

<<Last Updated:2021/02/24>>

## Course Schedule Information

Course Code	885008
Semester	Intensive
Day and Period	Other
Course Name (Japanese)	国際交流特別講義 (国際ナノ理工学特論B)
Room	
Course Name	International Exchange Special Lecture (International Exchange Lecture on Nanoscience and Nanoengineering B)
Capacity	0
Course Numbering Code	88INES9U105
Required/Optional	英語により開講している大学院科目(基) 【履修対象：特別聴講学生のみ】
Credits	1.0
Student Year	1,2,3,4,5,6
Field	
Instructor	TAKEDA Seiji, ITO Tadashi

## Detailed Syllabus Information

Course Name	International Exchange Lecture on Nanoscience and Nanoengineering B
Language of the Course	English
Type of Class	Lecture Subject
Course Objective	The Institute for NanoScience Design, Osaka University will invite foreign lecturers from abroad and hold the INSD summer school 2016 on nanoscience and nanotechnology, composed of four topics each having eight lectures that are usually taught in topmost foreign universities. The summer school is aimed at fostering international young talent on nanoscience and nanoengineering. This program is shared with Tsukuba University and connects three campuses, Toyonaka, Suita, and Tsukuba, via video conferencing systems. This year four lectures will offer four topics, two from Osaka and two from Tsukuba.
Learning Goals	Students not only attend the class taught in English but also learn the topmost foreign style of lecturing and how to capture main objects for the lecture. Students are requested to ask various kinds of questions which they do not understand or want to study further. At the same time, students are asked to be used to some quiz, exercise, and examination during the lecture
Requirement / Prerequisite	Those who are registered for the Graduate Program for Advanced Interdisciplinary Studies or the Graduate Minor Program are allowed to take this subject with priority. Since extra seats are usually available, the lecture is also open to other students.
Class Plan	Due to the difference in lecture time tables between Osaka and Tsukuba, the following time schedule will be allotted. 1st lecture: 9:00-10:30, 2nd lecture:10:45-12:15, 3rd lecture:12:45-14:15, 4th lecture:14:30-16:00. The detailed information about the topics, syllabus and the lecturer schedule will be put on the following website: <a href="http://www.insd.osaka-u.ac.jp/nano/">http://www.insd.osaka-u.ac.jp/nano/</a>
Independent Study Outside of Class	If the lecture note is uploaded before the lecture, students are asked to read the document before attending the class. Those students who do not understand a part of the content should review the lecture by watching the video streaming of the recorded lecture through the internet. It is also recommended to take another exchange lectures in English together with the University of Groningen, the Netherlands.
Textbooks	The lecture note for each lecture is uploaded on the following website a few days before each lecture:

	<a href="http://www.insd.osaka-u.ac.jp/nano/">http://www.insd.osaka-u.ac.jp/nano/</a> In some case, the document will be delivered on site.
<b>Reference</b>	Some references will be introduced in the lecture, if necessary.
<b>Grading Policy</b>	Attendance, asking questions, assignment, and final examination or report will be used for grading.
<b>Other Remarks</b>	face-to-face class or online class The program will be shared by the students in University of Tsukuba through real-time TV lecture systems. Students are asked not only to attend the class taught in English but also to learn the topmost foreign style of lecturing and how to capture main objects for the lecture.
<b>Special Note</b>	The summer school consists of four sets of eight lectures on different topics given in English by four foreign lecturers. Students can choose at most two topics out of four as International Exchange Lecture on Nanoscience and Nanoengineering B or C. Lecture rooms: (Toyonaka Campus, capacity: 40) R.N. 305, INSD Seminar Room, 3rd floor of Interdisciplinary Research Building, (Suita Campus, capacity 12) R.N. F390, INSD Satellite Room, 3rd floor of the first research building of Institute of Scientific and Industrial Research. Invited lecturers in Osaka University will give lectures at Toyonaka Campus.  When students with disabilities take this course and request reasonable accommodation, please contact the Graduate Students Section or the instructor in advance and discuss the concerns.
<b>Office Hour</b>	Those students who have any question should ask the lecturers just after each lecture or send e-mail to the following address: nano-program@insd.osaka-u.ac.jp
<b>Keywords</b>	
<b>Messages to Prospective Students</b>	As soon as the detail of the exchange lectures is fixed, it is put on the website: <a href="http://www.insd.osaka-u.ac.jp/nano/">http://www.insd.osaka-u.ac.jp/nano/</a> . Those students who want to attend the class are requested to fill the application form and send it to the program office in advance. E-mail: nano-program@insd.osaka-u.ac.jp

