Course Requirements

Tohoku University

MEXT Initiative to Establish Next-generation
Novel Integrated Circuits Centers(X-NICS)

Innovative Spintronics X Semiconductor Research Hub

For the 2026 Academic Year

1 Outline of the Innovative Spintronics X Semiconductor Research Hub

The realization of innovative low-power semiconductors, which will be essential for carbon neutrality and Society 5.0, requires development not only in terms of technology but of **human resources** who can support the discipline.

At this research hub, spintronics semiconductors — through which we have led the world in both R&D and human resource development — are positioned as a core technology for a new game-changing approach (X), and we have defined our research and development domain as 'Spintronics X Semiconductors: Materials and Devices × Circuits and Systems'. We are promoting R&D covering not only new materials and devices and the circuits and architectures that make the best use of their unique characteristics, but also integration technologies, and are conducting prototype verification using functioning semiconductor chips to establish proof of concept. Through these initiatives, we aim to create innovative low-power semiconductors that reduce the power consumption of semiconductor integrated circuits to the absolute minimum, without comprising performance, while also **developing highly skilled human resources** with expertise in semiconductors.

Low-power semiconductors are a core technology that society has and will rely upon — in the past, present, and future. These days, societal demands for power saving, including carbon neutrality, are more pressing than ever. R&D of innovative semiconductor materials and devices, with an outlook towards viable practical applications, together with **human resource development**, are urgently needed. The Spintronics X Semiconductors on which our research is focused are a core technology that will be a game changer in low-power semiconductor technology. Maintaining and strengthening Japan's competitiveness in the area of semiconductor integrated circuits will lead to the raising of the country's status in future global markets.

2 Our Vision for Human Resources at the Innovative Spintronics X Semiconductor Research Hub

In addition to Tohoku University, the hub is partner to eight Japanese universities (Hokkaido University, the University of Tokyo, the Institute of Science Tokyo, the University of Electro-Communications, Kyoto University, the University of Osaka, Kyushu University, and Keio University), two public research institutes (the National Institute for Materials Science and the Japan Aerospace Exploration Agency), and there are a further six universities and 27 companies cooperating with us (as of 1st April 2026).

Furthermore, the academic fields at this hub are comprehensive, encompassing everything from physical properties, materials, and devices to processes, circuits, and even architectures and systems, and the mutual synergies between these fields have a great impact on both academia and industry. In response to distinct societal challenges such as carbon neutrality and Society 5.0, we will integrate R&D areas focused on 'Spintronics X Semiconductors', which is viewed as a very promising solution, with the aim of creating and systemizing what will be an important academic field in the future by creating new principles and methods and disseminating them to other fields. The researchers at this hub are at the world's vanguard in a wide range of fields required for semiconductor research, from solid academic-based research on physical properties, materials, and devices to research on circuits and architectures, and also research on integrated technologies, and they are working together to create mutual synergies.

Within this outstanding research environment for Spintronics X Semiconductors, we will expand the applications of the technologies developed by building on Japan's strengths in the creation of new materials, devices, and manufacturing technologies. At the same time, the dynamism and innovation that drive the development of new-concept computing based on new theories are being fostered within academia. Through these initiatives, R&D capabilities for semiconductor integrated circuits at universities are being enhanced, while both the quality and the number of highly skilled professionals are being improved by enabling the next generation of students to learn not only the importance but also the enjoyment of this technology.

We will thereby be able to rapidly develop not only Spintronics X Semiconductors, but also new materials and devices into integrated circuits and systems that are world-class, contributing to the improvement of Japan's research and development capabilities and human resource development capabilities, while at the same time aiming to solve global issues such as carbon neutrality.

3 Curriculum Policy at the Innovative Spintronics X Semiconductor Research Hub

To help students acquire the basic knowledge and familiarity with practical technologies for Spintronics X Semiconductors, the hub has organized its human resource development curriculum into four steps: the 'Basic Semiconductor Course', the 'Semiconductor Development Course', the 'Semiconductor Training Course', and the 'Practical Semiconductor Course'. Each course consists of a subject group covering the basics and the practical aspects of semiconductors, with both faculty members and corporate researchers acting as instructors in the human resource development course. Graduate students taking these courses will be able to acquire knowledge in their specializations, including materials research conducted at the hub, circuit design, and the use of prototyping environment for working semiconductor chips, as well as knowledge and insight in related fields.

