Mahidol University Degree Profile

Bachelor's Degree Program	
1. Program Title (In Thai) หลักสูตรวิทยาศาสตรบัณฑิต สาขาวิชาวัสดุศาสตร์และวิศวกรรมนาโน (หลักสูตรนานาชาติ) (In English) Bachelor of Science Program in Materials Science and Nano Engineering (International Program) 2. Degree Offered (In Thai) วิทยาศาสตรบัณฑิต (วัสดุศาสตร์และวิศวกรรมนาโน) (In English) Bachelor of Science (Materials Science and Nano Engineering)	
General information of the program	
Type of program	Bachelor's Degree (International Program), Academic Program
Total credits required	Plan A - no less than 133 credits of courses taken while studying at Faculty of Science, Mahidol University (MUSC). Plan B - no less than 83 credits of courses taken while studying at Faculty of Science, Mahidol University (MUSC) no less than 96 credits taken while studying at University of Technology Sydney (equivalent to 53 Mahidol credits)
Studying duration / Program cycle	4-Year Program
The program's status and opening schedule	1. Revised Program 2019 2. Program start: Semester I Academic Year 2019
Degree offered	One degree of one major
Degree-granting Institutions (MOU with other institutions)	Mahidol University, Thailand
Organization certifying the standards	-

Specific information of the program	
Purpose / Goals / Objectives	**Goals** To educate and provide certified bachelor-degree for graduates, who meet the specific requirements of the science-based National Qualifications Framework, with the insightful understanding of theories and applications of materials science and Nano engineering frontier together with innovation perspectives. The graduates will be able to possess four MU graduated attributes (i.e., T-shaped (having knowledge in breadth and depth, globally talented, socially contributing, and entrepreneurially minded), 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 materials science, nanoscale science, technology, and related sciences to address current and future industrial needs. 2. demonstrate technical skills for using instruments and planning and development of projects involved in manufacturing and service industries.

Distinctive features	1. This program is designed to develop students via learning by doing approach. Students will join world-class research laboratories from a second year onward. Students will have 1 full semester to carry out advanced research project and 1 full semester for industrial internship. This process will develop various skills for students including hand-on experience with various instruments, problem solving, creative thinking and innovation and team work. 2. This program also provides opportunity for students to have working/studying experience abroad through doubled degree with University of Technology of Sydney
Educational system	Semester System
Graduates' advancement	
Career opportunities	1. Most graduates go into a range of employment in leading industries such as oil and gas, automotive, manufacturing, pharmaceuticals, jewelry, ceramics, glass, paints, polymers, metals, etc. 2. Jobs are available in many sectors such product/process development scientist, materials engineer, manufacturing system engineer, quality manager, project manager, technical sale engineer, etc. 3. Graduates can work as research assistant in leading
Further fields of study	Continue their studies for higher degree in electrical, chemical and materials engineering, materials science, and related fields such as polymer and chemistry.

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-
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
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
Subject-specific Competences	1. Conceptual knowledge in basic science including biology, chemistry, mathematics, and physics. 2. Conceptual knowledge in materials science and Nano engineering including classes of materials and the relationship between the scale and the properties of materials. 3. Experience in a wide range of laboratories with laboratory techniques and scientific instruments in materials science and Nano engineering.

Graduates' learning Outcomes	
PLO1	Solve industrial problems in the field of materials science and nanoengineeering logically by applying interdisciplinary approaches.
PLO2	Carry out industrial and academic works relating to materials science and nanoengineeering by using appropriate instruments and in accordance with international standard
PLO3	Create an independent project in material science and nanoengineeering analyzed from scientific journals and laboratory reports along with laboratory safety skills and professional code of conduct.
PLO4	Communicate concepts of material science and nano engineering 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 a material scientist.

Appendix

1. Requirements: Qualifications of lecturers in charge of the program

Name-Surname	Educational Qualifications	Latest Academic Products in the Past 5 Years
Asst. Prof. Dr. Rakchart Traiphol	-Ph.D. (Chemistry), Clemson University, USA: 2003 - B.Sc. (Chemistry), Khonkaen University: 1996	Potai, R., Faisadcha, K., Traiphol, R., Traiphol, N. Controllable thermochromic and phase transition behaviors of polydiacetylene/zinc(II) ion/zinc oxide nanocomposites via photopolymerization: An insight into the molecular level (2018) Colloids and Surfaces A: Physicochemical and Engineering Aspects, 555, pp. 27-36.
Asst. Prof. Dr. Chayanisa Chitichotpanya	-Ph.D. (Materials Science and Engineering),University of Rochester, USA: 2004 -M.Sc.(Materials Science and Engineering), University of Rochester, USA: 1997 - B.Sc. (Chemistry), Chulalongkorn University: 1992	Chitichotpanya, P., Pisitsak, P., Chitichotpanya, C. Sericin–copper-functionalized silk fabrics for enhanced ultraviolet protection and antibacterial properties using response surface methodology (2018) Textile Research Journal, 89, pp. 1166-1179.
Dr. Pongsakorn Kanjanaboos	-MS-PHD. (Physics), University of Chicago, USA (2013) -BA (Physics and Economics), Washington University	Boonthum, C., Pinsuwan, K., Ponchai, J., Srikhirin, T., Kanjanaboos, P. Reconditioning perovskite films in vapor environments through repeated cation doping (2018) Applied Physics Express, 11 (6), art. no. 065503.

Name-Surname	Educational Qualifications	Latest Academic Products in the Past 5 Years
	in Saint Louis, USA (2008)	
Dr. Tanant Waritanant	- Ph.D. (Engineering), University of Manitoba, Canada: 2017 - M.Sc. (Optics and Photonics), National Central University, Taiwan: 2011 - B. Eng. (Electronic) Chulalongkorn University: 2009	Nadimi, M., Waritanant, T., Major, A. Thermal lensing in Nd:GdVO4 laser with direct in-band pumping at 912 nm (2018) Applied Physics B: Lasers and Optics, 124 (8), 170.
Dr. Yodchay Jompol	-Ph.D. in Physics, University of Cambridge, UK: 2008 -M.Sc. in Physics, Chalmers University of Technology,Sweden: 2001 - B.Sc. (Physics), Chulalongkorn University: 1998	Roche, B., Roulleau, P., Jullien, T., Jompol, Y., Farrer, I., Ritchie, D.A., Glattli, D.C. Harvesting dissipated energy with a mesoscopic ratchet (2015) Nature Communications, 6, art. no. 6738