

Chiba University
Graduate School of Science and Engineering

Master's Program for
Nano Imaging International Consortium
Special Selection

Admission Guidelines
October 2019 Admission

Department of Materials Science in
Division of Advanced Sciences and Engineering

Before applying, please contact directly a desired research supervisor in the education and research field that you wish to choose, and inquire about the content of the related education and research or others so as to confirm your choice.

Chiba University
 Graduate School of Science and Engineering
 Master's Program for
 Nano Imaging International Consortium Special Selection
 Admission Guidelines of October 2019 Admission

The department of Materials Science in the division of Advanced Sciences and Engineering at the graduate school of Science and Engineering invites applications for its Master's Program of Nano Imaging International Consortium as outlined in the table below.

Please visit our website and view Admissions Policy of every department in addition to those of the graduate school and the university.

1. About the program

This graduate school is pleased to offer an international graduate program (the "Program for Nano Imaging International Consortium") which will allow students going to international master-course to very effectively learn about recent advances at the frontiers of science and engineering. In this program, all courses and also master's thesis are conducted entirely in English. This program of English-based instruction will feature more than ten course offerings, and will therefore be ideal for students who have not yet gained proficiency in Japanese. Lectures will also be provided through collaboration with visiting professors from some of the world's top universities, each of whom is working at the forefront of nano-research. This broad science and technology curriculum covers a range of topics, from nano-electronic devices based on carbon nanotubes and organic molecules, to nano-imaging technologies such as flexible graphic display devices for use in mobile cell phones or televisions.

Before applying, please contact directly a supervisor in the education and research field that you wish to choose, and inquire about the content, etc. of the related education and research so as to confirm your choice.

2. Divisions, Departments and Number of Students to Be Admitted

<i>Division</i>	<i>Department</i>	<i>Number of Students to be Admitted October 2019 Admission</i>
Advanced Sciences and Engineering	Materials Science	A few

3. Required Qualification

Applicants are required to meet one of the following requirements.

- (1) They must have completed a 16-year program in the educational institutions in a foreign country, or expect to complete such a course of study by September 2019.
- (2) They must have completed a 16-year program in the educational institutions of a foreign country, or expect to complete such a course of study by September 2019, after taking a correspondence program offered by a foreign school in Japan.
- (3) They must have graduated, or are expected to graduate by September 2019, from a Japanese university*. However applicants of Japanese nationality are not accepted.
 (*This said university must have been designated in accordance with Article 83, Paragraph 1, of the School Education Law.)
- (4) They must have completed, or are expected to complete a foreign university curriculum by September 2019, through which the applicant is certified as having completed 16 years of school education in the respective foreign country, at an educational facility in Japan that has been accredited as having a curriculum approved under the educational system of the respective foreign country and is so designated by the Minister of Education, Culture, Sports, Science and Technology of Japan (hereinafter referred to as "the Minister of MEXT").
- (5) They must have been awarded, or are expected to be awarded a degree equivalent to a bachelor's degree by September 2019, by completing a three-year or longer program at a foreign university or other foreign educational facility. The university or educational facility must have been accredited by the respective foreign government or a person certified by the appropriate foreign governmental agency, or have been so designated by the Minister of MEXT (This includes applicants who have completed an appropriate program offered by the respective foreign educational facility through distance learning while residing in Japan, and applicants who have completed an appropriate foreign educational program at an educational program at an educational facility in Japan as specified in the previous category.).
- (6) They must have completed a 15-year program in the educational institutions in a foreign country, or must have completed a 15-year program in the educational institutions of a foreign country after taking a

correspondence program offered in Japan by a foreign school, by September 2019 and have been recognized by this graduate school as having obtained the prescribed number of credits with superior grades.

- (7) They must have been recognized to have scholastic attainments that are at least the equivalent of those of graduates of foreign universities, based on an examination, conducted by this graduate school, of the applicant's qualifications to enter this school, and be also 22 years of age or be going to turn 22 by September 2019.

Applicants who would meet the Required Qualification (6) or (7) above need another procedure in advance. Please see "12. Request for Judging Applicant's Qualification."

