Osaka University International Certificate Program Details

31/01/2025

Course Name	Introduction to Computational Materials Design		
Course Affiliation	Graduate School of Engineering		
Course Manager	Prof. Morikawa Yoshitada, Graduate School of Engineering		
Cooperative Schools	Graduate School of Science, Graduate School of Engineering Science, R^3 Institute for Newly-Emerging Science Design, Institute for International 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	15Each (Inbound / Outbound)
Course Objective	To reveal the factors which donate material properties by computer simulation based on quantum mechanics To get basic knowledge and skills about computational material design which can give a guide for designing materials with desired properties through lectures, practical trainings and laboratory works To develop human resources who are capable of utilizing quantum simulations for major issues related to the future of the human beings such as economics, energy and environmental issues		
Learning Goals	To understand the importance of computer simulation methods especially simulation methods based on quantum mechanics in material sciences To understand the utility of quantum simulation methods on designing materials To understand the utility of quantum simulation methods on SDGs To understand the collaboration of quantum simulations and demonstrations To nurture practical skills to apply quantum simulations for specific issues		
Components	【Required Subjects】 Common Subject (Fall, Winter Term) : "OUICP-Introduction to computational materials design" Common Subject (Spring, Summer Term) : "SDGs and Asia-Pacific Region Ⅱ" Practical Study Abroad (PSA) Subjects: "Laboratory Study Ⅰ, Ⅱ" 【Elective Subjects】 "Tutorials on Computational Nano-Materials Design Ⅰ", "Topics in Quantum Simulations Ⅰ, Ⅱ", "Solid State Physics" "Selected Topics in Quantum Physics of Solids", "Solid State Theory Ⅰ"		
Requirements	To have knowledge of Physics, Chemistry or Materials Science at the undergraduate level. Students will be selected after screening. We welcome students who are interested in understanding of Material Science by Computational Simulation at the atomic level.		
Prior knowledge	It is recommended that the students to have the level of knowledge as they have graduated from 4-year university in science and engineering field about Physics, Chemistry or Materials Science.		
Special Note	All the courses in this program will be given in English.		

*ASEAN Campus Partner Universities
https://www.osaka-u.ac.jp/en/international/action/asean

Components

Course Numbering Code	Category	Course Name	Credits			Course Term	Study Hours	Course Affiliation	Notes
			Common	PSA	Elective				
88B007	common	OUICP-Introduction to computational materials design	1			Winter	15	Institute for International Initiatives	Online Course
88A085/88A022	common	SDGs and Asia-Pacific Region Ⅰ/Ⅱ	1			Spring, Summer	15	Institute for International Initiatives	
88A201	common	Laboratory study Ⅰ		1		Spring, Summer	45	Institute for International Initiatives	
88A202	common	Laboratory study Ⅱ		1		Spring, Summer	45	Institute for International Initiatives	
281503	common	Tutorials on Computational Nano-Materials Design Ⅰ			1	Winter	Lecture 13+ Practice 25	Graduate School of Engineering	Computational Material Design Workshop:Avairable on streaming
281559	common	Topics in Quantum Simulations Ⅰ			1	Spring	15	Graduate School of Engineering	Avairable at ASEAN campus on streaming
281560	common	Topics in Quantum Simulations Ⅱ			1	Summer	15	Graduate School of Engineering	Avairable at ASEAN campus on streaming
280488	common	Solid State Physics			2	Spring to Summer	30	Graduate School of Engineering	Avairable at ASEAN campus on streaming
280769	common	Selected Topics in Quantum Physics of Solids			2	Spring to Summer	30	Graduate School of Engineering	Avairable at ASEAN campus on streaming
240190	common	Solid State Theory Ⅰ			2	Spring to Summer	30	Graduate School of Science	Avairable at ASEAN campus on streaming

*Participants have to choose two or three PSA courses