

Osaka University International Certificate Program Details

18/3/2026

Course Name	Frontier Engineering Science: An Introduction through STEM-Centered Learning		
Course Affiliation	Graduate School of Engineering Science		
Course Manager	Prof. Umakoshi Hiroshi, Graduate School of Engineering Science		
Cooperative Schools	Institute for International Initiatives		
Eligibility	<ul style="list-style-type: none"> Graduate students of ASEAN Campus Partner Universities 		
Requirements for completion	6 to 8 credits	Capacity	7
Course Objective	<p>In order to contribute to SDGs which are the common challenges on a global scale including ASEAN countries, "STEM (Science, Technology, Engineering, Mathematics) perspectives" is essential. To acquire this perspectives, participants will realize "STEM factors" which are the basis of each theme related to SDGs through frontier researches in Engineering Science (ES) focusing on joint research.</p> <p>In addition, participants will understand "STEM", which is essential for ES human resources through close communications among laboratory staff, students and exchange students.</p>		
Learning Goals	<p>To acquire the ability to understand 1) the principle of Engineering Science, 2) the role of STEM (Science, Technology, Engineering, Mathematics) which is basic theory of Engineering Science, 3) the relationship between Engineering Science, and materials, functions and system, 4) the relationship between Engineering Science and industrial technology innovation such as extreme substances, spintronics, sunlight and future research, and 5) the relationship between Engineering Science and SDGs</p> <p>To gain scientific, technical and humane knowledge as an Engineering Scientist through advanced STEM practices in the fields of Materials physics, Chemistry, Chemical engineering, Frontier materials science, Nonlinear mechanics, Mechanical engineering, Bioengineering, Advanced electronics & optical science, Systems science and applied informatics, Mathematical science and Mathematical science for social systems</p>		
Components	<p>【Required Subjects】 Lecture subjects for 1), 2) and 5) (2 credits) STEM practice subjects for 3) and 4) (Graduate School of Engineering Science) (more than two credits) 【Elective Subjects】 Lectures for deepening 1), 2) and 3) Required elective subjects and elective subjects are decided baed on a consultation with a supervisor for STEM practices</p>		
Requirements	<p>To belong to a master course of a graduate school in the fields of science, technology and information or medical science, dentistry and pharmaceutical sciences To have interest in STEM in advanced science technology To be assigned to a laboratory to do STEM practices</p>		
Prior knowledge	<p>To have basic knowledge about mathematics, physics, chemistry and biology at undergraduate level which is essential for ES human resources</p>		
Special Note	<p>All the courses in this program will be given in English.</p>		

*ASEAN Campus Partner Universities

https://www.osaka-u.ac.jp/en/international/action/asean/asean_cci_n

Components

Course Numbering Code	Course Name	Credits			Course Term	Study Hours	Course Affiliation	Notes
		Common	PSA	Elective				
290858	Engineering Science: A First Step	1			winter	15	Graduate School of Engineering Science	
88A022	SDGs in Asia Pacific Region II	1			spring to summer	15	Institute for International Initiatives	
88A201/88A204	Laboratory study I		1		spring to winter	45	Institute for International Initiatives	Course Term: Spring, Summer
88A202/88A205	Laboratory study II		1		spring to winter	45	Institute for International Initiatives	Course Term: Spring, Summer
88A203/88A206	Laboratory study III		1		spring to winter	45	Institute for International Initiatives	Course Term: Spring, Summer
290859	Topics in Engineering Science 1 (Materials Engineering Science)			1	winter	15	Graduate School of Engineering Science	
290860	Topics in Engineering Science 2 (Mechanical Science and Bioengineering)			1	spring	15	Graduate School of Engineering Science	
290861	Topics in Engineering Science 3 (System Innovation)			1	spring	15	Graduate School of Engineering Science	
290852	Bio-Inspired Chemical Engineering 2			1	winter	15	Graduate School of Engineering Science	

*Participants have to choose two or three PSA courses