<table>
<tr><th colspan="2">X-nics</th></tr>
<tr><td>Basic Semiconductor Course (Required)</td><td>Semiconductor Basic Subjects (selected by each partner institution)
Subjects offered by participating universities and departments can be selected as one wishes
→ Common (2 points)
X-nics Industry-Academia Collaboration Lectures (lectures by companies)
First semester: Advanced Leader Seminar (AIE) *1
Second semester: Engineering, Electrical, Communications, and Electronics/Special Lecture A
* 1 AIE: WISE Program for AI Electronics</td></tr>
<tr><td rowspan="2">Semiconductor Development Course (Elective)
- From Materials to Systemization -</td><td>Semiconductor Development Subjects (selected by each partner institution; common)
Subjects determined by participating departments within the university → Common (4 points)</td></tr>
<tr><td>Semiconductor Practice Subjects (common within the hub)
〇 Programs offered by the university (also available to working adults as recurrent education)
・Semiconductor Process Practice (RIEC) *2
・Semiconductor Process Practice (μSIC) *3
〇 Programs offered by companies
・PBL (including using WISE Program PBL)

* 2 RIEC: Tohoku University's Research Institute of Electrical Communication
* 3 μSIC: Tohoku University's Micro System Integration Center</td></tr>
<tr><td>Semiconductor Training Course (Elective)</td><td>Internships and Overseas Study Programs
・Companies in the student's own research field; Laboratories or companies in fields other than the student's own
・Overseas study programs in collaboration with GP-Spin *4
*4 GP-Spin: Graduate Program in Spintronics</td></tr>
<tr><td>Practical Semiconductor Course (Required)</td><td>Practical On-the-Job Training Projects
Each of the projects within X-nics and students' own research</td></tr>
</table>

Courses and subjects for acquiring basic knowledge and familiarity with practical technologies for 'Spintronics X Semiconductors'

4 Financial support

Financial support will be provided to outstanding graduate students selected for the Innovative Spintronics X Semiconductor Research Hub. The amount of support and other matters will be determined separately.

5 About X-nics points

- X-nics points are equivalent to the credits earned by taking graduate school lecture subjects. However, because X-nics is not equivalent to a graduate school or degree program, students earn points rather than credits from X-nics.
- X-nics points can be earned by taking lectures in X-nics subjects and by passing examinations, etc.
- At X-nics, the requirements for completing courses are determined based on the number of points earned.
- Students taking lectures designated by X-nics (common lectures) among the lecture subjects offered at graduate schools can earn graduate school credits and X-nics points. In instances such as this, the conditions for earning the credits and points are generally the same, but please note that the conditions may differ for some lectures.
  Please carefully check the 'Conditions for Earning Points' in the table below.
- To register for X-nics subjects, a document such as a 'Notification of Subject Enrollment' must be submitted.
- At X-nics, a 'Certificate of Completion' is issued for each course once the required points for each subject group within the course has been achieved.
- An 'Open Badge' is issued once the 'Required Points' target for the subject groups in all courses has been achieved.