4. Application Procedures

(1) Application Period: June 19, Wed. – June 20, 2019, Thu. (without fail)

(2) Application Method

① If mailing your applications in Japan, please send it by a registered mail, writing "Application for Master's Program for Nano Imaging International Consortium" in red on the envelope.

If mailing from outside Japan, send it by EMS (Express Mail Service).

Mailed applications must arrive before 17:00 by the same deadline as above.

Incomplete documents might be not accepted. When application is to be made directly from abroad, applicants are strongly advised to contact the Graduate Student Affairs at the Administration Office for Faculty of Engineering for confirmation of the applications well ahead of the application deadline.

② If submitting your application in person, visit our office, the Graduate Student Affairs at the Administration Office for Faculty of Engineering.

Venue: Faculty of Engineering Bldg. #11, 1st floor

Time: 9:00-12:00, 13:00-17:00

(3) Application Materials

You may fill out the application forms ①, ②, ⑧, ⑨, ⑩ and ⑪ as below in English.

Those prescribed forms of **A1**, **A2**, **B**, **C** and **D** should be downloaded to use from the website of the Graduate school.

<i>Required Materials</i>	<i>Notes</i>
① Application Form	Fill in the prescribed form A1 and A2 .
② Admission Ticket for Examination and Photo ID Card	Fill in the prescribed forms B . Do not separate these forms of Admission Ticket for Examination from Photo ID Card.
③ Examination Fee Currently Japanese Government (MEXT) Scholarship students are not charged the fee. Contact us before applying.	<p>The examination fee should be paid ahead of the application deadline Japan time. No refunds will be made. It will be, however, refunded to the applicants who paid it by mistake, and besides, didn't apply for the admission, in full if they finish the prescribed procedures for the refund by March 30, 2019, Fri., 5:00 P.M. For more details, please contact us, the Graduate Student Affairs at the Administration Office for Faculty of Engineering.</p> <p>● Applicants residing outside Japan JPY30,000 Payment of the Examination Fee should be made by credit card BEFORE applying as follows:</p> <p>(1) Please visit our website of Japanese version and follow the procedure for the payment. <千葉大学 Chiba University website: http://www.chiba-u.ac.jp> → <入試案内> → <海外からの検定料支払い Payment of Entrance Examination Fee from Overseas> → <検定料支払い受付画面へ Examination Fee Payment (website: https://www.kentei.chiba-u.jp) ></p> <p>(2) You should soon receive an Email payment confirmation from Chiba University after your payment by credit card. You must print out the message of Email confirmation and send it together with the Application Form A1 to the Graduate Student Affairs at the Administration Office for Faculty</p>

