# Course Description

## UEC Exchange program
### Japanese University Studies in Science and Technology (JUSST)

**Fall Semester, 2018**

Center for International Programs and Exchange

The University of Electro-Communications

国立大学法人
電気通信大学
UEC TOKYO

100th ANNIVERSARY SINCE 1918

# Contents

# JUSST Program Course Requirements

| | Subject | 1st Semester | 2nd Semester |
|---|---|---|---|
| **CORE SUBJECTS** | **LAB WORK** Research / Project (Required for JUSST student) | **[ UNDERGRADUATE STUDENTS ]** Individual Study Project under the supervision of UEC faculty member. Minimum 8 hours/week 5 Credits/one academic year (2 Credits/one semester) | |
| | | **[ GRADUATE STUDENTS ]** Independent Research Project under the supervision of UEC Faculty member. Minimum 8 hours/week 6 Credits/one academic year (3 Credits/one semester) | |
| | Academic Skills I | 2 hours/week (2 Credits) | – |
| | Academic Skills II | | |
| | Academic Skills III | – | 2 hours/week (2 Credits) |
| | Japanese Language | **Elementary / Intermediate / Advanced *** 8 - 14 hours/week (6 - 7 Credits) | |
| | Science and Engineering Subjects ( ELECTIVE ) | **[ UNDERGRADUATE STUDENTS ]** Need to pass **3 subjects** at minimum ** in *Each Semester* | |
| | | **[ GRADUATE STUDENTS ]** Need to pass **3 subjects** at minimum ** in *One Academic Year* | |
| | | **Electronic Experiment Lab.*** 4 hours/week (2 Credits) Required for all Undergraduate Students Only offered in the **FALL Semester** | |
| **FREE ELECTIVE** | Reading Scientific Research | 2 hours/week (2 Credits) Offered in the **SPRING Semester** only | |
| | Research Presentation | | |
| | English for Interpersonal Communication | 2 hours/week (2 Credits) Offered in the **FALL Semester** only | |
| | Preparation for Graduate School | | |
| | Sports Classes | – | 2 hours/week (1 Credit) |

\*) Japanese language classes may be exempted in the 2nd semester.

\**) Students are highly recommended to take scientific & Engineering courses, at least one subject more than the minimum requirement in order to ensure your successful completion of JUSST program. (Form D)

\***) "Electronic Experiment Lab" is considered as one of the Science and Engineering Subjects.

# 2018 FALL SEMESTER CALENDAR

## OCT

| SUN | MON | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 |  |  |  |

- **1 (MON):** New Students Arrival
- **2–5:** Orientation
- **8 (MON):** Health & Sports Day / Classes Begin
- **10 (WED):** Weekly Meeting Begin
- **18–19 (THU–FRI):** Medical Checkup 1st Semester Student
- **18th to 24th:** Course registration period

## NOV

| SUN | MON | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
|  |  |  |  | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 |  |

- **3 (SAT):** Culture Day
- **22nd – 26th No Classes:** University Festival (open campus)

## DEC

| SUN | MON | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 |  |  |  |  |  |

- **23 (SUN):** Emperor's Birthday
- **24 (MON):** Make-up Holiday
- **25th Dec to 4th Jan:** Winter Break

## JAN

| SUN | MON | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
|  |  | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 |  |  |

- **1 (TUE):** New Year's Day
- **3–4:** Winter Break
- **5 (SAT):** Classes Resume
- **14 (MON):** Coming-of-Age Day

## FEB

| SUN | MON | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
|  |  |  |  |  | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 |  |  |

- **5th to 7th:** Make-up Class Period
- **11 (MON):** National Foundation Day
- **12th to 18th:** Examination Period
- Preparing for the mini-Conference

## MAR

| SUN | MON | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
|  |  |  |  |  | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 |  |  |  |  |  |  |

- **JUSST mini-Conference and Closing Ceremony** — Every JUSST student have to attend (to be announced)
- Spring Break
- **21 (THU):** Spring Equinox Day

## APR

| SUN | MON | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 |  |  |  |  |

- **2nd semester Class Guidance** — All students have to attend

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**@ JUSST students Weekly Meeting on every Wednesday (start from 16:30 in E2-B117)**

Legend:
- National holiday
- University center exam and UEC entrance exams

# Time-Table for Fall Semester, 2018
## 平成30年度秋学期（後期）　短期留学プログラム時間割

| Day 曜日 | Period 授業時間 | Subject　授業名 | Department 学科等 | Lecturer 教員名 | Classroom 教室 | Note 備考 |
|---|---|---|---|---|---|---|
| Mon 月 | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 4 | Topics in Informatics I (Quality and Reliability Engineering) | J | SUZUKI Kazuyuki（鈴木 和幸） | W5-209 | |
| | 5 | | | | | |
| Tue 火 | 1 | UEC Academic Skills I (Computer Literacy) | CIPE | CHOO | C-401 | Old C building (Computer room) |
| | 2 | UEC Academic Skills II (Information literacy and Research) | CIPE | CHOO | C-401 | |
| | | Life　Long　Learning　Sports (for Senior student only) | SPORTS | ANDO Soichi（安藤　創一） | | * |
| | 3 | Japanese Language（日本語） | CIPE | | | |
| | 4 | Japanese Language（日本語） | CIPE | | | |
| | 5 | Semiconductor Materials and Devices | I | NOZAKI Shinji（野崎　眞次） | E6-204 | |
| Wed 水 | 1 | | | | | |
| | 2 | Japanese Language（日本語） | CIPE | | | |
| | 3 | Japanese Language（日本語） | CIPE | | | |
| | 4 | Japanese Language（日本語） | CIPE | | | |
| | | Preparation for Graduate School | HLSS | SHI Jie（史　傑） | E1-606 | |
| | 5 | English for Interpersonal Communication | HLSS | SHI Jie（史　傑） | E1-606 | |
| Thu 木 | 1 | UEC Academic Skills III (Publishing Literacy and Research) | CIPE | CHOO | E3-1st floor | Computer Room |
| | 2 | Advanced Communication Engineering and Informatics III (Computational Complexity) | I | TARUI Jun（垂井　淳） | C-301 | Old C building |
| | 3 | Advanced Communication Engineering and Informatics IV (Computer Algorithms) | I | KOBAYASHI Satoshi（小林　聡） | W9-116 | |
| | 3 | Experimental Electronics Laboratory | S | KISHIMOTO Tetsuo（岸本　哲夫） VOHRA Varun | W8-318 | Compulsory for Undergraduate |
| | 4 | | | | | |
| | 5 | Topics in Mechanical and Intelligent Systems Engineering II (Visual Communications) | M | KANEKO Masahide（金子　正秀） | W8-132 | |
| Fri 金 | 1 | Japanese Language（日本語） | CIPE | | | |
| | 2 | Japanese Language（日本語） | CIPE | | | |
| | 3 | | | | | |
| | 4 | | | | | |
| | 5 | | | | | |
| Intensive Course | | Topics in Mechanical and Intelligent Systems Engineering I (Advanced Robotics and Mechatronics Engineering) | M | AOYAMA Hisayuki（青山　尚之）, et al. | See page 22 for the classroom and schedule | |