Course	Subject Group	X-nics Lecture Name	Points	Conditions for Earning Points	Remarks
Basic Semiconductor Course (Required)	Semiconductor Basic Subjects (Required Points: 2)	Semiconductor Basics	2	Having completed their masters' degrees, students complete courses they have taken for their major.	*The list on this page includes courses that will not be offered this year, as well as courses that have been added this year. *Even if they are not being offered this year or the course name has changed, lectures taken in the past for which points could be earned will be listed so that students can check their course status.
	X-nics Industry-Academia Collaboration Lectures (Required Points: 4)	X-nics Industry-Academia Collaboration Lectures	4	"AIE Advanced Leader Seminar I" Passing by attending and submitting a report earns students 2 points. "Special Lecture on Electrical Engineering A" Passing by attending all lectures and submitting a report earns students 2 points.	
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points: 4)	X-nics Spin Engineering	2	Students earn credits for common subjects at graduate schools by attending two of the six X-nics lectures. Even if students earn credits for several common subjects in one lecture, the number of points for that lecture will be considered to be 2 at a maximum.	
		X-nics Material Property Measurements	2		
		X-nics Semiconductor Processes	2		
		X-nics Energy Systems	2		
		X-nics Information Processing and Security	2		
		X-nics Big Data Processing	2		
	Semiconductor Practice Subjects (Required Points: 2)	Semiconductor Practice	2	Semiconductor Process Practice (RIEC): 2 points Semiconductor Process Practice (μSIC): 2 points PBL (including the use of WISE Program PBL): 2 points	
Semiconductor Training Course (Elective)	Internship / Overseas Training (Required Points: 3)	Internship / Overseas Training	3	Students take part in an internship or overseas training. *There are conditions, such as the duration, so students who wish to participate should please contact the administrative office to inform them of the destination and duration of their internship/overseas training.	
Practical Semiconductor Course (Required)	Practical OJT Project	Doctoral Dissertation		Students can obtain a doctorate by submitting a doctoral thesis and passing any required examinations, including those carried out by examination committees.	

6 Curriculum at the Innovative Spintronics X Semiconductor Research Hub

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Basic Semiconductor Course (Required)	Semiconductor Basic Subjects (Required Points: 2)	Semiconductor Basics	Select one subject from your major that does not overlap with the Semiconductor development subjects.	2	Each University	
	X-nics Industry-Academia Collaboration Lectures (Required Points: 4	X-nics Industry-Academia Collaboration Lectures	AIE Advanced Leader Seminar I	2	Tohoku University	
			Special Lecture on Electrical Engineering A	2	Tohoku University	
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Spintronics Engineering	Spintronics Devices	2	Tohoku University	
			Physics of Magnetism	2	Tohoku University	
			Physics of Magnetic Materials	2	Tohoku University	
			Solid Statistics Basics	2	Tohoku University	
			Physics of Electron Device	2	Hokkaido University	Former: Advanced Quantum Nanoelectronics
			Semiconductor Device and Materials I	2	University of Tokyo	Not Offered in 2026
			Semiconductor Device and Materials II	2	University of Tokyo	Not Offered in 2026
			Physics of Magnetic Materials	2	Institute of Science Tokyo	
			Quantum Transport	2	Institute of Science Tokyo	
			Quantum Mechanics of Many-Body Systems	2	Institute of Science Tokyo	
			Statistical Mechanics III	2	Institute of Science Tokyo	Not Offered in 2026
			Molecular Electronics	2	Kyoto University	Not Offered in 2026
			Quantum Theory for Electronics	2	Kyoto University	
			Semiconductor Nanospintronics	2	Kyoto University	
			Advanced Quantum Theory of Electrons in Solids	2	Osaka University	
			Science and Engineering of Correlated Electron Materials	2	Osaka University	
			An Introduction to Magnetism and Spintronics	2	Osaka University	Abolished in 2024
			Advanced Topics in Magnetism and Spintronics	2	Osaka University	Abolished in 2024
			Nanoelectronics	2	Osaka University	
			Quantum Effect Device	2	Osaka University	Abolished in 2025

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Spintronics Engineering	Quantum Electronics	2	Osaka University	
			Topics in Quantum Simulations I	2	Osaka University	Former:Advanced Topics in Quantum Simulation
			Topics in Quantum Simulations II	2	Osaka University	Former:Advanced Topics in Quantum Simulation
			Photonic Engineering	2	Osaka University	
			Magnetic Electronics I	2	Kyushu University	
			Magnetic Electronics II	2	Kyushu University	
			Fundamental Optical-Quantum Devices I	2	Kyushu University	
			Fundamental Optical-Quantum Devices II	2	Kyushu University	
			Nano-Photonic Information Device I	2	Kyushu University	
			Nano-Photonic Information Device II	2	Kyushu University	
			Spintronic Technology I	2	Kyushu University	
			Spintronic Technology II	2	Kyushu University	
			Advanced Course on Spin and Nano-scaled Solid State Physics	2	Keio University	
			Advanced Quantum Mechanics	2	Keio University	
			Physics of Magnetism	2	Keio University	Not Offered in 2026
			Mathematical Engineering for Quantum Mechanics	2	Keio University	Not Offered in 2026
			Mesoscopic Material Science	2	Keio University	
			Applied Quantum Physics	2	Keio University	
			Optical Control of Quantum Systems	2	Keio University	
			Spin Electronics	2	Keio University	
			Quantum Electronics	2	Keio University	
			Nano-Electronics	2	Keio University	
		X-nics Material Property Measurement	Solid State Physics	2	Tohoku University	