	<p>of Engineering.</p> <p>Note 1. Check the appropriate item for credit card of Application Form A1.</p> <p>2. Payment could be made as from June 1, 2019, Sat. You must make a payment by credit card BEFORE applying.</p> <p>3. About the kind of credit cards available, you can check and view it on the website when you follow the payment procedure.</p> <p>Payment from abroad must be made by credit card only. Bank transfer will not be accepted. If you cannot make a payment by credit card, please contact the Graduate Student Affairs at the Administration Office for Faculty of Engineering.</p> <p>● Applicants residing in Japan JPY30,000</p> <p>Bank transfer (<i>furikomi</i>). The examination fee can be transferred by wire from any bank in Japan (except for Yucho Bank). The bank transfer form (<i>furikomi irai-sho</i>) is available at your bank. Note that the Examination fee must not be paid from an ATM (automatic teller machine).</p> <p>(1) Information for bank transfer: Bank Name: Chiba Bank Branch Name: Himawari Dai-Ichi Shiten Account Number: (Futsu Yokin) 2372002 Branch Address: 1-2 Chibaminato, Chuo-ku, Chiba-shi, Chiba 260-0026 Japan Remittee: CHIBA DAIGAKU Remittee Address: 1-33 Yayoi-cho, Inage-ku, Chiba-shi, Chiba 263-8522 Japan</p> <p>(2) Bank transfer charge shall be borne by applicant. Please write “WM” (as admission code) and then applicant’s name in the space to write sender’s name (<i>goirainin</i>) in of the bank transfer form (<i>furikomi irai-sho</i>) at any bank (except for Yucho Bank). Note that the Examination fee must not be paid from an ATM (automatic teller machine). You cannot receive a certificate from the ATM (see (3) as below.)</p> <p>(3) Following the bank transfer, you will receive a bank transfer certificate. Affix the certificate onto the designated blank of the prescribed form A1. A certificate that does not have the stamp of the financial institution that handled the transaction will be invalid. Therefore, when you get the certificate, ensure that it has the stamp.</p> <p>(4) Applicants submitting the application documents in person must still bank transfer the Examination fee.</p>
④ Official Transcripts	An official transcript prepared by the president or dean of the last attended university.
⑤ TOEFL or TOEIC L&R Score	<p>When submitting applications, submit both an official and original score certificate or report, and a photocopy of it, of the one of the following;</p> <ul style="list-style-type: none"> ➢ Official Score Certificate of the TOEIC L&R or TOEIC SP ➢ Examinee Score Report of the TOEFL-iBT ➢ Examinee Score Report of the TOEFL-PBT <p>The official score certificates above are valid as long as the test is taken in and after June 2017.</p> <ul style="list-style-type: none"> ➢ If submitting your application in person; an official and original one will be returned promptly. ➢ If mailing your application; an official and original one will be returned with Admission Ticket for Examination

	by mail. *The one of the TOEIC L&R-IP (Institutional Program) test or the TOEFL-ITP (Institutional Testing Program) for group applications, or TOEIC S&W CANNOT be accepted.
⑥ 2 Photographs	Affix the same photograph each of the head and shoulders of the applicant, without a hat, taken within 3 months before application, to the prescribed form A1 and B . (photo size: 6 cm long x 4 cm wide) with a glue.
⑦ (Expected) Graduation Certificate	An officially certified copy of the (expected) graduation certificate prepared by the president or dean of the last attended university or college. The applicant who submits an expected graduation certificate, must submit a graduation certificate following completion of his/her undergraduate program by the time of the entrance procedure.
⑧ Writing Sample	A writing sample such as a graduation thesis or a term paper or others.
⑨ Research Proposal	Download and fill in the prescribed form C .
⑩ Curriculum Vitae	Download and fill in the prescribed form D .
⑪ Letters of Recommendation	One or two letters of recommendation (in any format, to be signed and sealed) must be submitted along with the other applications (or they can be sent separately and directly to our office). At least one should be from a faculty member of the institution from which the applicant obtained/will obtain a bachelor's degree or equivalent.
⑫ Certificate of Residence (<i>Juminhyo-no-Utsushi</i>) or Photocopy of Passport	<p>● Applicants residing outside Japan Please submit a photocopy of passport that indicates full name, date of birth, sex, and if applicable, a copy of Japanese visa page.</p> <p>● Applicants residing in Japan This document must be obtained at the city, ward, town or village office in which the applicant resides. Photocopy is not accepted. This must include information as below.</p> <ol style="list-style-type: none"> 1. Visa status (<i>Zairyu-shikaku</i> or <i>Zairyu-kubun</i>) 2. Authorized period of stay (<i>Zairyu-kan</i>) in Japan 3. Nationality <p>However, we are not allowed to accept the one written the code of the Social Security and Tax Number System (called "My Number" System).</p>