**Department 学科等**
- **J:** Department of Informatics（情報学専攻）
- **I:** Department of Computer and Network Engineering（情報・ネットワーク工学専攻）
- **M:** Department of Mechanical and Intelligent Systems Engineering（機械知能システム学専攻）
- **S:** Department of Engineering Science（基盤理工学専攻）
- **CIPE:** Center for International Programs and Exchange（国際教育センター）
- **SPORTS:** UEC Physical Education Division（健康・スポーツ科学部会）
- **HLSS:** The Division of Humanities Languages and Social Sciences（総合文化部会）

**Period 授業時間**
1:　9:00-10:30
2:　10:40-12:10
3:　13:00-14:30
4:　14:40-16:10
5:　16:15-17:45
6:　17:50-19:20
7:　19:30-21:00

\* for 2nd semester students on

# UEC CAMPUS MAP
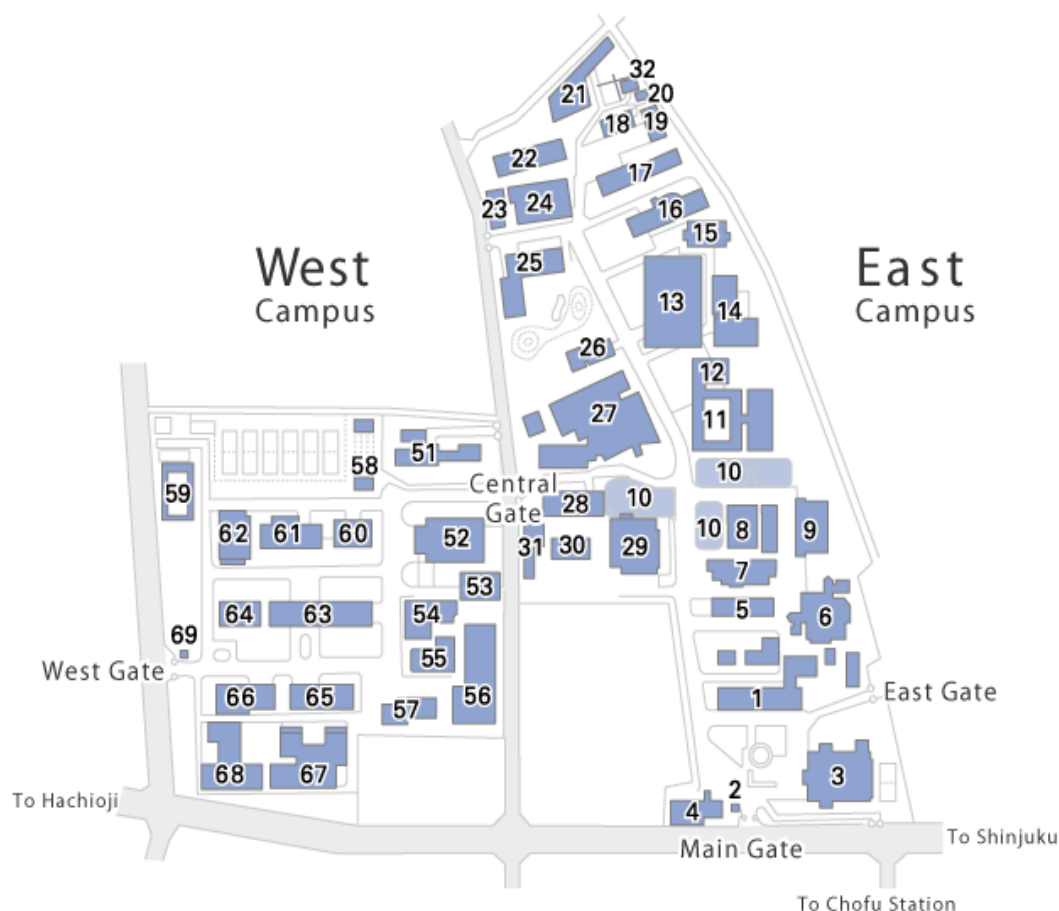


- Main Building （1）
- Auditorium （3）
- 80th Anniversary Memorial Hall （4）
- Building E-1（7）
- Building E-2（28）
- Building E-3（27）
- Building E-4（11）
- Building E-5（12）
- Building E-6（13）
- Building E-7（14）
- Building E-8（15）
- Building E-9（16）
- Building E-10（17）
- Building A（5）
- Building B（6）
- Building C（8）
- Building D（9）
- Communication Park （10）
- University Center （29）
- Health Care Center（26）
- International House（21）
- Facilities for Extracurricular Activities（22）
- Judo Gymnasium（31）
- Personnel Clubhouse（20）
- Child-Care Facility（32）
- Building E-31（18）
- Building E-32（19）
- Building E-33（23）
- Building E-34（24）
- Building E-35（25）
- Building E-36（30）

- Security Office of the Main Gate（2）

- Building W-1（65）
- Building W-2（63）
- Building W-3（66）
- Building W-4（64）
- Building W-5（54）
- Building W-6（60）
- Building W-7（61）
- Building W-8（67）
- Building W-9（68）
- Building W-10（56）
- Building W-11（62）
- Gymnasium（52）
- Gymnasium II（53）
- Archery Facility（58）
- Swimming Pool（59）
- West Cafeteria（55）
- Student Dormitory（51）
- Building W-31（57）
- Security Office of West Gate（69）
- Center for International Programs and Exchange（28）
- University Library（27）
- Information Technology Center（27）
- Coordinated Center for UEC Research Facilities（13）
- Center for Industrial and Governmental Relations（14）
- Advanced Wireless Communication Research Center（17）
- UEC Museum of Communication（17）
- Center for Developing e-Learning（66）
- Institute for Laser Science（61）
- Center for Community Relations（1）
- Innovation Research Center for Fuel Cells（16）
- Center for Photonic Innovation（62）

- Research Center for Ubiquitous Networking and Computing（66）

- Advanced Ultrafast Laser Research Center（62）

# UEC Academic Skills I (Computer Literacy)

## General Information

| | |
|---|---|
| **Course title (Japanese)** | UEC Academic Skills I (Computer Literacy)（上級科目） |
| **Course title (English)** | UEC Academic Skills I (Computer Literacy) |

| | | | |
|---|---|---|---|
| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |

| | |
|---|---|
| **Category** | General culture subjects |
| **Cluster/Department** | School of Informatics and Engineering |
| **Lecturer(s)** | Choo　Cheow　Keong |
| **Office** | E2-305 |
| **e-mail** | uec-as1@fedu.uec.ac.jp |
| **Course website** | http://www.fedu.uec.ac.jp/skills |

| | | | |
|---|---|---|---|
| **Last updated** | 2018/03/27 17:15:31 | **Update status** | Released |