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Material Property Measurement	Electronic Materials and Processing	2	Tohoku University	
			Basics of Solid State Spectroscopy	2	Tohoku University	
			Biomedical Engineering with Biomedical Measurement and Control	2	Tohoku University	
			Introduction to Advanced Magnetics A	2	Tohoku University	
			Introduction to Advanced Magnetics B	2	Tohoku University	Not Offered in 2026
			Semiconductor Optoelectronics A	2	Tohoku University	
			Nanostructures and Function Control in Materials	2	Tohoku University	
			Solid State Physics for Electronics	2	Hokkaido University	
			Advanced Electronic Materials	2	Hokkaido University	
			Solid State Electronics I	2	University of Tokyo	
			Solid State Electronics II	2	University of Tokyo	
			Semiconductor Photonics	2	University of Tokyo	
			Crystal Physics	2	Institute of Science Tokyo	
			Superfluidity	2	Institute of Science Tokyo	Abolished in 2025
			Superconductivity	2	Institute of Science Tokyo	
			Physics of Two-Dimensional Materials	2	Institute of Science Tokyo	
			Light and Matter I	2	Institute of Science Tokyo	
			Light and Matter II	2	Institute of Science Tokyo	Not Offered in 2026
			Light and Matter III	2	Institute of Science Tokyo	Not Offered in 2026
			Light and Matter IV	2	Institute of Science Tokyo	
			Quantum Theory of Electrons in Solids	2	Institute of Science Tokyo	
			Advanced Special Lectures in Physics, Part 8	2	Institute of Science Tokyo	Abolished in 2022
			Advanced Special Lectures in Physics, Part 9	2	Institute of Science Tokyo	Abolished in 2026
			Advanced Special Lectures in Physics, Part 10	2	Institute of Science Tokyo	Abolished in 2026

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Material Property Measurement	Special Lectures in Physics XII	2	Institute of Science Tokyo	
			Electronic Materials, Adv.	2	Kyoto University	
			Electrical Conduction in Condensed Matter	2	Kyoto University	
			Advanced Lecture on Properties of Inorganic Materials	2	Kyoto University	
			Advanced Lecture on Structures of Inorganic Materials I	2	Kyoto University	
			Advanced Lecture on Structures of Inorganic Materials II	2	Kyoto University	
			Inorganic Solid State Chemistry I	2	Kyoto University	
			Inorganic Solid State Chemistry II	2	Kyoto University	
			Advanced Lecture on Properties of Solid Surfaces	2	Kyoto University	
			Crystal Structure Chemistry	2	Kyoto University	
			Electronic Structure and Chemistry of Solids	2	Kyoto University	
			Solid State Spectroscopy	2	Osaka University	
			Semiconductor Material Physics	2	Osaka University	
			Properties of Materials	2	Osaka University	
			Physics of Surfaces, Interfaces, and Ultra-Thin Films	2	Osaka University	
			Electronic Device Engineering	2	Osaka University	
			Quantum Theory of Solid-State Electron Systems	2	Osaka University	
			Frontier of Nano-Scale Materials	2	Osaka University	
			Advanced Optoelectronics	2	Osaka University	Abolished in 2025
			Lightwave and Microwave Engineering	2	Osaka University	
			Materials Science on Thin Solid Films	2	Osaka University	
			Selected Topics in Scientific Instruments I	2	Osaka University	Former:Special Lecture on Precision Scientific Instruments
			Selected Topics in Scientific Instruments II	2	Osaka University	Former:Special Lecture on Precision Scientific Instruments
			Microstructure Evaluation	2	Osaka University	Abolished in 2025