(4) Points of Concern Regarding Application Submission

- ① Incomplete applications may not be accepted.
- ② **All official and original copies are required unless otherwise specified.** Photocopies, faxes and unofficial printouts cannot be accepted. Submitted documents for application will not be returned under any circumstances. In case you wish to submit an original copy which cannot be reissued, be sure to consult the Graduate Student Affairs at the Administration Office for Faculty of Engineering in advance.
- ③ A word processing software may be used to fill in the forms prescribed by this school, that are to be submitted. (You may not paste a piece of paper downloaded or copied on the prescribed form with a glue.)
- ④ Changing the contents of submitted documents will not be allowed once the application procedures are completed.
However, if you change your address after the application, please provide written notification to that effect (the form to be used is optional).
- ⑤ Entrance permission may be revoked at any time, even after enrollment, if the application documents are found to be invalid or containing any false information.
- ⑥ Regarding the procedure of the visa, applicants residing abroad must make sure of it well in advance and follow the procedure at the nearby Japanese Embassy or Consulate in their country on their own responsibility.
- ⑦ In addition to being used for selecting applicants, personal information collected in the applicant selection process may be used for such purposes as managerial and administrative activities, academic guidance activities, and activities related to research and study on applicant selection methods.

- ⑧ Contact & Destination of Admission Application Submission
Graduate Student Affairs
Administration Office for Faculty of Engineering
Chiba University
1-33 Yayoi-cho, Inage-ku, Chiba City, Chiba 263-8522 Japan
TEL: 043-290-3885
Email: kougaku-daigakuin@office.chiba-u.jp

5. Entrants Selection Process

(1) Selection Method

Applicants will be selected based on an examination (an oral interview) and academic transcripts.

(2) Examination

Oral interview in English: It will include a check in the basic scholastic ability and a research proposal and others.

(3) Examination Date and Time

August 21, 2019, Wed., 10:00 a.m.

*For applicants residing abroad, the examination date and place might be considered and then decided based on the advance consultation before the admission application. Please contact desired supervisor for more information.

(4) Examination Location

It will be held at Nishi-Chiba campus at Chiba University. Please confirm the notice posted on the bulletin board for more details. (See section 6-(1) below.)

6. Precautions

- (1) Necessary information about the examination and assignment of examination rooms will be posted on the bulletin board of the Faculty of Engineering at 10:00 a.m. on the day before the examination.
- (2) Please be sure to bring and have your Admission Ticket for Examination with you during examination period.
- (3) On the entrance examination day, there happen to be some traders concerned with soliciting for notice of the exam results by telegram or the sales of goods at the nearby station or campus around. Those acts bear no relation to Chiba University. You must be careful not to be in troubled by being charged unreasonably for them. Chiba University will take no responsibility for it even if such an accident happens.

7. Advance Consultation for Applicants with Physical or Other Disabilities

If applicants with physical or other disabilities need their condition to be taken into consideration for taking the entrance examination or for taking courses and study after enrollment, please apply for advance consultation before the admission application.

(1) Required Documents

- ① Application form for advance consultation;
which is obtainable from the Graduate Student Affairs at the Administration Office for Faculty of Engineering.
- ② Medical certificate issued by a doctor;
explaining, the type and degree of their disabilities, and also any specific treatment that they need.

(2) Application Deadline

May 17, 2019, Fri., 5:00 P.M.

(3) Contact & Application Submission

Graduate Student Affairs
Administration Office for Faculty of Engineering
Chiba University
1-33 Yayoi-cho, Inage-ku, Chiba City, Chiba 263-8522 Japan
TEL: 043-290-3885
Email: kougaku-daigakuin@office.chiba-u.jp

(4) Consideration for Advance Consultation

We, the staffs at this university will consider based on the documents submitted above. We might contact the applicants, their parents or guardians, or the last university attended regarding the application.

8. Announcement of Examination Results

Date and Time: September 6, 2019, Fri., 2:00 P.M.

It will be posted on the bulletin board of the Faculty of Engineering.

For all applicants, the Graduate School of Science and Engineering will promptly send, the letter of the examination results to the address written on the prescribed form, by a simple registered mail or EMS. For successful applicants who are accepted, a Letter of Notification of Acceptance (*Gokaku Tsuchisho*) and the relative documents such as admission procedures will be also sent.

Any questions concerning results by telephone or email are not available.

9. Entrance Procedures

(1) Period

September 19, Thu. – September 20, 2019, Fri.

Note: 1. A Letter of Notification of Acceptance or Admission Ticket for Examination will be needed for administrative process upon the entrance procedures. Please keep it securely.