## Course Description

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|---|---|
| **Topic and goals** | This course gives the students the intermediate-advanced knowledge of computer systems and computer networks in a typical academic environment. The lecture stresses fundamental tools and techniques that are applicable to a broad reach of systems such as the use of primitive, but powerful tools as UNIX shell, HTML, LaTeX. |
| **Prerequisites** | NIL |
| **Recommended prerequisites and preparation** | コンピューターリテラシー<br>Computer literacy |
| **Course textbooks and materials** | NIL |
| **Course outline and weekly schedule** | Course schedule and topics that will be covered<br>================================================<br>1. Introduction (Usage: The Information Technology Center ITC, UEC campus network use policies)<br>2. Computer operating system and Tools (fundamentals)<br>3. Unix operating system (fundamentals)<br>4. Unix operating system (The Internet and computer network)<br>5. Word Processing (Basic; Desktop publishing, WYSIWYG, and LaTeX)<br>6. LaTeX (Environments and layout; LaTeX commands, Structure, Package, Class, style, Text typesetting)<br>7. LaTeX (Mathematical Formulas)<br>8. LaTeX (Displayed; Lists, Tabulator, Tables)<br>9. LaTeX (Displayed; Graphics, Drawing)<br>10. LaTeX (Labels, Cross-referencing, Citations and Bibliography)<br>11. World Wide Web (Overview; Web systems, applications, HTML )<br>12. HTML (Basic; Structure, Tag, color, typesetting)<br>13. HTML (Links and Multimedia; Images, Sound, and Movies)<br>14. HTML (Forms, Tables, and Frames)<br>15. HTML (Interactivity, Cascading Style Sheet; CSS)<br>================================================<br><br>This course is intended to be a lecture in combination with a practical exercise ("learn, practice, implement and apply") that will cover the usage of the UNIX system, and including how to write in LaTeX and HTML.<br><br>Note that the lecture schedule is subject to constant revisions throughout the course. |
| **Preparation and review outside class** | Students are required to create/design a homepage and present it in class at the end of the semester. Thus, student may need some extra time to create the homepage. |

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|---|---|
| **Evaluation and grading** | Evaluation is given as follows; (Tasks 50%, Mid-Semester presentation 30%, Final presentation 20%)<br><br>Since this course is a practical course, attendance and participation in class is obligatory. Only students who have 1) maintained at least 70% of attendance, 2) submitted all the assignments and 3) made their Mid-semester & final presentations can obtain the credits. |
| **Office hours** | 12:00-13:00, for just-in-case, schedule an appointment before walking in. |
| **Message for students** | We expect students to be the active part of the learning process. We encourage the students' participation in class discussions, asking questions and interacting with others. If you have any comments on the topics covered, please feel free to share with the others in class. |
| **Others** | Students are expected to come to class on time. Absences are excused in case of emergency, illness, or trips to conferences. |
| **Keyword(s)** | Unix, HTML, Latex |

# UEC Academic Skills II (Information Literacy and Research)

## General Information

| | |
|---|---|
| **Course title (Japanese)** | UEC Academic Skills II (Information Literacy and Research) （上級科目） |
| **Course title (English)** | UEC Academic Skills II (Information Literacy and Research) |

| | | | |
|---|---|---|---|
| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |

| | |
|---|---|
| **Category** | General culture subjects |
| **Cluster/Department** | School of Informatics and Engineering |
| **Lecturer(s)** | Choo   Cheow   Keong |
| **Office** | E2-305 |
| **e-mail** | uec-as2@fedu.uec.ac.jp |
| **Course website** | http://www.fedu.uec.ac.jp/skills |

| | | | |
|---|---|---|---|
| **Last updated** | 2018/03/27 17:16:07 | **Update status** | Released |

## Course Description

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|---|---|
| **Topic and goals** | This course is designed to foster students' ability to identify, evaluate and use diverse information sources effectively in science and engineering studies. It involves the knowledge of information technology tools and their application to research. Students are required to give a poster presentation on their major study or research at the end of the semester. |
| **Prerequisites** | UEC Academic Skills I (Computer Literacy) or コンピューターリテラシー |
| **Recommended prerequisites and preparation** | NIL |
| **Course textbooks and materials** | NIL |
| **Course outline and weekly schedule** | Course schedule and topics that will be covered<br>===============================================<br>1. Introduction (Usage: The Information Technology Center etc.)<br>2. Academic Integrity (Referencing, citing)<br>3. Mind mapping, brain storming<br>4. Scientific literatures and resources retrieval 1/2<br>5. Scientific literatures and resources retrieval 2/2 (UEC Library)<br>6. Managing resources<br>7. Managing, accessing and sharing resources, and Create bibliographies<br>8. Logical and Critical reading (comprehend, examine, evidence, utilize)<br>9. Graphical information (Inkscape, GIMP)<br>10. Tables, Graphs, Charts, Diagrams and Timelines  (SciDAVis)<br>11. Formula editor (word processing and computation)<br>12. Desktop publishing for poster presentation (Scribus)<br>13. Preparation for presentation<br>14. Poster presentation 1/2<br>15. Poster presentation 2/2<br>===============================================<br><br>The course gives an introduction to the use of some powerful tools for scientific research and engineering, and the lectures include hands-on learning and applicable exercises.<br><br>Note that the lecture schedule is subject to constant revisions throughout the course. |
| **Preparation and review outside class** | Students have to read 1 to 3 articles about varied topics, and at the end of the semester, the students are expected to make a postal presentation. |
| **Evaluation and grading** | Evaluation is given as follows; (Assignments 50%, midterm presentation 20%, Poster presentation 30%) |

| | Since this course is a practical course, attendance and participation in class is obligatory. Only students who have 1) maintained at least 70% of attendance, 2) submitted all the assignments and 3) made their poster presentations can obtain the credits. |
|---|---|
| **Office hours** | 12:00-13:00, for just-in-case, schedule an appointment before walking in. |
| **Message for students** | We expect students to be the active part of the learning process. We encourage the students' participation in class discussions, asking questions and interacting with others. If you have any comments on the topics covered, please feel free to share with the others in class. |
| **Others** | Students are expected to come to class on time. Absences are excused in case of emergency, illness, or trips to conferences. |
| **Keyword(s)** | Research, library, Desktop publishing, poster presentation |

# UEC Academic Skills III (Publishing Literacy and Research)

## General Information

| | |
|---|---|
| **Course title (Japanese)** | UEC Academic Skills III (Publishing Literacy and Research) |
| **Course title (English)** | UEC Academic Skills III (Publishing Literacy and Research) |

| **Academic year** | 2018 | **Year offered** | 3/4 |
|---|---|---|---|
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |

| | |
|---|---|
| **Category** | General culture subjects |
| **Cluster/Department** | School of Informatics and Engineering |
| **Lecturer(s)** | Choo　Cheow　Keong |
| **Office** | E2-305 |
| **e-mail** | uec-as3@fedu.uec.ac.jp |
| **Course website** | http://www.fedu.uec.ac.jp/skills |

| **Last updated** | 2018/03/27 17:16:20 | **Update status** | Released |
|---|---|---|---|