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Material Property Measurement	Scientific Measurements	2	Osaka University	Not Offered in 2026
			Applied Surface Science	2	Osaka University	Abolished in 2025
			Ultrasonic Engineering	2	Osaka University	
			Advanced Material Science Ⅰ	2	Kyushu University	
			Advanced Material Science Ⅱ	2	Kyushu University	
			Measurement and Instrumentation Ⅰ	2	Kyushu University	
			Measurement and Instrumentation Ⅱ	2	Kyushu University	
			Applied Superconductivity Ⅰ	2	Kyushu University	
			Applied Superconductivity Ⅱ	2	Kyushu University	
			Measurement Systems Engineering Ⅰ	2	Kyushu University	
			Measurement Systems Engineering Ⅱ	2	Kyushu University	
			Advanced Superconducting Applications Ⅰ	2	Kyushu University	
			Advanced Superconducting Applications Ⅱ	2	Kyushu University	
			Topics in Optical Condensed Matter Physics	2	Keio University	Not Offered in 2026
			Advanced Course on Surface Chemistry	2	Keio University	Not Offered in 2026
			Topics in Condensed Matter Physics A	2	Keio University	
			Introduction to Functional Materials	2	Keio University	Abolished in 2026
			Optoelectronics	2	Keio University	Abolished in 2026
			Electrical and Magnetic Functional Materials	2	Keio University	Abolished in 2026
			Surface and Interface Science	2	Keio University	
			Special Lectures in Applied Physics A	2	Keio University	Abolished in 2026
			Introduction to Applied Physics and Physico-Informatics	2	Keio University	Former:Topics in Applied Physics C
			Electron Conduction Theory	2	Keio University	Abolished in 2025
			Superconductivity and Materials Science	2	Keio University	Abolished in 2025

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Material Property Measurement	Field Theory	2	Keio University	Not Offered in 2026
			Photonic Nanostructure	2	Keio University	
			Nanoscale Science Joint Seminar/ Material Design Science Joint Seminar	2	Keio University	Abolished in 2026
			Nanomaterials Engineering	2	Keio University	
		X-nics Semiconductor Process	Introduction to Semiconductor Device Physics and Technology	2	Tohoku University	
			Microprocess Science	2	Tohoku University	Not Offered in 2026
			Basic Plasma Engineering	2	Tohoku University	Not Offered in 2026
			Plasma Applied Engineering	2	Tohoku University	Not Offered in 2026
			Information Affective Engineering	2	Tohoku University	Former:Image Sensing Engineering
			Special Lecture on Optical Properties II	2	Tohoku University	Not Offered in 2026
			Semiconductor Device Physics	2	Hokkaido University	
			Integrated Material Processing	2	Hokkaido University	
			Quantum Nanoelectronics	2	Hokkaido University	Former:Advanced Topics in Electronic Devices
			Advanced Electronic Devices and Circuits	2	Hokkaido University	
			Joining Manufacturing	2	University of Tokyo	Not Offered in 2026
			VLSI Testing	2	University of Tokyo	Not Offered in 2026
			Laser Physics	2	Institute of Science Tokyo	
			Integrated Circuit Basics	2	University of Electro-Communications	
			ＶＬＳＩ Low Power Circuit Design	2	University of Electro-Communications	
			Advanced Topics in Integrated Circuit Design	2	University of Electro-Communications	
			Advanced Topics in CMOS Integrated Circuit Design	2	University of Electro-Communications	
			Semiconductor Engineering, Adv.	2	Kyoto University	
			Surface Science of Semiconductors	2	Osaka University	
			Special Lecture on Extreme Precision Machining	2	Osaka University	Abolished in 2025