2. **The successful applicants who did not complete the entrance procedures within the prescribed entrance procedures period mentioned above, will be regarded as enrollment declining.**

(2) Expenses

■ Admission Fee: JPY282,000 (once at matriculation)

■ Tuition Fee: JPY267,900 half year (annual total tuition: JPY535,800)

Note: 1. Applicants of October Admission should pay it for Fall semester (from October to March) in November, by automatic withdrawal, *Koza Hikiotoshi* which is available in the banking systems. But from the following semester, it should be paid in April for every Spring semester, and in October for every Fall semester, by automatic withdrawal, *Koza Hikiotoshi*. The detailed information on automatic withdrawal, *Koza Hikiotoshi* will be given at the time of the entrance procedure.

2. If the tuition or others be revised, the new tuition or others will go into effect as of the time of the revision.

3. There is a system by which the enrollment fee and tuition may be waived.

For details, please refer to the webpage below:

<http://www.chiba-u.ac.jp/international/isd/english/guide/tuition.html>

For more information, please inquire at the Student Support Division in the Department of Student Affairs.

Phone: (043) 290-2178

■ Fee for Student Health Mutual Aid Society: JPY4,000 (for 2 years)

This is required of all students and is payable at any post office or Yucho Bank.

The purposes of this society are for students to aid one another at times of illness and injury, and to contribute actively to the maintenance of student health.

For details, please inquire at the Student Health Mutual Aid Society Department.

Phone: (043) 290-2220

Email: def2219@office.chiba-u.jp

■ Premium for Student Disaster and Injury Insurance (coupled with Liability Insurance): JPY2,430 (for 2 years)

This is required of all students and is payable at any post office or Yucho Bank.

That insurance covers injuries incurred in class, school events, extracurricular activities and commuting to school. It also covers property damage or injuries to other people. The new insurance premiums will go into effect as of the time of the revision if the insurance premiums have been revised.

For details, please inquire at Student Support Division in the Department of Student Affairs.

Phone: (043) 290-2162

Email: ddc2162@office.chiba-u.jp

10. Completion Conditions

The standard residence period in the master's program at the Graduate School of Science and Engineering is two years. It is the necessary conditions to complete the master's program that you must be registered for two years or more, and also obtain 30 credits or more following the attached Curriculum Requirements, and besides, successfully pass inspection of the master's thesis or the result of study on a specific subject, and the final examination.

11. Early Completion

A student may shorten the period required to complete the master's program to one year if the student has achieved exceptional research results while enrolled in the program.

12. Request for Judging Applicant's Qualification

Applicants who would meet the Required Qualifications (6) or (7) need another procedure in advance as follows. Documents listed below are required to submit so that applicants are judged whether they are qualified to take the entrance examination by this graduate school.

The applicable applicants should contact the Graduate Student Affairs at the Administration Office for Faculty of Engineering before applying.

(1) Submission of Documents

If they wish, they may download and use the documents of **[D]** and **[E]** from the website of this graduate school.

Required Materials	Notes	Qualification	
		(6)	(7)
Request for Judging Applicant's Qualification	Use the form prescribed by this graduate school [E] .	○	○
Official Transcripts	An official transcript prepared by the president at the last university you attended.	○	○
(Expected) Graduation Certificate	An officially certified copy prepared by the president at the last university you attended.	○	/
Curriculum Vitae	Use the form prescribed by this graduate school [D] .	○	○
Letter of Recommendation	One or two letters of recommendation (in any format, to be signed and sealed) must be submitted along with the above documents. At least one should be from a faculty member of the institution from which the applicant obtained/will obtain a bachelor's degree or equivalent. If the applicant is employed, a letter from the head or an individual who is in a supervisory position at the workplace may be used. Otherwise, a letter of self-recommendation (in any format, to be signed and sealed) is acceptable.	○	○
Writing Sample	A writing sample such as a graduation thesis, a term paper or others.	/	○
Certificate of Residence (<i>Juminhyo-no-Utsushi</i>) or Photocopy of Passport	<p>●Applicants residing outside Japan Please submit a photocopy of passport that indicates his/her name, date of birth, sex, and if applicable, a copy of his/her Japanese visa page.</p> <p>●Applicants residing in Japan This document must be obtained at the city, ward, town or village office in which the applicant resides. Photocopy is not accepted. This must include information as below.</p> <ol style="list-style-type: none"> 1. Visa status (<i>Zairyu-shikaku</i> or <i>Zairyu-kubun</i>) 2. Authorized period of stay (<i>Zairyu-kan</i>) in Japan 3. Nationality <p>However, we are not allowed to accept the one written the code of the Social Security and Tax Number System (called "My Number" System).</p>	○	○