## Course Description

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|---|---|
| **Topic and goals** | This class focuses attention on the exercise of strategic research project. Students are required to carry out a study/research project for more than a half of year with a specific topic. Then, they have to proceed their own project after they choose their own topic and make a monthly plan. At the end of semester, there will be an international mini-conference that has participants of all the JUSST Exchange Students and other regular UEC Students. Students are required to give a presentation on their research-based projects. |
| **Prerequisites** | UEC Academic Skills I (Computer Literacy) or コンピューターリテラシー |
| **Recommended prerequisites and preparation** | UEC Academic Skills II (Information Literacy and Research) |
| **Course textbooks and materials** | NIL |
| **Course outline and weekly schedule** | Course schedule and topics that will be covered<br>==============================================<br>1. Introduction (Usage: The Information Technology Center etc.)<br>2. Academic Integrity (interesting and Unpublished, Scientific misconduct)<br>3. Researcher's outputs (Why, How, Where)<br>4. Planning the research/research protocol (LaTeX editor, Mind mapping and brainstorming etc.)<br>5. Proposing and Reporting on Research<br>6. Making a scientific presentation<br>7. Midterm Presentation 1/2<br>8. Midterm Presentation 2/2<br>9. Brush up on your skills (Handling Q&A)<br>10. Communication and Correspondence (Peer, Researcher, Editor, etc.)<br>11. Academic publishing  (Overviews; Dissertation, Monograph, Scientific paper )<br>12. Academic publishing  (Procedures, Processes and standards)<br>13. Assessment and evaluation<br>14. Oral presentation 1/2<br>15. Oral presentation 2/2<br>==============================================<br><br>This course is designed to support the pursuit of writing research paper and share the skills of quality publishing. The lectures are linked with practical activities, and the final assignment requires that each student to publishing and presenting a research paper/article in a mock conference (in class for regular student).<br><br>Note that the lecture schedule is subject to constant revisions throughout the course. |

| | |
|---|---|
| **Preparation and review outside class** | Students have to read 2 to 3 articles about varied topics and at the mid and end of the semester, the students are expected to make an oral presentation.<br><br>For laboratory assigned students, the essential project hours are estimated for more than 8 hours a week, where this is the same standard of graduate thesis project. |
| **Evaluation and grading** | Evaluation is given as follows; (Assignments 40%, Writing paper 30%, Oral presentation 30%)<br><br>Since this course is a practical course, attendance and participation in class is obligatory. Only students who have 1) maintained at least 70% of attendance, 2) submitted the writing paper and 3) made their final presentations can obtain the credits. |
| **Office hours** | 12:00-13:00, for just-in-case, schedule an appointment before walking in. |
| **Message for students** | We expect students to be the active part of the learning process. We encourage the students' participation in class discussions, asking questions and interacting with others. If you have any comments on the topics covered, please feel free to share with the others in class. |
| **Others** | Students are expected to come to class on time. Absences are excused in case of emergency, illness, or trips to conferences. |
| **Keyword(s)** | Research, Publishing paper, oral presentation |

# Preparation for Graduate School

## General Information

| | | | |
|---|---|---|---|
| **Course title (Japanese)** | Preparation for Graduate School | | |
| **Course title (English)** | Preparation for Graduate School | | |
| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |
| **Category** | General culture subjects | | |
| **Cluster/Department** | School of Informatics and Engineering | | |
| **Lecturer(s)** | Shi Jie | | |
| **Office** | E1-609 | | |
| **e-mail** | shi.jie@uec.ac.jp | | |
| **Course website** | Nil | | |
| **Last updated** | 2018/03/09 15:34:58 | **Update status** | Released |

## Course Description

| | |
|---|---|
| **Topic and goals** | The transition from undergraduate to graduate study presents many challenges and requires careful preparation in many aspects and substantial effort. This course is designed to help undergraduate students make the difficult transition and gain the basic knowledge and the necessary competencies of what will be required of them at graduate school particularly in the respects of English language and other language-related academic skills. Students in this course will familiarize themselves with the common academic activities/tasks such as group discussion, critical reading and analysis of textbooks and academic articles, informal oral and written report, formal presentation at symposiums and conferences (poster and computer-aided), and basic academic paper writing. This course will also support students in areas of how to communicate with professors and international students orally and through emailing. At the end of the course, students will conduct a field research to survey and interview UEC graduate students and professors on how to succeed in graduate school. |
| **Prerequisites** | 1st and 2nd year compulsory English courses of UEC |
| **Recommended prerequisites and preparation** | Some Advanced English courses focusing on academic English, presentation and writing |
| **Course textbooks and materials** | Teaching materials will be prepared by the teacher and students based on the needs of the syllabus. |
| **Course outline and weekly schedule** | Week 1: Guidance/Course Orientation<br>Week 2: What is academic English? What kinds of English are needed in your future labs?<br>Week 3: Journal articles and reporting them bilingually<br>Week 4: Research and types of academic presentations<br>Week 5: PPT presentation on journal articles<br>Week 6: PPT presentation on journal articles<br>Week 7: Impromptu Speech on academic topics<br>Week 8: Academic written English vs Academic spoken English<br>Week 9: Design and language for poster presentation<br>Week 10: Poster presentation<br>Week 11: Poster presentation<br>Week 12: Abstracts for academic conferences and journal articles<br>Week 13: Self-review, peer-review of abstracts<br>Week 14: Testing strategies: TOEIC, TOEFL, IELTS<br>Week 15: Testing strategies: TOEIC, TOEFL, IELTS<br>(Week 16: Testing strategies: TOEIC, TOEFL, IELTS) |
| **Preparation and review outside class** | Group work or research for presentations may take up a lot of time outside of the classes. |

| | |
|---|---|
| **Evaluation and grading** | Performance and attitude in class: 20%<br>PPT Presentation: 30%<br>Poster Presentation: 20%<br>Abstract writing: 20%<br>Reading assignments: 10% |
| **Office hours** | Tue 4 or based on appointment arranged by email. |
| **Message for students** | Never allow English to ride on you; you should ride on it (A Chinese proverb).<br>Logic, logic, logic! |
| **Others** | Students interested in independent learning and corpus-analysis of English for Science and Technology are specially welcome. |
| **Keyword(s)** | graduate school, academic English, presentation, abstract, journal article, research |

# English for Interpersonal Communication

## General Information

| | |
|---|---|
| **Course title (Japanese)** | English for Interpersonal Communication |
| **Course title (English)** | English for Interpersonal Communication |

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| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |

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| **Category** | General culture subjects |
| **Cluster/Department** | School of Informatics and Engineering |
| **Lecturer(s)** | Shi Jie |
| **Office** | E1-609 |
| **e-mail** | shi.jie@uec.ac.jp |
| **Course website** | Nil |

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| **Last updated** | 2018/03/09 15:35:40 | **Update status** | Released |

