

Degree Bachelor Master Doctoral

Faculty of Science, School of Materials Science and Innovation

Bachelor of Science Program in Materials Science and Nanoengineering (international program)

MU Degree Profile

Degree Profile

Bachelor's Degree (International Program)	
Topic	Program of the Year 2024
(In Thai)	หลักสูตรวิทยาศาสตรบัณฑิต สาขาวิชาวัสดุศาสตร์และวิศวกรรมนาโน (หลักสูตรนานาชาติ)
(In English)	Bachelor of Science Program In Materials Science And Nanoengineering (International Program)
(In Thai)	วิทยาศาสตรบัณฑิต (วัสดุศาสตร์และวิศวกรรมนาโน)
(In English)	Bachelor of Science (Materials Science and Nanoengineering)
Type of program	Bachelor's Degree (International Program) Academic Program
Total credits required	No less than 124 credits
Studying duration / Program cycle	4-Year Program
The program's status and opening schedule	1. Revised Program (2024) 2. Program start: Semester 1 Academic Year 2024
Degree offered	one degree one major (B.Sc. In Materials Science and Nanoengineering offered by Mahidol University, Thailand)
Degree-granting Institutions (MOU with other institutions)	Mahidol University, Thailand
Organization certifying the standards	-
Goals & Objectives	Program Goals To produce graduates with materials science knowledge, related laboratory skills, soft skills and professional ethics suitable for the career paths in materials science and related industries. The graduates will be able to possess MU graduate attributes (T-Shaped, Globally Talented, Socially Contributing, Entrepreneurially Minded) and 21st century skills,



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	<p>which make them well-qualified for the employment in highly competitive organization and social needs.</p> <p>Program Objectives</p> <p>To produce graduates who have the characteristics, knowledge and skills as follows:</p> <ol style="list-style-type: none">1. Integrate and apply knowledge in materials science, nanoscale science, technology, and related sciences to address current and future industrial needs.2. Demonstrate technical skills for using instruments, planning and development of projects involved in manufacturing and service industries.3. Demonstrate skills in problem solving, creative thinking, entrepreneurship, and an ethical mindset geared toward social responsibility.4. Formulate ideas and products to serve the social needs.5. Display teamwork skills and be able to demonstrate leadership and collaboration6. Demonstrate skills in English communication such as listening, speaking, reading, and writing skills, depending on the target audience and for academic purposes
Distinctive Features	<ol style="list-style-type: none">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. The program has strong ties to the industrial sectors such as TOA paint company, SCG R&D laboratories through well-established research groups which the students can participate in research activities related to



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	<p>industries from second year of study onwards</p> <p>3. The program provides the opportunity to do state of the art research works through collaboration with graduate programs within the School of Materials Science and Innovation</p> <p>4. The program provides flexible learning experience for the students</p>
Educational system	Semester System
Career opportunities	<p>1. Most graduates go into a range of employment such as, R&D researchers, service engineers, sale engineers etc., in leading industries such as oil and gas, automotive, manufacturing, pharmaceuticals, jewelry, ceramics, glass, paints, polymers, metals, etc.</p> <p>2. Jobs are available in many sectors such as product/process development scientist, materials engineer, manufacturing system engineer, quality manager, project manager, technical sale engineer, etc.</p> <p>3. Graduates can work as a research assistant in leading</p>
Further fields of study	Continue their studies for higher degrees in electrical, chemical, and materials engineering, materials science, and related fields such as polymer and chemistry.
Program philosophy	<p>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 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 challenges for the learners. We also incorporate MU Education Philosophy Administering education that focuses on learners' achievements by means of a learning-centered approach for self-</p>



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	development of knowledge, abilities, and new skills
Strategy/teaching guidelines	<p>The program is aware of differences in students' backgrounds, strengths and weaknesses, interests, and learning styles. Therefore, a range of teaching styles are promoted through diverse learning activities according to the learning outcomes, including</p> <ul style="list-style-type: none"> • 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 <p>The teaching and learning management are consistent with constructivism by teaching from basic to advanced, supporting self-cognition by linking new knowledge with old knowledge and creating an environment that promotes self-reflection and self-development</p>
Strategy / student's evaluation guidelines	<p>The assessments and evaluations align with the desired learning outcomes and teaching strategies.</p> <ul style="list-style-type: none"> • Assessment tools must be valid, reliable, and fair. • Authentic assessment evaluates the student through contexts, scenarios, and situations beyond the classroom.



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	<ul style="list-style-type: none">• Formative assessment is ungraded and used to monitor the student progress in order to help students recognize their weakness and improve their performance. Formative assessments include quizzes, strategic questions, and assessment reflection.• Summative assessments include multiple-choice questions, written and oral examinations, individual or group activities, oral and poster presentations, practical tests, and laboratory reports.• The rubrics based on the learning outcomes of each subject are utilized to assess learning outcomes.• The criterion-referenced assessments are utilized to assess the accomplishments of students.• Authentic assessment is also used to promote self-development process of students.
Generic Competences	<ol style="list-style-type: none">1. Ethics: demonstrate moral and ethical behavior and be responsible in their own actions including awareness of plagiarism2. 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 thinking3. 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 the target audience and for academic purposes5. Collaboration: be able to work with others appropriately and accept the difference between



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	<p>people</p> <p>6. ICT: be able to choose the appropriate information technology to search for information and data</p>
Subject-specific Competences	<p>1. Demonstrate conceptual knowledge in basic science including biology, chemistry, mathematics, physics, materials science and Nanoengineering including classes of materials and the relationship between the scale and the properties of materials.</p> <p>2. Apply knowledge and technical skills in materials science and nanoengineering to</p> <p>2.1 Solve pain points of current issues in industry</p> <p>2.2 Develop proper solution to the project by means of chemical innovation and technology including planning, assumption, experimentation, analysis and conclusion for sustainable industrial applications</p> <p>3. Demonstrate professional ethics and code of conduct.</p>
<p>Graduates' learning Outcomes</p> <p>At the end of the program study, graduates will be able to...</p>	
PLO1	Solve research and industrial problems in the field of materials science and nanoengineering systematically and logically with interdisciplinary approaches
PLO2	Perform appropriate instrument skills related to materials science and nanoengineering in accordance with international standard methodology and safety
PLO3	Develop solution to the independent project analyzed from scientific journals and laboratory reports and industrial problem in materials science and nanoengineering based on professional code of conduct
PLO4	Communicate concepts of material science and nanoengineering clearly and purposefully with target



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	audiences in English, in both written and oral forms with appropriate technologies in an organized manner
PLO5	Work with others to achieve team goals based on the roles and responsibilities of a materials scientist
PLO6	Develop their academic potential in Materials Science and Nanoengineering to make themselves competent (a combination of knowledge, skills, and attitudes) and responsible global citizens capable of adapting to changing situations