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Semiconductor Process	Topics on Precision Engineering I	2	Osaka University	Former:Special Lecture on Precision Engineering
			Topics on Precision Engineering II	2	Osaka University	Former:Special Lecture on Precision Engineering
			Applied Device Engineering	2	Osaka University	
			Seminar in Precision Science and Technology I	2	Osaka University	Former:Precision Engineering Exercise
			Seminar in Precision Science and Technology II	2	Osaka University	Former:Precision Engineering Exercise
			Seminar in Precision Science and Technology III	2	Osaka University	Former:Precision Engineering Exercise
			Seminar in Precision Science and Technology IV	2	Osaka University	Former:Precision Engineering Exercise
			Overview of Ultraprecision Machining	2	Osaka University	
			Electronic Device Engineering	2	Osaka University	
			Semiconductor Physics	2	Osaka University	
			Fundamental Integrated Circuit Design I	2	Kyushu University	
			Fundamental Integrated Circuit Design II	2	Kyushu University	
			Bio Electronics I	2	Kyushu University	
			Bio Electronics I II	2	Kyushu University	
			Nanoprocess Engineering I	2	Kyushu University	
			Nanoprocess Engineering II	2	Kyushu University	
			Advanced Organic Electronics I	2	Kyushu University	Not Offered in 2026
			Advanced Organic Electronics II	2	Kyushu University	Not Offered in 2026
			Advanced LSI Device Physics I	2	Kyushu University	
			Advanced LSI Device Physics II	2	Kyushu University	
			Packaging Engineering I	2	Kyushu University	
			Packaging Engineering II	2	Kyushu University	
			Advanced CMOS Technology	2	Kyushu University	Added in 2025
			Advanced Topics in Sustainability and Semiconductors	2	Kyushu University	Added in 2025

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Semiconductor Process	Laser Physics	2	Keio University	Not Offered in 2026
			Mems: Design and Fabrication	2	Keio University	
			Topics in Electrical and Electronics Engineering	2	Keio University	Former:Special Lecture on Advanced Electrical and Information Engineering
			System on A Chip Design	2	Keio University	
			Device Properties Engineering	2	Keio University	Abolished in 2026
			Physics and Modeling of Semiconductor Devices	2	Keio University	Abolished in 2026
			System LSI Design	2	Keio University	Abolished in 2026
		X-nics Energy System	Electrical Energy Conversion and Control Equipment Engineering	2	Tohoku University	Not offered in 2026
			Power Electronics	2	Tohoku University	
			System Control Theory	2	Tohoku University	
			Electric Power Systems Engineering	2	Tohoku University	
			Ubiquitous Energy Engineering	2	Tohoku University	Not Offered in 2026
			Laser Energetics	2	Osaka University	
			Electromagnetic Energy Engineering Ⅰ	2	Kyushu University	
			Electromagnetic Energy Engineering Ⅱ	2	Kyushu University	
			Electric Energy Engineering Ⅰ	2	Kyushu University	Not Offered in 2026
			Electric Energy Engineering Ⅱ	2	Kyushu University	Not Offered in 2026
			Energy and Environment Ⅰ	2	Kyushu University	
			Energy and Environment Ⅱ	2	Kyushu University	
			Electromagnetic Energy Conversion Engineering Ⅰ	2	Kyushu University	
			Electromagnetic Energy Conversion Engineering Ⅱ	2	Kyushu University	
			Applied Electromagnetic Energy Engineering Ⅰ	2	Kyushu University	
			Applied Electromagnetic Energy Engineering Ⅱ	2	Kyushu University	
			Advanced Electrical Energy Applications Ⅰ	2	Kyushu University	

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Energy System	Advanced Electrical Energy Applications II	2	Kyushu University	
			Applied Power Electronics	2	Keio University	Abolished in 2026
		X-nics Information Processing and Security	Internet and Its Security	2	Tohoku University	
			Secure Information Communication Systems	2	Tohoku University	
			Communication Systems	2	Tohoku University	Not Offered in 2026
			Information Network Systems	2	Tohoku University	
			Highly-Reliable System Design	2	Tohoku University	
			Cryptology	2	Tohoku University	
			Information and Communication Technology Theory	2	Tohoku University	
			Internet Engineering	2	Tohoku University	Not Offered in 2026
			Hardware Fundamentals	2	Tohoku University	
			Physics and Mathematics for Electrical Engineering	2	Hokkaido University	
			Advanced Optoelectronics	2	Hokkaido University	Added in 2025
			Quantum Information	2	Institute of Science Tokyo	Not Offered in 2026
			Frontier of Information and Communications Technology	2	Osaka University	
			Optical Transceiver Engineering I	2	Kyushu University	
			Optical Transceiver Engineering II	2	Kyushu University	
			High Frequency Device Engineering I	2	Kyushu University	Not Offered in 2026
			High Frequency Device Engineering II	2	Kyushu University	Not Offered in 2026
			Neuro Computing I	2	Kyushu University	
			Neuro Computing II	2	Kyushu University	
			Advanced Wireless Communication I	2	Kyushu University	
			Advanced Wireless Communication II	2	Kyushu University	
			Foundations of Multi-Agent Systems I	2	Kyushu University	