## Course Description

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| **Topic and goals** | This course teaches the basic elements in interpersonal communication. Students will be given opportunities to study the basic concepts in interpersonal communication as well as practice the theories in various kinds of class activities such as simulations, discussions, skits/drama and presentations. |
| **Prerequisites** | All required English courses in first and second years. |
| **Recommended prerequisites and preparation** | English courses that involved students in discussion, presentation and research. |
| **Course textbooks and materials** | The teacher and students will both prepare reading, discussion and presentation materials. |
| **Course outline and weekly schedule** | The main topics and activities are as follows:<br>Week 1. Definition of communication, interpersonal communication<br>Week 2. Perception of self<br>Week 3. Perception of the world<br>Week 4. Cross-cultural communication<br>Week 5. Gender differences: a myth or fact<br>Week 6. The role of language and language use in communication<br>Week 7. Management of personal conflicts and crisis<br>Week 8. In-class/On-campus research project<br>Week 9-11. Presentation<br>Week 12-14. Essay writing<br>Week 15: Review and course evaluation |
| **Preparation and review outside class** | Students must be prepared to conduct out-of-class home assignments, e.g. research, preparation for presentation, team work, and essay writing. |
| **Evaluation and grading** | This course adopts an accumulative grading system which divides the final grades into percentages. It is important to note that there will NOT be a final test that counts for 100% of your grade. Note: Those students who are absent for two times or more without any official excuses will not be eligible for Grade "AA"; Those students who miss over 30% of total classes without any official excuses will fail automatically.<br>Attitude and Performance in class: 20%<br>Homework: 20%<br>Research presentation: 30%<br>Research essay: 30% |
| **Office hours** | Office Hours: Period 2, Tuesday or based on appointment arranged by email. |
| **Message for students** | Your attendance and your participation in class activities are two of the most important elements of the course and your achievement. You must try to use English in class all the time. Inappropriate use of Japanese in class will be considered unacceptable behaviors in class and will |

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| | lead to lower final grade. You are encouraged to ask questions actively in class. In addition, you are expected to make contributions to the class materials and group collaboration for research and group work. |
| **Others** | All students must have an active account with the UEC e-Learning system. |
| **Keyword(s)** | Personal, interpersonal, communication, discussion, presentation |

# Topics in Informatics I（Quality and Reliability Engineering）

## General Information

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|---|---|
| **Course title (Japanese)** | Topics in Informatics I（Quality and Reliability Engineering）　（学域） |
| **Course title (English)** | Topics in Informatics I |

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|---|---|---|---|
| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |

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| **Category** | Core subjects |
| **Cluster/Department** | Cluster I （Informatics and Computer Engineering)/Cluster II （Emerging Multi-interdisciplinary Engineering） |
| **Lecturer(s)** | SUZUKI Kazuyuki (鈴木　和幸) |
| **Office** | West 5-605 |
| **e-mail** | suzuki@se.uec.ac.jp |
| **Course website** | http://www-suzuki.se.uec.ac.jp/ |

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| **Last updated** | 2018/02/27 18:48:46 | **Update status** | Released |

## Course Description

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| **Topic and goals** | Lots of Japanese products have been spreading out all over the world. Two of the reasons are high quality and reliability of Japanese products. Quality control (QC) in Japan has developed after World War 2, and now the Japanese way of QC is adopted in USA, Europe and Asia. In USA, reliability and quality are categorized in different fields but in Japan they are considered to be closely related each other. This lecture course focuses on the philosophy, ideas and scientific method used to build quality and reliability into products and systems. Also, recent development of information technology has been changing the way of QC and Reliability Engineering. This new aspects is also dealt with. |
| **Prerequisites** | None |
| **Recommended prerequisites and preparation** | None |
| **Course textbooks and materials** | Handouts prepared by the teacher |
| **Course outline and weekly schedule** | This course consists of the following three parts.<br><br>1.World Wide Quality Revolution<br>History of Quality and Quality Control, Origin of "Made in Germany", Japanese TQC and its Spread to the World, Rally of USA.<br>2.Quality Assurance (QA) and Total Quality Management<br>Meaning of Quality, What is QA? New Product Development and QA, Quality Functional Development, Four leading principles of Japanese TQC.<br>3.Statistical Quality Control<br>QC seven tools, Statistical Process Control, Design of Experiments |
| **Preparation and review outside class** | Please summarize your learning after each class |
| **Evaluation and grading** | Class appearances, assignment submissions, and group discussions within classes |
| **Office hours** | Any questions are welcomed after each class |
| **Message for students** | This lecture will be given in English. It is a good chance to improve spoken English and make international friends. |
| **Others** | None |
| **Keyword(s)** | Quality Control, Reliability Engineering, QC Seven Tools, Design of Experiments |

# Semiconductor Materials and Devices

## General Information

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|---|---|---|---|
| **Course title (Japanese)** | Semiconductor Materials and Devices | | |
| **Course title (English)** | Semiconductor Materials and Devices | | |
| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | Faculty of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |
| **Category** | Core subjects | | |
| **Cluster/Department** | All | | |
| **Lecturer(s)** | NOZAKI Shinji (野崎　眞次) | | |
| **Office** | East31-203 | | |
| **e-mail** | nozaki@ee.uec.ac.jp | | |
| **Course website** | none | | |
| **Last updated** | 2017/02/21 15:01:09 | **Update status** | Released |

## Course Description

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| **Topic and goals** | In this course you will receive an introduction to the operation and fabrication of the most important semiconductor devices used in integrated circuit technology together with device design and layout. At the end of the course you will have a basic understanding of pn diodes, bipolar transistors, and MOSFETs as well as some light emitting and light detecting devices such as photodiodes, LEDs and solar cells. You will also receive an introduction to the fundamental concepts of semiconductor physics such as doping, electron and hole transport, and band diagrams. |
| **Prerequisites** | none |
| **Recommended prerequisites and preparation** | Electronic Circuits |
| **Course textbooks and materials** | Modern Semiconductor Devices for Integrated Circuits (Chenming Calvin Hu) |
| **Course outline and weekly schedule** | 1. General Overview of the course, Electrons and Holes in Semiconductors I<br>2. Electrons and Holes in Semiconductors II<br>3. Motion and Recombination of Electrons and Holes<br>4. Device Fabrication Technology<br>5. PN Junction I<br>6. PN Junction II<br>7. Application to Optoelectronic Devices (Slar Cells, LEDs, Diode Lasers, Photodiodes)<br>8. Metal-Semiconductor Junction<br>9. MOS Capacitor I<br>10. MOS Capacitor II<br>11. MOS Transistor I<br>12. MOS transistor II<br>13. MOSFETs in ICs<br>14. Bipolasr Transitor I<br>15. Bipolar Transistor II<br>16. Final Exam (in class)<br>Take Home Exam in the winter holidays |
| **Preparation and review outside class** | The students are advised to buy the text and read the assigned chapter before and after the class.  The paperback is available at Amazon Bookstore for a lower price. |
| **Evaluation and grading** | Based on the scores of the takehome and inclass exams (50% each) |
| **Office hours** | After a class or e-mail for an appointment |
| **Message for students** | Semiconductors are a key driver of job growth, productivity and innovation throughout the world. The students are encouraged to take the course if they plan to work as engineers in the electronic industry or researchers in the field of semiconductor electronics in future. |

