

Osaka University International Certificate Program Composition

since 2020

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	Center for Global Initiatives		
Eligibility	Graduate students of Joint Campus counterpart universities, and working people who have received at least a bachelor's degree are eligible		
Requirements for completion	6 to 8 credits	Capacity	10
Course Objective	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. In addition, participants will understand "STEM", which is essential for ES human resources through close communications among laboratory staff, students and exchange students.		
Learning Goals	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 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		
Components	【Required Subjects】 Lecture subjects for 1), 2) and 5) (2 credits) 【Required Elective Subjects】 STEM practice subjects for 3) and 4) (ASEAN campus and Graduate School of Engineering Science) (more than 3 credits) 【Elective Subjects】 Lectures for deepening 1), 2) and 3) (1 credit) Required elective subjects and elective subjects are decided based on a consultation with a supervisor for STEM practices		
Requirements	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		
Prior Knowledge	To have basic knowledge about mathematics, physics, chemistry and biology at undergraduate level which is essential for ES human resources		
Special Note	All the courses in this program will be given in English.		

Components

Course Numbering Code	Course Name	Credits			Course Term	Study Hours	Course Affiliation	Special Note
		Required	Required Elective	Elective				
290858	Engineering Science: A First Step	1			Winter	15	Graduate School of Engineering Science	
720560	SDGs in Asia Pacific Region II	1			Summer	15	Center for Global Initiatives	
720542	Laboratory study I		1		Spring - Winter	45	Center for Global Initiatives	
720543	Laboratory study II		1		Spring - Winter	45	Center for Global Initiatives	
290754	Internship in Graduate School of Engineering Science I (PSA)		1		Spring - Winter	45	Graduate School of Engineering Science	
290772	Internship in Graduate School of Engineering Science II (PSA)		1		Spring - Winter	45	Graduate School of Engineering Science	
290859	Topics in Engineering Science 1 (Mechanicals Engineering Science)			1	Spring	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	