(2) Submission Period

Period: May 15, Wed. – May 17, 2019, Fri. (without fail)

(3) Submission Method

- ① If mailing your application in Japan, please send it by a registered mail, writing "Request for Judging Applicant's Qualification for Master's Program for Nano Imaging International Consortium Special Selection" in red on the envelope.

If mailing from outside Japan, send it by EMS (Express Mail Service).

Mailed applications must arrive before 17:00 by the same deadline as above.

Incomplete documents might not be accepted. When application is to be made directly from abroad,

applicants are strongly advised to contact the Graduate Student Affairs at the Administration Office for Faculty of Engineering for confirmation of the applications well ahead of the application deadline.

- ② If submitting your application in person, visit our office, the Graduate Student Affairs at the Administration Office for Faculty of Engineering.

Venue: Faculty of Engineering Bldg. #11, 1st floor

Hours: 9:00-12:00, 13:00-17:00

- (4) Notification of Results

Applicants will be notified of the decision whether to recognize their qualification by mail.

- (5) Admission Application Procedures

The applicants who are approved that they are qualified to take the entrance examination by this graduate school, still need to submit the rest of the admission application documents during the admission application period (see Section 4), though the documents already submitted in this recognition process are not necessary to be resubmitted for that.

- (6) Entrants Selection Process

The admission's selection of the applicants approved in this recognition process, is conducted in the same manner as general applicants.

Program for Nano Imaging International Consortium
Master's Program
Curriculum Requirements

Completion Conditions

The standard residence period in the master's program at the Graduate School of Science and Engineering is two years. It is the necessary conditions to complete the master's program that you must be registered for two years or more, and also obtain 30 credits or more following the attached Curriculum Requirements, and besides, successfully pass inspection of the master's thesis or the result of study on a specific subject, and the final examination.

Course Requirements

Compulsory subjects (total of 10 credits) :

Advanced Seminar I (4 credits)

Graduate Research I (6 credits)

Elective subjects (total of 20 credits or more) :

Two subjects (4 credits) from the subjects No.3 to 6 of the courses list below.

In addition to the above the two subjects, other subjects (at least 16 credits) taken from the subjects No.7 to 17 below.

Courses Provided in this Program

Term** Y-R: Year-Round

<i>Master's Program</i>						
No	Subject Title	Lecturer Adviser*	Term**	Outline	Credit	
					Compulsory	Elective
1	Advanced Seminar I	Related lecturers		Laboratory works as well as research experiment, seminar and internship for master or doctor thesis study.	4	
2	Graduate Research I	Related lecturers		Thesis study as a final course work for master or doctor research instructed in each laboratory.	6	
3	Introduction to Nanoelectronics	Nobuyuki AOKI J. P. BIRD*	T1-2	The objective of this course is to introduce the student to the basics of mesoscopic physics, relevant to understanding the operation of modern nanoelectronic devices. The course begins from an introductory discussion of mesoscopic devices (quantum wires & dots, 2DEG systems) and proceeds to review topics such as density of states, one-dimensional conductance quantization and the Landauer formula, the quantum Hall effect, the Aharonov-Bohm effect, universal conductance fluctuations, and single electron tunneling in semiconductor and metallic nanostructures.		2