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| **Others** | The lectures are in English.  The credit can be transferred to "Introduction to Semiconductor Devices" in the undergraduate program of Engineering Science at IE.  The students at Department of Engineering Science who are proficient in English are also encouraged to take the course. |
| **Keyword(s)** | semiconductor, MOS, IC, LED, solar cell, transistor |

# Advanced Communication Engineering and Informatics III（Computational Complexity）

## General Information

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|---|---|
| **Course title (Japanese)** | Advanced Communication Engineering and Informatics III （Computational Complexity） |
| **Course title (English)** | Advanced Communication Engineering and Informatics III |

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| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |

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| **Category** | Core subjects |
| **Cluster/Department** | Cluster I （Informatics and Computer Engineering)/Cluster II （Emerging Multi-interdisciplinary Engineering） |
| **Lecturer(s)** | TARUI Jun (垂井　淳) |
| **Office** | E3-824 |
| **e-mail** | tarui@ice.uec.ac.jp |
| **Course website** | www.jtlab.ice.uec.ac.jp |

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| **Last updated** | 2018/03/06 20:23:13 | **Update status** | Released |

## Course Description

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| **Topic and goals** | In the academic year of 2018, the subject of this course will be Computational Complexity, which studies questions such as "Which computational problems have efficient algorithms?" and "Do quantum computers have more computational power than classical computers?" The course will be an introduction to Computational Complexity, and will cover a wide spectrum of topics. |
| **Prerequisites** | none |
| **Recommended prerequisites and preparation** | Students should have taken an introductory course on algorithms, and should have written at least one computer program. |
| **Course textbooks and materials** | none |
| **Course outline and weekly schedule** | In the first half of the course, we will discuss the following various algorithmic paradigms:<br>(1) learning algorithms<br>(2) randomized algorithms<br>(3) approximation algorithms<br>In the second half, we will discuss the following:<br>(1) complexity classes including important classes P and NP<br>(2) theory of NP-completeness<br>(3) theoretical cryptography<br><br>More specific plan of 15 lectures is as follows.<br>I will somewhat fine-tune the lecture plan after finding out backgrounds of actual class attendees.<br><br>1. overview, review of algorithm analysis<br>2. review of sorting algorithms and their analysis<br>3. explanation of programming project<br>4. learning algorithm (1): learning axis-parallel rectangles<br>5. learning algorithm (2): PAC learning paradigm<br>6. learning algorithm (3): learning conjunctions and DNFs<br>7. student presentation of programming project<br>8. randomized algorithm<br>9. approximation algorithm<br>10. complexity classes P and NP<br>11. NP-completeness (1): reduction<br>12. NP-completeness (2): 3SAT<br>13. NP-completeness (3): 3coloring |

| | 14. cryptography<br>15. P vs NP conjecture |
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| **Preparation and review outside class** | at least 1.5 hour/week expected |
| **Evaluation and grading** | Grading will be based on biweekly homework reports and one programming project. To pass the course, you have to understand at least two-thirds of the topics in class well enough to the extent that you can give simple examples for explanation, and you have to complete well at least two-thirds of your homework. |
| **Office hours** | TBA |
| **Message for students** | Regular UEC students from all departments are very much welcome. |
| **Others** | If you have questions about this course, please feel free to ask me by email. |
| **Keyword(s)** | algorithm, computational complexity, learning algorithm, NP-completeness |

# Advanced Communication Engineering and Informatics IV （Computer Algorithms）

## General Information

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|---|---|---|---|
| **Course title (Japanese)** | Advanced Communication Engineering and Informatics IV（Computer Algorithms） （学域） | | |
| **Course title (English)** | Advanced Communication Engineering and Informatics IV | | |
| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |
| **Category** | Core subjects | | |
| **Cluster/Department** | Cluster I （Informatics and Computer Engineering)/Cluster II （Emerging Multi-interdisciplinary Engineering） | | |
| **Lecturer(s)** | KOBAYASHI Satoshi (小林　聡) | | |
| **Office** | W9-735 | | |
| **e-mail** | kobayashi.satoshi@uec.ac.jp | | |
| **Course website** | http://www.comp.cs.uec.ac.jp/lectures/ | | |
| **Last updated** | 2018/03/01 11:21:10 | **Update status** | Released |

## Course Description

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| **Topic and goals** | The purpose of this lecture is provide the theory and technique to design efficient algorithms for various fundamental problems.<br>The goals of the students are to achieve the following points:<br>(1) to understand the behavior, correctness, and time complexity analysis of the algorithms discussed in the lecture,<br>(2) to understand the principles of design methodologies of algorithms, such as dynamic programming, greedy method, etc. |
| **Prerequisites** | Registered students should have ability to write C programs. Furthermore, the knowledge about some basic data structures (list, binary tree, heap, etc.) and basic algorithms (sorting, etc.) are required. |
| **Recommended prerequisites and preparation** | None |
| **Course textbooks and materials** | Some handouts are provided at the lecture. |
| **Course outline and weekly schedule** | (a) Contents of the lecture<br><br>[1] Minimum spanning tree problem and greedy algorithms<br>[2] Correctness of Prim's and Kruskal's algorithm<br>[3] Greedy algorithms for other problems<br>[4] Shortest path problem and Dynamic Programming (DP)<br>[5] DP Method (1) --- Transform DFAs to regular expressions<br>[6] DP Method (2) --- Context-free grammar and its recognition problem<br>[7] DP Method (3) --- CYK algorithm for CFG recognition<br>[8] DP Method (4) --- Hidden Markov Models (HMM)<br>[9] DP Method (5) --- Recognition problem of HMM<br>[10] DP Method (6) --- HMM recognition algorithm<br>[11] DP Method (7) --- Approximate string matching algorithms<br>[12] String matching problem<br>[13] Computing failure functions in KMP algorithm<br>[14] Correctness and time complexity of KMP algorithm<br>[15] Summary and conclusion of this lecture<br><br>(b) How does this lecture proceed? |

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| | For each problem, we first discuss on its background and motivation, and then give an algorithm for the problem. The correctness and time complexity analysis of the given algorithm will be discussed in details. Example runs will be used to enrich the understanding. |
| **Preparation and review outside class** | Implement algorithms given in the the lecture, if possible. |
| **Evaluation and grading** | Academic performance is evaluated by exams. The lowest standard is 60%. |
| **Office hours** | Any time, but appointments by e-mails are necessary. |
| **Message for students** | None |
| **Others** | None |
| **Keyword(s)** | Dynamic programming, greedy algorithms, context free grammars, HMM, string matching, etc. |