## Instructor(s)

Instructor Name	Name (hiragana)	Affiliation, Title, Course	Office	Extension	Fax	E-mail
Seiji Takeda	たけだ せいじ	INSD, specially appointed professor				takeda@insd.osaka-u.ac.jp
Tadashi Itoh	いとう ただし	INSD, specially appointed professor				itoh@insd.osaka-u.ac.jp

## Cautions for Students

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<<Last Updated:2021/02/19>>

## Course Schedule Information

Course Code	885009
Semester	Summer Term
Day and Period	Other
Course Name (Japanese)	国際交流特別講義 (国際ナノ理工学特論C)
Room	
Course Name	International Exchange Special Lecture (International Exchange Lecture on Nanoscience and Nanoengineering C)
Capacity	0
Course Numbering Code	88INES9U105
Required/Optional	英語により開講している大学院科目(基) 【履修対象：特別聴講学生のみ】
Credits	1.0
Student Year	1,2,3,4,5,6
Field	
Instructor	TAKEDA Seiji, ITO Tadashi

## Detailed Syllabus Information

Course Name	International Exchange Special Lecture (International Exchange Lecture on Nanoscience and Nanoengineering C)
Language of the Course	English
Type of Class	Lecture Subject
Course Objective	The Institute for NanoScience Design, Osaka University will invite foreign lecturers from abroad and hold the INSD summer school 2016 on nanoscience and nanotechnology, composed of four topics each having eight lectures that are usually taught in topmost foreign universities. The summer school is aimed at fostering international young talent on nanoscience and nanoengineering. This program is shared with Tsukuba University and connects three campuses, Toyonaka, Suita, and Tsukuba, via video conferencing systems. This year four lectures will offer four topics, two from Osaka and two from Tsukuba.
Learning Goals	Students not only attend the class taught in English but also learn the topmost foreign style of lecturing and how to capture main objects for the lecture. Students are requested to ask various kinds of questions which they do not understand or want to study further. At the same time, students are asked to be used to some quiz, exercise, and examination during the lecture
Requirement / Prerequisite	Those who are registered for the Graduate Program for Advanced Interdisciplinary Studies or the Graduate Minor Program are allowed to take this subject with priority. Since extra seats are usually available, the lecture is also open to other students.
Class Plan	The period of the summer school of this year will be eight days during July 22th to August 9th, except for Saturday and Sunday. Due to the difference in lecture time tables between Osaka and Tsukuba, the following time schedule will be allotted. 1st lecture: 9:00-10:30, 2nd lecture:10:45-12:15, 3rd lecture:12:45-14:15, 4th lecture:14:30-16:00. The detailed information about the topics, syllabus and the lecturer schedule will be put on the following website: <a href="http://www.insd.osaka-u.ac.jp/nano/">http://www.insd.osaka-u.ac.jp/nano/</a>
Independent Study Outside of Class	If the lecture note is uploaded before the lecture, students are asked to read the document before attending the class. Those students who do not understand a part of the content should review the lecture by watching the video streaming of the recorded lecture through the internet. It is also recommended to take another exchange lectures in English together with the University of Groningen, the Netherlands.
Textbooks	The lecture note for each lecture is uploaded on the following website a few days before each

	lecture: <a href="http://www.insd.osaka-u.ac.jp/nano/">http://www.insd.osaka-u.ac.jp/nano/</a> In some case, the document will be delivered on site.
<b>Reference</b>	Some references will be introduced in the lecture, if necessary.
<b>Grading Policy</b>	Attendance, asking questions, assignment, and final examination will be used for grading.
<b>Other Remarks</b>	face-to-face class or online class The program will be shared by the students in University of Tsukuba through real-time TV lecture systems. Students are asked not only to attend the class taught in English but also to learn the topmost foreign style of lecturing and how to capture main objects for the lecture.
<b>Special Note</b>	The summer school consists of four sets of eight lectures on different topics given in English by four foreign lecturers. Students can choose at most two topics out of four as International Exchange Lecture on Nanoscience and Nanoengineering B or C. Lecture rooms: (Toyonaka Campus, capacity: 40) R.N. 305, INSD Seminar Room, 3rd floor of Interdisciplinary Research Building, (Suita Campus, capacity 12) R.N. F390, INSD Satellite Room, 3rd floor of the first research building of Institute of Scientific and Industrial Research. Invited lecturers in Osaka University will give lectures at Toyonaka Campus.  When students with disabilities take this course and request reasonable accommodation, please contact the Graduate Students Section or the instructor in advance and discuss the concerns.
<b>Office Hour</b>	Those students who have any question should ask the lecturers just after each lecture or send e-mail to the following address: nano-program@insd.osaka-u.ac.jp
<b>Keywords</b>	
<b>Messages to Prospective Students</b>	As soon as the detail of the exchange lectures is fixed, it is put on the website: <a href="http://www.insd.osaka-u.ac.jp/nano/">http://www.insd.osaka-u.ac.jp/nano/</a> . Those students who want to attend the class are requested to fill the application form and send it to the program office in advance. E-mail: nano-program@insd.osaka-u.ac.jp

