Mahidol University Degree Profile

Bachelor's Degree Program	
1. Name of the Program (In Thai) วิทยาศาสตรบัณฑิต สาขาวิชาคณิตศาสตร์อุตสาหการและวิทยาการข้อมูล (หลักสูตรนานาชาติ) (In English) Bachelor of Science Program in Industrial Mathematics and Data Science (International Program)	
2. Degree Name (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
Required number of credits	**Plan A:** no less than 120 credits of courses taken while studying at Faculty of Science, Mahidol University (MUSC) **Plan B:** no less than 84 credits of courses taken while studying at Faculty of Science, Mahidol University (MUSC) and no less than 300 credits of courses taken while studying at Curtin University
Studying duration / Program cycle	4-Year Program
The Program's status and opening schedule	1. Revised Program 2019 (พ.ศ. 2562) 2. Program start: Semester 1 Academic Year 2019
Degree offered	One degree of one major

Degree-granting Institutions (MOU with other institutions)	Mahidol University, Thailand Curtin University of Technology, Australia
Organization certifying the standards	-
Specific information of the Program	
Purpose/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 at the international standards. Graduates have specialized knowledge of their interests and the characteristics of the desirable graduates of the Mahidol University, according to the skills of the 21st century related to Thailand 4.0 Strategy, to be ready for working and graduate study. **Objectives** Teaching to produce graduates to have the following qualifications. 1. Have the knowledge, understanding, and skills in optimization mathematics, which can be applied to work in various stages in industry. 2. Have the knowledge, understanding and skills that combine both statistical computer knowledge and programming and the use of appropriate software to manage and interpret large data to predict future events. 3. Can analyze and apply mathematical knowledge to other related sciences and be able to solve the problem effectively. 4. Can communicate and work with others. And use the technology properly. 5. Morality, ethics, responsibility, and ethics 6. Have a good attitude and readiness to develop themselves.

Distinctive features	1. Elective courses in mathematics, statistics and computer diverse and up-to-date for working requirements such as optimization and data science. 2. Academic cooperation with Curtin University in curriculum design and conduct joint teaching. 3. Learners have opportunity to choose a study plan abroad through double degree with Curtin University.
Educational system	Semester System
Graduates' advancement	
Career opportunities	1. **Business:** such as information technologist, investment planner, logistics system warehouse 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, quality assurance engineer and risk analyst. 4. **Education:** such as teacher, teacher assistant, and academician.
Further fields of study	Graduate studies in Mathematics, Statistics, Engineering Information and related fields
Educational philosophy in program management	
Program 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 shift from an information provider to a coach or a facilitator creating challenge-based activities.

Strategy / teaching guidelines	The program is aware of student differences in backgrounds, strengths and weaknesses, interests, and learning styles. Therefore, a range of teaching styles are set through the diverse learning activities according to the learning outcomes including interactive lectures, laboratory practical, individual and group discussions and assignments, active research projects with emphasis on student's demonstration of ideas, logical reasoning, and problem-solving.
Strategy / student's evaluation guidelines	The assessments and evaluations align with the teaching strategies and the desired learning outcomes such as written and oral examination, practical test, oral presentation, individual or group class participation and project-based research learning. Rubrics based on the objectives of the course are announced clearly and used to score the 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 enhance 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. **ICT**: 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. Describe the basic concepts of mathematics and related statistics. 2. Describe the key concepts for subjects that related to optimization and data science. Such as operation research, computer programming, and statistical analysis. 3. Use mathematical knowledge, computer, statistics, and mathematical process skills to explain, problem solving, decision making, or predicting future events. For situations involving other sciences such as physical and biological sciences, engineering, social sciences, economics or business administration under ethical codes. 4. Write and use the appropriate computer programming language to analyze and solve mathematical problems.
Graduates' learning outcomes (PLOs) At the end of the program, successful students will be able to:	
PLO1	Make an operational decision logically and systematically to solve industrial and business management problems by applying appropriate optimization techniques.
PLO2	Apply data analysis and data science strategy for trend prediction to support making data driven decision with the regard for data privacy, ethics, and protection.
PLO3	Create an independent project and/or work in industrial mathematics and data science based on related concepts with professional code of conduct.
PLO4	Communicate industrial and data science related information clearly and purposefully with target audiences in English, in both written and oral forms with appropriate technologies in an organized manner
PLO5	Work independently and coordinate with others to achieve team goals based on roles and responsibilities of an industrial mathematician and data scientist.

Alignment between PLOs & Higher Education TQF Level 2 or TQF 1

TQF Level 2 Graduates Competencies / Skills / LOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
Competency/skill 1 : Moral *(Ethics and Moral)*					
1.1 Have honesty and integrity			✓	✓	
1.2 Have self-discipline					✓
1.3 Have awareness and realize in compliance with academic and professional ethics			✓	✓	
1.4 Respect rights and opinion of other people				✓	✓
Competency/skill 2 : Knowledge					
2.1 Have knowledge on principles and theories of science and/or mathematics	✓	✓	✓		
2.2 Have basic knowledge on science and mathematics that can be used to explain principles and theories in specific field	✓	✓	✓		
2.3 Be able to catch up academic advancement and development of new knowledge especially in science and mathematics				✓	
2.4 Possess broad knowledge in various fields that can be applied in daily life		✓	✓	✓	
Competency/skill 3 : Cognitive					
3.1 Be able to systematically and reasonably analyze based on scientific principles and methods	✓	✓	✓		
3.2 Correctly and appropriately apply scientific and mathematical knowledge in various situations	✓	✓	✓		
3.3 Have desire for knowledge, be able to correctly analyze and synthesize knowledge from various sources of data that will lead to creating innovation	✓	✓	✓		
Competency/skill 4 : Communication *(Interpersonal Skills and Responsibility)*					
4.1 Have leadership and be able to work with other people as a good leader and a good team member					✓
4.2 Have responsibility for society and organization as well as self-development and work development				✓	✓

TQF Level 2 Graduates Competencies / Skills / LOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
4.3 Be able to adapt self to organizational situation and culture					✓
Competency/skill 5 : ICT ***(Numerical Analysis, Communication and Information Technology)***					
5.1 Be able to apply mathematical and statistical knowledge to appropriately analyze, process, solve problem and present information	✓	✓	✓	✓	
5.2 Possess language skills to effectively communicate knowledge on science and mathematics as well as be able to select appropriate forms of communication				✓	
5.3 Possess skills and knowledge on English or other foreign language that are suitable and necessary for doing research				✓	
5.4 Be able to apply information technology on searching and collecting data that is effective and suitable for the situation		✓		✓	