# Experimental Electoronics Laboratory

## General Information

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|---|---|---|---|
| **Course title (Japanese)** | Experimental Electoronics Laboratory （学域） | | |
| **Course title (English)** | Experimental Electoronics Laboratory | | |
| **Academic year** | 2018 | **Year offered** | 2/3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Practical (Experiment) | **Credits** | 2 |
| **Category** | Core subjects | | |
| **Cluster/Department** | Cluster III (Fundamental Science and Engineering) | | |
| **Lecturer(s)** | KISHIMOTO Tetsuo (岸本　哲夫), VOHRA　Varun | | |
| **Office** | Building East 6, Room 628 | | |
| **e-mail** | kishi(at)pc.uec.ac.jp | | |
| **Course website** | none | | |
| **Last updated** | 2018/03/23 16:38:28 | **Update status** | Released |

## Course Description

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| **Topic and goals** | This course aims for providing the students, who may have no practical knowledge of electrical circuits, with the basics of analog and digital electronics through hands-on experience. |
| **Prerequisites** | Basic Electronics |
| **Recommended prerequisites and preparation** | Analysis, especially complex numbers. |
| **Course textbooks and materials** | Instruction manual in text materials or a pdf file will be provided at the class. |
| **Course outline and weekly schedule** | A student builds the following electrical circuits on the solderless breadboard. He or she then measures and analyzes various properties. The experiments are carried out every other week, and classroom discussion is held in between.<br><br>1) Measurement of resistance.<br>2) Measurement of complex impedance for C and L.<br>3) Resonant behavior of LC-circuits.<br>4) Transmit radio signals and receive them using LC-circuits.<br>5) Transistor and LED.<br>6) Operation amplifier and its applications.(transmit and receive sound signal using LEDs).<br>7) Logic gates. |
| **Preparation and review outside class** | Please study on the basic technical terms of the IC you will work on each week. |
| **Evaluation and grading** | It is mandatory to finish all the projects listed above in order to acquire the credit. The score rate is 80%, where the attitude toward the experiment is also taken into account. The student must submit a report on the project within a week, which is subject to either quick, oral examination with the lecturer or open discussion in which every student is to participate. This post-laboratory step will be assessed at a rate of 15%. The pre-laboratory test will also be assessed (5%). |
| **Office hours** | Please make an appointment before coming to my office.<br>Contact: Bldg-E6, room 628<br>　　Ext:5449<br>　　kishi(at)pc.uec.ac.jp |
| **Message for students** | Electronic circuits are fun to play with. |
| **Others** | The course has originally been designed for JUSST students, but regular students can take it. |
| **Keyword(s)** | complex impedance, inductor, capacitor, logic gate, operational amplifier, bipolar junction transistor. |

# Topics in Mechanical and Intelligent Systems Engineering II
（Visual Communications）

## General Information

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| **Course title (Japanese)** | Topics in Mechanical and Intelligent Systems Engineering II（Visual Communications） |
| **Course title (English)** | Topics in Mechanical and Intelligent Systems Engineering II |

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| **Academic year** | 2018 | **Year offered** | 3/4 |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | School of Informatics and Engineering |
| **Teaching method** | Lecture | **Credits** | 2 |

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| **Category** | Core subjects |
| **Cluster/Department** | Cluster II （Emerging Multi-interdisciplinary Engineering）/Cluster III (Fundamental Science and Engineering) |
| **Lecturer(s)** | KANEKO Masahide (金子　正秀) |
| **Office** | West 8-514 |
| **e-mail** | kaneko@ee.uec.ac.jp |
| **Course website** | None |

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| **Last updated** | 2018/03/08 12:51:30 | **Update status** | Released |

## Course Description

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| **Topic and goals** | As represented by the famous proverb "Seeing is believing", visual information plays a very important role in our daily lives. Nowadays digital cameras and digital videos are widely used by many people. Furthermore we enjoy the digital broadcasting, digital cinema, and various pictures and videos through Internet every day. So the technologies of visual communications are very popular for us. In this class, the fundamentals of visual communication, especially image coding techniques, are lectured from the viewpoint of efficient transmission and storage of image information, and better communication through visual media. International activities to establish the worldwide common standards of image coding are also introduced. |
| **Prerequisites** | NIL |
| **Recommended prerequisites and preparation** | NIL |
| **Course textbooks and materials** | Original handouts will be prepared in the class. |
| **Course outline and weekly schedule** | (Outline of Class and Contents)<br>[1] Visual media<br>Definition of "visual media"<br>Classification of "visual media"<br>Use of visual information in the fields of information and communication<br><br>[2] Fundamentals to handle digital images<br>Definition of "digital image / digital picture"<br>Digitization : sampling + quantization<br>Amount of information contained in digital images<br>Characteristics of human vision<br><br>[3] Visual communication and Image / Video Coding<br>Role of visual communication and image / video coding<br>Redundancies contained in images and videos<br>Basic methods of image and video data compression<br>　predictive coding, transform coding, interframe coding, motion compensation, coding of facsimile (MH, MR, MMR)<br><br>[4] International standards of image / video coding<br>JPEG, JPEG2000, JPEG XR, Motion-JPEG2000, JBIG<br>H.261, H.263, H-264 (MPEG-4 / AVC), HEVC/H-265 |

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| | MPEG-1, MPEG-2, MPEG-4, MPEG-7, MPEG-21<br>◯ JPEG ==> Digital camera, Pictures used in Web site<br>   MPEG-2 ==> Digital broadcasting (satellite, terrestrial), DVD<br>    MPEG-4 ==> Digital movie camera, Video by mobile phone (One segment broadcasting), and so on<br>   HEVC/H-265 ==> QVGA -- 8Kx4K(Super High Vision) : High Efficiency Video Coding<br><br>[5] Video over Internet and over mobile network<br>Internet as transmission media of video<br>Streaming<br>Mobile network as transmission media of video<br>Error resilience coding |
| **Preparation and review outside class** | Preparation is not required. However the intensive review is required for every lesson. |
| **Evaluation and grading** | There will be some report requirements on the topics mentioned above during the semester. One examination will be carried out at the end of semester. Assessment in this class will take account of these reports, examination, and contribution for class discussions at the score proportion of 30%, 50%, and 20% respectively. |
| **Office hours** | Before visiting to the office, please make an appointment by using E-mail. |
| **Message for students** | Not only attending lessons but also deliberating upon visual communications and their applications deeply. |
| **Others** | NIL |
| **Keyword(s)** | visual communication, image coding, video coding, digital image, compression, international standard of coding method |

# Topics in Mechanical and Intelligent Systems Engineering I
# (Advanced Robotics and Mechatronics Engineering)

## General Information

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|---|---|
| **Course title (Japanese)** | Advanced Robotics and Mechatronics Engineering |
| **Course title (English)** | Advanced Robotics and Mechatronics Engineering |

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| **Academic year** | 2018 | **Year offered** | All years |
| **Semester(s) offered** | Fall semester | **Faculty offering the course** | Int'l Joint Program |
| **Teaching method** | Lecture (Intensive) | **Credits** | 2 |