## Instructor(s)

Instructor Name	Name (hiragana)	Affiliation, Title, Course	Office	Extension	Fax	E-mail
Seiji Takeda	たけだ せいじ	INSD, specially appointed professor				takeda@insd.osaka-u.ac.jp
Tadashi Itoh	いとう ただし	INSD, specially appointed professor				itoh@insd.osaka-u.ac.jp

## Cautions for Students

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<<Last Updated:2021/03/15>>

## Course Schedule Information

Course Code	885004
Semester	Summer Term
Day and Period	Fri2
Course Name (Japanese)	国際交流特別講義 (量子シミュレーション特論 II)
Room	
Course Name	International Exchange Special Lecture (Topics in Quantum Simulations II)
Capacity	0
Course Numbering Code	88INES9U105
Required/Optional	英語により開講している大学院科目(工) 【履修対象：特別聴講学生のみ】
Credits	1.0
Student Year	1,2,3,4,5,6
Field	
Instructor	MORIKAWA Yoshitada,HAMADA Ikutaro

## Detailed Syllabus Information

Course Name	Topics in Quantum Simulations II
Language of the Course	Japanese/English
Type of Class	Lecture Subject
Course Objective	After learning about the Hartree-Fock method and density functional theory, which are the basis of electronic state theory based on quantum mechanics, we will study the chemical reaction process on solid surfaces, solid-liquid interfaces, under high pressure, and in solutions from a quantum mechanical point of view. The purpose is to acquire the basic knowledge necessary for understanding at the molecular level and to cultivate problem-solving ability.
Learning Goals	The purpose is to develop the ability to understand the electronic state of a substance and the factors of the physical and chemical properties expressed by materials based on quantum mechanics, and to give a guideline for designing a more desirable materials based on the knowledge obtained from quantum theories. The purpose of this lecture is to learn Hartree-Fock approximation, density functional theory, and concrete electronic state theory using them.
Requirement / Prerequisite	It assumes basic knowledge of quantum mechanics and statistical mechanics.
Class Plan	1st Hartree-Fock approximation 2nd Density matrix 3rd Density functional theory 4th Pseudopotential method 5th Electronic structure of solids 6th Electronic level alignment at organic molecule / metal interface 7th Solid surface / interface reaction simulation 8th Discussion and debate
Independent Study Outside of Class	Do quizzes and write reports.
Textbooks	Not specified
Reference	Richard M. Martin, "Electronic Structure: Basic Theory and Practical Methods", 2nd Ed., (Cambridge University Press, 2020) R.G. Parr and W. Yang, "Density Functional Theory of Atoms and Molecules", (Oxford Univ. Press, 1989)
Grading Policy	By attendance, quizzes and reports.

<b>Other Remarks</b>	Face-to-face and / or online.
<b>Special Note</b>	
<b>Office Hour</b>	We do not have office hours, but you can answer questions after the lecture or by making an appointment with the faculty member by email.
<b>Keywords</b>	Quantum Mechanics, Density Functional Theory, Hartree Fock, Solid State Physics, Surfaces, Interfaces
<b>Messages to Prospective Students</b>	Quantum simulation is becoming an indispensable method in material science, and this lecture will introduce its basics and applications.

## Instructor(s)

<b>Instructor Name</b>	<b>Name (hiragana)</b>	<b>Affiliation, Title, Course</b>	<b>Office</b>	<b>Extension</b>	<b>Fax</b>	<b>E-mail</b>
Yoshitada Morikawa	もりかわ よし ただ	Graduate School of Engineering / Professor	M1-414			morikawa@prec.eng.osaka- u.ac.jp

## Cautions for Students

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