work in various stages in industry. 2. 3BUse appropriate statistical computer software and programming to manage and interpret large data to predict future events. 3. 4BDemonstrate skills in business management, problem solving, creative thinking and an ethical mindset geared toward social responsibility. 4. 5BCommunicate ideas and findings in optimization, data science, and related fields to the scientific community and

	the general public through clear and concise written and verbal communication in a manner.
	5. 6BDemonstrate self-development, morality, responsibility, and ethics.
	6. 7BWork with others appropriately and accept the difference between people.
Distinctive Features	1. Students have the opportunity to learn about business practices and are allowed to pursue a Master's degree in Management offered by the College of Management, Mahidol University (CMMU). They can earn bachelor's and master's degree in 5 years.
	2. Elective courses in mathematics, statistics and computer diverse and up-to-date for working requirements such as optimization and data science.
	3. Academic cooperation with Curtin University in curriculum design, joint teaching result in the opportunity to choose a study plan abroad through double degree with Curtin University, 3.5-year Bachelor of Science international program in Industrial Mathematics and Data Science from Mahidol university and a selection between B.Sc. Industrial Optimization or B.Sc. Data Science from Curtin university.
	4. Students have the opportunity to learn industrial optimization practice and are allowed to pursue a Master's degree in Industrial Optimization offered by Curtin university. They can earn bachelor's and master's degree in 5 years.
Educational System	Semester System
Graduates' advancement	
Career opportunities	1. Business: such as information technologist, investment planner, logistics system, warehouse manager, logistic manager, and pricing analyst.
	2. Computer professionals: such as information technician, system analyst, programmer, and software developer.
	3. Information professionals: such as information technologist, data analyst, data scientist, statistician, policy analyst, project manager.

	4. Education: such as teaching assistant and educator.
Further fields of study	Graduate studies in Mathematics, Statistics, Engineering Information, and related fields
Philosophy in program administration	
Educational Philosophy	Our primary focus is on educating the learners, as for them to attain academic achievement through learning-centered education, outcome-based education, and constructivism. To become a wisdom graduate, learners combine what they have learned so far with the new knowledge, and with experiential learning activities, while the role of a lecturer in the learning process is shifted from an information provider to a coach or a facilitator creating challenge-based activities. Administering education that focuses on learners' achievements by means of a learning-centered approach for self-development of knowledge, abilities, and new skills.
Strategy / teaching guidelines	The teaching strategies align with learning outcomes. The program is aware of student differences in backgrounds, strengths and weaknesses, interests, and learning styles. Therefore, different teaching strategies with different end goals are set through the diverse learning activities, self-reflection, self-development, depending on the desired learning outcomes. - Active learning strategies by putting students at the center of the classroom and requiring students to become active participants in their learning process. - Encourage initiative strategies by allowing students to participate in the class discussions and exercises that support the initiative. - Problem-based/project-based learning strategies to allow students engaged in individual or group work to investigate and find the proper solution by themselves as well as to improve students' creativity, critical thinking and analysis. - The teaching and learning management is consistent with constructivism by teaching from basic to intermediate and

	advanced, supporting self-cognition by linking new knowledge with old knowledge and creating an environment that promotes learner learning.
Strategy / student's evaluation guidelines	The assessments and evaluations strategies align with learning outcomes and teaching strategies. - Assessment tools must be valid and reliable. - Formative assessment takes place on a day-to-day basis during learning and teaching process. It is ungraded and used to monitor student progress to improve students' strength and weakness. Formative assessments include tasks, questions, short comparative assessment, lesson exit tickets and pop quiz. - Summative assessments include written examination, oral examination, practical test, oral presentation, problem-based/project-based paper, internship evaluation paper. Rubrics based on the outcomes of the course are announced clearly and used to score the students' achievement. - Authentic assessment - Self-assessment - The criterion referenced assessments are used to evaluate students' achievement.
Competences provided to the students	
Generic Competences	1. Ethics: demonstrate moral and ethical behavior and be responsible in their own action including awareness of plagiarism 2. Critical thinking and analysis: be capable of analytical and critical thinking and be able to evaluate both general and scientific information with logical and systematic thinking 3. Creativity: be able to bridge research to innovation which further enhances basic knowledge. 4. Communication: be able to choose appropriate forms of English communication such as listening, speaking, reading, and writing skills, depending on target audience and for academic purposes

	5. Collaboration: be able to work with others appropriately and accept the difference between people 6. Digital transformation: be able to choose the appropriate information technology for searching of information and data and be able to analyze the reliability of data from various sources.
Subject-specific Competences	1. Demonstrate knowledge in mathematics, statistics, and science that is related to optimization and data science, including operations research, computer programming and statistical analysis. 2. Apply knowledge and technical skills in mathematics, statistics, and science that is related to optimization and data science to enhance decision making processes and trend prediction in industry, business management and data science. 3. Develop proper solution to the project by means of mathematics and statistics including planning, assumption, analysis, and conclusion for industrial and data science applications with professional ethics and code of conduct.

Graduates' learning outcomes

At the end of the program, successful students will be able to:

PLO1 Solve industrial and business management problems logically and systematically by means of appropriate optimization techniques.

PLO2 Make a fact-based mathematical model of trend prediction in industrial and business management to support making data-driven decision with the respect of data privacy, ethics, and protection.

PLO3 Conduct an independent project and/or work in the field of industrial mathematics and data science with professional code of conduct.

PLO4 Communicate concepts in the field of industrial mathematics and data science clearly and purposefully with respect to the target audience, in English, in both written and oral formats.

PLO5 Work with others to achieve team goals based on the roles and responsibilities of an industrial mathematician or a data scientist.

PLO6 Develop their academic potential in Industrial Mathematics and Data Science to make themselves competent (a combination of knowledge, skills, and attitudes) and responsible global citizens capable of adapting to changing situations