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| **Category** | Graduate school core education subjects - Core subjectsII |
| **Cluster/Department** | Department of Mechanical and Intelligent Systems |
| **Lecturer(s)** | AOYAMA Hisayuki (青山　尚之), MING Aiguo (明　愛国), YOKOI Hiroshi (横井　浩史), JIANG Yinlai (姜　銀来), KANAMORI Chisato (金森　哉吏), KAN Tetsuo (菅　哲朗), KOIZUMI Norihiro (小泉　憲裕) |
| **Office** | E4-304, E4-503, E4-601,E4-305,E4-405 |
| **e-mail** | aoyama@mce.uec.ac.jp, ming@mce.uec.ac.jp, kanamori@mce.uec.ac.jp, yokoi@mce.uec.ac.jp, tetsuokan@uec.ac.jp, jiang@hi.mce.uec.ac.jp, nkoizumi@uec.ac.jp |
| **Course website** | |

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|---|---|---|---|
| **Last updated** | 2018/09/17 | **Update status** | Released |

## Course Description

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| **Topic and goals** | As far as Advanced Robotics and Mechatronics are concerned that it is a cutting-edge of technologies to deal with the design, fabrication, operation, structural disposition, production and application for human society, industry and medical field. Robotics and Mechatronics are very exciting area of the computer-controlled technology with such as intelligent property as well as mechanical and electrical elements. Also robotics and mechatronics are related to the science of electronics, mechanics and computer software engineering. Generally this course for the Joint Program can provide several issues of advanced robotics and mechatronics with the intensive style. In today's life, the importance of robotics and mechatronics for various practical applications are improving not only in industrial life but also other spheres such as human life. So the interesting scopes are set up for the candidates that would complete this international joint program. |
| **Prerequisites** | Mechanical and Electrical Engineering, Control Engineering, Robotics Engineering |
| **Recommended prerequisites and preparation** | Mechanical and Electrical Engineering, Control Engineering, Robotics Engineering |
| **Course textbooks and materials** | Fundamental Robotics and Applications |
| **Course outline and weekly schedule** | [1] Introduction to Advanced Robotics and Mechatronics<br>　The latest topics that are related with Robotics and Mechatronics are introduced so that the overview of these technologies will be given.<br>[2] Industrial 4.0, IoT and Global Warming for Robotics and Mechtronics Engineering<br>　The latest topics such as Industrial 4.0, IoT and Global Warming are discussed and the solution to these problems are given to improve the quality of the life for aged societies.<br>[3]Intelligent Mechatronics (I)<br>　The fundamental topics with Intelligent Mechatronics are given and such the typical structure and the function are discussed.<br>[4]Intelligent Mechatronics (II)<br>As the application of Intelligent Mechatronics, the self-locomotion in-door system and the home service robot are discussed.<br>[5] Micro Electronics Mechanical System (I)<br>　The fundamental topics with Micro Electro Mechanical Systems are given　and the fabrication process for MEMS is discussed.<br>[6] Micro Electronics Mechanical System (II)<br>　As the application of MEMS, micro sensors/devices and applications are discussed.<br>[7] Medical Robotics (I)<br>　The fundamental topics with Medical Robotics are given and such the typical function and the unique structure are discussed. |

[8] Medical Robotics (II)
As the application of Medical Robotics, the diagnostic technique with ultrasound imaging for motion control is discussed.
[9]Brain Science for Robotics(I)
  The fundamental topics for image processing in brain for robot motion control is discussed.
[10]Brain Science for Robotics (II)
  As the application of Brain Science for Robotics, several latest technologies for human life support and health care monitor are discussed.
[11] Mechatronics for Artificial Arm and Intelligent Control (I)
  The fundamental topics for control the artificial arm mechanism and the signal processing as well as image processing are discussed.
[12] Mechatronics for Artificial Arm and Intelligent Control (II)
  As the application of Mechatronics for Artificial Arm and Intelligent Control,several practical arm robots and control schemes are discussed for improving the quality of human life.
[13] Bio-Robotics and Mechatronics (I)
  The fundamental topics of the mechanical dynamics and that can give the sense of new technologies inspired by biological solutions.
[14]Ibo-Robotics and (I)
  As the application of brio-robotics and , such a jumping mechanism and a fish swimming robots are discussed.
[15] Intelligent Control (Tentative by Guest Professors)
[16] Robotics and Mobile Communications for Smart Society (Tentative by Guest Professors)

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| **Preparation and review outside class** | Before course work, it is required to check the background of the topics by such the internet. After course works, some homework should be given to improve the knowledge about the topics. |
| **Evaluation and grading** | (Assessment Policy)<br>  There will be some report requirements on the topics mentioned above during the semester. And the practical mechatronics development will be given to improve the mechatronics sense. Assessment in this class will take account of (1) these reports, (2) attendance-rate and (3) the prototype development with the score<br>  proportion of 30%, 30% and 40%, respectively. |
| **Office hours** | Monday 16:00-17:00 at UEC. |
| **Message for students** | This course is provided for the international jointly offered graduate program. The students who join this program have to get one course at UEC and another course at the counterpart oversea university. |
| **Others** | |
| **Keyword(s)** | Robotics, Mecatronics, Electronics, Signal Processing, Micro System, Medical Engineering, Brain Science, Biomimitics, Robot Navigation, MEMS |

## Course Schedule ( Classroom E4-315 / E4-222 / E4-317 )

| Lecture | Date | Period | Classroom (Tentative) | Professor | Topics |
|---|---|---|---|---|---|
| 1 | 19th Nov (Mon) | 5th, 6th 16:15-19:20 | E4-315 | Aoyama H. | Introduction to Advanced Robotics and Mechatronics |
| 2 | 20th Nov (Tue) | 5th, 6th 16:15-19:20 | E4-222 | Aoyama H. | Industrial 4.0, IoT and Global Warming for Robotics and Mechtronics Engineering |
| 3, 4 | 21th Nov (Wed) | 5th, 6th 16:15-19:20 | E4-315 | Kanamori C. | Intelligent Mechatronics (I) & (II) |
| 5, 6 | 22th Nov (Thu) | 5th, 6th 17:50-19:20 | E4-317 | Kan T. | Micro Electronics Mechanical System (I) & (II) |
| 7, 8 | 26th Nov (Mon) | 6th, 7th 16:15-21:00 | E4-315 | Koizumi N. | Medical Robotics (I) & (II) |
| 9, 10 | 27th Nov (Tue) | 5th, 6th, 7th 16:15-21:00 | E4-315 | Yokoi K. | Brain Science for Robotics (I) & (II) |
| 11, 12 | 28th Nov (Wed) | 5th, 6th 16:15-19:20 | E4-315 | Jiang Y. | Mechatronics for Artificial Arm and Intelligent Control (I) & (II) |
| 13, 14 | 29th Nov (Thu) | 5th, 6th 16:15-19:20 | E4-315 | Ming A. | Bio-Robotics and Mechatronics (I) & (II) |
| 15, 16 | 11th Dec (Tue) | 5th, 6th 16:15-19:20 | E4-315 | Taworn (KMITL) Lee (TKU) | Intelligent Control ,Robotics and Mobile Communications for Smart Society |