

2008

**Nano Materials Technology
(Lecture) Course**

Japan Advanced Institute of Science and Technology
Center for Nano Materials and Technology

Purpose of Nano Materials Technology(Lecture) Course

The Center for Nano Materials and Technology (CNMT) has started in April 2002 as a renewal of the former Center for New Materials originally established as one of the facilities of common use in JAIST.

The Nano Materials Technology Lecture Course managed by CNMT has a purpose to train graduate students to acquire a wide range and high level knowledge and also experimental techniques of nano-technologies and to play an important role in companies and / or research laboratories.

Outline of Nano Materials Technology(Lecture) Course

1 Start Time

You can start to learn from the beginning of any term listed, but you have to obtain the required credits to complete the course within a year.

Term	Period
1-2	June 6 - July 31
2-1	October 6 - December 2
2-2	December 3 - February 10

2 Prospective Students for the NMT Course

Engineers, Researchers and Scientists in Companies and Institutes, and Graduate Students, etc.

3 Course Enrollment

A person belonging to a company or an institute should carry out the enrollment procedure as a credit auditor and a student belonging to a graduate school in other university should carry out the procedure as a special auditor. The procedures for enrollment are closed one month before the beginning of each term.

4 Screening Fee / Entrance Fee / Tuition

(1) Screening fee: 9,800 yen (2) Entrance fee: 28,200 yen (3) Tuition: 14,800 yen (per credit)

There is a system to support screening fee and entrance fee for patron member of JAIST Foundation and companies which headquarters operations are in Ishikawa, Toyama and Fukui prefecture. For the detailed information, please contact Academic Affairs Section of Services Department. Every special auditor need not to pay a screening fee and entrance fee.

If a special auditor is a graduate student who is currently enrolled at one of national universities or the universities that have the agreements on tuition waiver with JAIST, he / she need not to pay tuition.

5 Lectures

Field	Lectures	Terms	Faculty Roster	Credits
Basic Lectures for Nano-Technology	Fabrication of Nano-Devices with Training Course	2-1	T.Suzuki-Shikoh	2
	Study on Biotechnology with Training Course	2-1	Tsukahara-Takamura-H.Suzuki	2
	Analysis of Nano-Materials with Training Course	2-1	Ohki-Tsujimoto	2
	Structural Analysis of Solids on Nano-Scale with Training Course	2-1	Maenosono-Horita-Otsuka-Noh-Tomitori	2
	Material Analysis with Training Course	2-1	Kawakami-Sasaki-Shinohar-Kaneko-Yamaguchi	2
Advanced Lectures for Nano-Materials	Nano Information- Technology Materials	1-2	Yamada-Mizutani-T.Suzuki-Matsumura-Shimoda	2
	Nano Biodevice Materials	1-2	Tsukahara-Ohki-Fujimoto-Hohsaka-Miura	2
	Nano Quantum Device Materials	1-2	Yamada-Katayama-Iwasaki-Koyano-Fujiwara-Murata-Shinohara	2
Lectures for Advanced Application of Nano-Materials	Advanced Nano-Devices	Specially arranged schedules during 2-1 and 2-2	Lecturers from School of Materials Science, CNMT, and outside	2
	Structure and Functionality of Nano-Materials			2
	Advanced Analysis Technology for Nano-Materials			2

Lectures are held on 4th (15:10-16:40) and 5th (16:50-18:20) periods except for N009, N010, and N011.

6 Course Requirements

As the regular completion requirements, students must acquire total of 8 credits from 4 lectures at minimum within one year after your enrolment with at least 2 credits from 1 lecture of "Basic Lectures for Nano-Technology", and at least 2 credits from 1 lecture of "Advanced Lectures for Nano-Materials" or "Lectures for Advanced Application of Nano-Materials".

7 Completion Certificate

Student could be conferred the completion certificate from the Nano Materials Technology Lecture Course.