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Information Processing and Security	Foundations of Multi-Agent Systems II	2	Kyushu University	
			Control System Synthesis Using Convex Optimization I	2	Kyushu University	
			Control System Synthesis Using Convex Optimization II	2	Kyushu University	
		X-nics Big Data Processing	Machine Learning Basics	2	Tohoku University	Former:Fundamentals of Data Science
			Data Science Programming Basics	2	Tohoku University	Former:Big Data Skill-Up Exercise
			Data Science Training I	2	Tohoku University	Former:Data Science Training Camp I
			Data Science Training II	2	Tohoku University	Former:Data Science Training Camp II
			Natural Language Processing	2	Tohoku University	
			Information Technology Fundamental	2	Tohoku University	
			Intelligent Systems Science	2	Tohoku University	
			Medical Information Measurement	2	Tohoku University	
			Information Metrology	2	Tohoku University	Not Offered in 2026
			Computational Humanities and Sociology Research Seminar I	2	Tohoku University	
			Computational Humanities and Sociology Research Seminar II	2	Tohoku University	
			Photonic Information System	2	Hokkaido University	
			Integrated Systems	2	Hokkaido University	Added in 2025
			Creativity Engineering Project I Q	2	University of Tokyo	
			Smart Systems Engineering I	2	Kyushu University	
			Smart Systems Engineering II	2	Kyushu University	
			Advanced Topics on Information Society	2	Kyushu University	
			Special Lecture on Designing Social Infrastructure Based on ICT	2	Kyushu University	
			Advanced Topics in Electrical and Electronic Engineering	2	Kyushu University	
			Advanced Seminar of Semiconcustor Business Strategy	2	Kyushu University	Added in 2025
			Advanced Semiconductor Technology Marketing	2	Kyushu University	Added in 2025

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Development Subjects (Required Points for Completion：4)	X-nics Big Data Processing	Advanced Semiconductor Technology Managing	2	Kyushu University	Added in 2025
			Advanced Semiconductor Social Inplementation	2	Kyushu University	Added in 2025
			Innovation Management	2	Kyushu University	Added in 2025
			Technology Marketing Game	2	Kyushu University	Added in 2025
			New Value Creation I	2	Kyushu University	Added in 2025
			New Value Creation II	2	Kyushu University	Added in 2025
			Advanced Lecture in Idea Evaluation	2	Kyushu University	Added in 2025
			Functional Design Engineering	2	Keio University	Added in 2026
			New Social System and Technologies of Society 5.0 (Mitsubishi Chemical)	2	Keio University	New Social System and Technologies of Society 5.0 (Tokyo Electron)

Course	Subject Group	X-nics Lecture Name	Subject Name	Points	Universities Offering the Subject	Remarks
Semiconductor Development Course (Elective)	Semiconductor Practice Subjects (Required Points: 2)	Semiconductor Practice	Semiconductor Process Practice (RIEC)	2	Tohoku University (RIEC)	
			Semiconductor Process Practice (μSIC)	2	Tohoku University (μSIC)	
			PBL (Including the use of WISE Program PBL)	2	Tohoku University（AIE）	
Semiconductor Training Course (Elective)	Internship / Overseas Training (Required Points: 3)	Internship / Overseas Training		3	Each University	
Practical Semiconductor Course (Required)	Practical OJT Project		※Doctoral Dissertation		Each University	

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