4	Computational Quantum Physics	Peter KRÜGER	T4-5	This lecture is an introduction to numerical methods for atomistic simulation of materials. The focus is on first principles electronic structure methods, but semi-empirical quantum methods and classical molecular dynamics are also introduced.	2
5	Introduction to Nonlinear Optics	Takashige OMATSU and Other lecturers	T4-5	This course introduces the principles of Nonlinear Optics on the basis of semi-classical and quantum theories. And this course also includes a topics such as high-harmonics generation and THz photonics.	2
6	Molecular Physics I	Hiroyuki YOSHIDA	T4-5	Physical science and technology for nanotechnology of functional molecules with nano meter scale are described in this class. Especially, the characteristics of the electronic structure of molecular system, and photoelectron spectroscopy to investigate electronic structures are focused.	2
7	Molecular Physics II	Hisao ISHII Yuya TANAKA	T1-2	Physical science and technology for nanotechnology of functional molecules with nanometer scale are described in this class. Especially, the characteristics of molecular materials, the evaluation and control of the structure of their films and interfaces are focused including chemical aspects. Recent overview on molecular-based nano devices such as single molecular devices is also discussed.	2
8	Physics and Engineering of Quantum Waves	Toshio MATSUSUE Hiroyuki BANDO	T4-5	Lectures on quantum wave properties of electrons, spins, electromagnetic waves in semiconductors and metals nanostructures. Especially, fabrication methods, structure designs, and device applications are explained with concern for manipulating the properties, and issues on realizing nanostructure devices with high performances and their ultimate performances are discussed.	2
9	Optical Properties of Molecules	Koji OKUDAIRA	T1-2	This course explores the electronic structure of excited states to understand the interaction between photons and molecules. Photon absorption process in atoms and molecules is also discussed. Topics in this course include the molecular orbital calculation which is a powerful method to understand the soft x-ray inner-shell excitation/ionization.	2
10	Quantum Many-Body Physics	Peter KRÜGER Takashi NAKAYAMA	T1-2	Basic techniques for treating many-electron problems in condensed matter physics are introduced. Density Functional Theory, currently the most widely used method for studying ground-state properties of matter, and the many-electron Green's function technique, suitable for studying the electronic structure of matter and excited-state properties of matter, are covered. The concept of response functions essential for understanding many phenomena is also introduced. As illustrations of the use of these techniques applications to real materials are discussed.	2

11	Lecture on Magnetic Materials	Toyokazu YAMADA	T1-2	The properties of the strongly correlated electron system, such as the magnetism and superconductivity are reviewed.	2
12	Engineering of Electronic Imaging Processes and Systems	Katsuyoshi HOSHINO	T4-5	This course introduces the basis of physical chemistry and engineering for electronic image formation, followed by the recent topics concerning advanced materials to convert electronic images to material images.	2
13	Photosensitive Materials	Kenichi KUGE	T4-5	Solid-state physics and chemistry are the basis program to understand the photosensitivity; the first step to recognize and prepare images. This lecture will explain crystallography, crystal growth, electronic structure of solids, solid-state photophysics and photochemistry etc., from the viewpoint of photosensitivity.	2
14	Material Science for Imaging	Shigeru TAKAHARA	T1-2	There are various chemical and physical processes in imaging, including the memory and conversion of information. The interactions between material and photon in these processes are discussed from the view of the design of materials. The aggregation of molecules and photochemical reactions in organized media are important for the design of functions in solid materials. Students who take the course are requested for their presentation of research topics in the photopolymer conference hold in June.	2
15	Special Lecture on Advanced Science and Engineering II b	Takashige OMATSU and Other lecturers	T4-5	This course introduces the principles and the recent progress concerning nano-material, imaging, and technology for nano-imaging expert.	2
16	International Research Activities I b	Related lecturers	Y-R	This course involves overseas research activities, and develops the ability to proceed with international research.	2
17	Special Lecture on Advanced Science and Engineering II c	Related lecturers	Y-R	This class involves lecture talks and discussions by occasionally visiting professors and researchers. The goal of this course is obtaining the international abilities of understanding scientific talking, training in conference presentation, and discussing with foreign researchers as well as in the international conference, seminar, and many kinds of lectures.	1