8 Syllabi

Basic Lectures for Nano-Technology

Lectures	Outline
Fabrication of Nano-Devices with Training Course	Basic fabrication and measurement methods for nano-scale semiconductor devices will be given.
Study on Biotechnology with Training Course	Methods on isolation and analysis of nano-biomaterials, especially for DNA and proteins. Fabrication and measurement method of nano-bio fluidic chip devices for bio-molecule treatment.
Analysis of Nano-Materials with Training Course	The aim of this class is to study the basic experimental techniques to analyze nanomaterials: NMR and Mass spectrometry.
Structural Analysis of Solids on Nano-Scale with Training Course	The aims of this class are to understand the principles and techniques of analytical instruments such as XRD, SEM, TEM and STM/AFM and to learn how to use the instruments through practices.
Material Analysis with Training Course	The analyses in this course are a chromatography, an absorption spectroscopy, an elemental analysis, a nuclear magnetic resonances (NMR) method, and a thermal analysis. The students should attend the training course of them.

Advanced Lectures for Nano-Materials

Lectures	Outline
Nano Information-Technology Materials	Characteristics and device applications of amorphous, semiconductor, liquid-crystal, and organic/inorganic materials for information-technology will be given.
Nano Biodevice Materials ※	To give an overview of recent progress on analysis and utilization of bio-nanomolecules.
Nano Quantum Device Materials	Fundamental properties and features of quantum device materials such as metals semiconductors, inorganic and organic-materials, bio-materials will be given with the possibility discussion for realization and recent topics of those devices.

※ The credits of M415 "Medical Biomaterials" offered in the School of Materials Science can substitute for the credits of this lecture "N007 Nano Biodevice Materials."

Lectures for Advanced Application of Nano-materials

Lectures	Outline
Advanced Nano-Devices	This lecture is the same as the lecture "Advanced Nano-Materials and Their Devices" in "Integrated Science and Technology Course" held at Kanazawa campus in a specially arranged schedule during 2-1 and 2-2 terms. Present status of research on nano-materials of semiconductors, organic or inorganic materials is briefly mentioned, operation principle of devices made from such materials is explained, and finally industrial impact of such nano-devices is discussed. The credits given by lectures of "Integrated Science and Technology Course" are counted as credits of "Nano Material Technology Lecture Course".
Structure and Functionality of Nano- Materials	This lecture is the same as the lecture "Structure Control of Functional Nano-Materials" in "Integrated Science and Technology Course" held at Kanazawa campus in a specially arranged schedule during 2-1 and 2-2 terms. One-dimensional or higher-order dimensional structure of nano-material is mentioned along with introduction of controlling and analyzing method of such structures. The credits given by lectures of "Integrated Science and Technology Course" are counted as credits of "Nano Material Technology Lecture Course".
Advanced Analysis Technology for Nano-Materials	This lecture is the same as the lecture "Analytical Method for Micro- and Nano-Materials" in "Integrated Science and Technology Course" held at Kanazawa campus in a specially arranged schedule during 2-1 and 2-2 terms. Principle and operation of advanced analytical systems, such as high-resolution mass spectrometer, nuclear magnetic resonance, and various microscopes, are explained along with introduction of examples of actual measurements. The credits given by lectures of "Integrated Science and Technology Course" are counted as credits of "Nano Material Technology Lecture Course".

Flowchart of Educational System of Nano Materials Technology

Basic Lectures for Nano-materials

Term: 2-1

Fabrication of Nano-Devices with Training Course

Study on Biotechnology with Training Course

Analysis of Nano-materials with Training Course

Structural Analysis of Solids on Nano-scale with Training Course

Material Analysis with Training Course

Advanced Lectures for Nano-materials

Term: 1-2

Nano Information-Technology Materials

Nano Biodevice Materials

Nano Quantum Device Materials

Lectures for Advanced Application of Nano-materials

Term: 2-1 and 2-2

Advanced Nano-Devices

Structure and Functionality of Nano-Materials

Advanced Analysis Technology for Nano-Materials

Knowledge Science

Information Science

Materials Science

Nanotechnological technicians and researchers in the field of Knowledge Science

Nanotechnological technicians and researchers in the field of Information Science

Nanotechnological technicians and researchers in the field of Materials Science

You can start studying from any term of the academic year.

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