Program Level ■ Bachelor ☐ Graduate Diploma Faculty of Science
☐ Master ☐ Higher Graduate Diploma ☐ Doctor
Program in Chemical Innovation and Technology Department of Chemistry

MU Degree Profile

Bachelor's degree Program	
1. Program Title (In Thai) หลักสูตรวิทยาศาสตรบัณฑิต สาขาวิชานวัตกรรมเคมีและเทคโนโลยี (หลักสูตรนานาชาติ) (In English) Bachelor of Science in Chemical Innovation and Technology (International Program) 2. Degree Offered (In Thai) วิทยาศาสตรบัณฑิต (สาขาวิชานวัตกรรมเคมีและเทคโนโลยี) (In English) Bachelor of Science (Chemical Innovation and Technology)	
General Information of the Program	
Type of program	Bachelor's Degree (International Program), Academic Program
Number of Credits	No less than 120 credits
Study Duration / Program Cycle	4-year Program
Program Status and Program Schedule	1. New Program 2. Program start: Semester 1 Academic Year 2024
Degree Granting	Mahidol University, Thailand
Degree-granting Institutions (MOU with other institutions)	-
Accreditation Institution	-
Specific information of the program	
Goals & Objectives	**Goals:** To produce bachelor degree graduates with knowledge in chemical innovation and technology, chemical laboratory skills, soft skills, information technology skills and professional ethics to meet the requirements of the science-based National Qualifications Framework. The graduates will be able to possess MU graduated attributes, which make them well-qualified for the employment in highly competitive organizations. **Objectives:** To produce graduates who have the characteristics, knowledge and skills as follows:

	1. Integrate and apply knowledge in chemistry, innovation, technology, and related science to solve problems in various industries or to be chemical innovators 2. Demonstrate chemical laboratory skills for using instruments and chemicals with respect to chemical safety, sustainable chemicals management and international standards 3. Develop solution to the project with social impact by means of chemical innovation and technology for sustainable industrial applications 4. Display teamwork skills and be able to demonstrate leadership and collaboration 5. Have professional ethics and code of conduct 6. Have skills in interpersonal communication 7. Demonstrate skills in information technology 8. Recognize the need for self-development and show the skills necessary to acquire, organize and reorganize new knowledge
Distinctive Features	Students can graduate within 3 years.
Educational System	Semester System
Graduates' advancement	
Career opportunities	1. Operator: Chemist, Analyst, Quality Control Inspector (QC), Technical sales 2. Academia: Research and Development Scientist (R&D), Forensic Science Officer, Project coordinator 3. Self-employed
Further fields of study	Continue their studies in higher degree in chemistry, polymer science, materials science, environmental science and related field
Philosophy in program administration	
Educational Philosophy	Our primary focus is on educating the learners, as for them to attain academic achievement through learning-centered approach for self-development of knowledge, abilities, and new skills, 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 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, 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 - classroom technology strategies by using a virtual field trip, VDO on demand, interactive VDO, or podcasts to improve student engagement - problem-based/project-based learning strategies in order 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 the easy to the difficult, supporting self-cognition by linking new knowledge with old knowledge and creating an environment that promotes self-reflection and self-development.
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 in order 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 objectives of the course are announced clearly and used to score the students' achievement. - The criterion referenced assessments are used to evaluate students' achievement. - Authentic assessment is also used to promote self-development process of students.
Competences provided to the students	
Generic Competences	1. 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 2. Creativity: be able to bridge research to innovation which further enhance basic knowledge 3. 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 4. Ethics: demonstrate moral and ethical behavior and be responsible in their own action 5. Communication: be able to choose appropriate forms of English communication such as speaking and writing skills, depending on target audience and for academic purposes 6. Collaboration: be able to work with others appropriately and accept the difference between people 7. Self-development: be able to acquire, organize, and reorganize new knowledge
Subject-specific Competences	1. Demonstrate conceptual knowledge in chemistry, innovation, technology, and related science including analytical chemistry, organic chemistry, inorganic chemistry, instrumental analysis, chemical dynamics in industrial applications, quantum development, polymer technology, quality assurance and quality control 2. Apply knowledge and technical skills in chemistry, innovation, technology, and related science to solve pain points of current issues in industry 3. Develop proper solution to the project by means of chemical innovation and technology including planning, assumption,

	experimentation, analysis, and conclusion for sustainable industrial applications with professional ethics and code of conduct

Graduates' learning outcomes

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

PLO1 Systematically solve chemical problems relevant to chemical innovation and technological challenges related to human needs and sustainable environment management with professional ethics awareness

PLO2 Perform scientific laboratory-based experiments related to chemistry in accordance with international standard methodology and chemical safety

PLO3 Develop solution to the project derived from pain points of current issues in chemical innovation and technology with social impact based on professional code of conduct

PLO4 Communicate concepts of chemical innovation and technology clearly and purposefully in both written and oral forms to both non-scientific and scientific community in English

PLO5 Work with others in chemical innovator role to achieve goals of science team, both as a leader or as a team member

PLO6 Develop their academic potential in Chemical Innovation and Technology to make themselves competent (a combination of knowledge, skills, and attitudes) and responsible global citizens capable of adapting to changing situations