Course Description

UEC Exchange program

Japanese University Studies in Science and Technology (JUSST)

Spring Semester, 2017

Center for International Programs and Exchange

The University of Electro-Communications

国立大学法人
電気通信大学

UEC JUSST Program Course Description

Japanese University Studies in Science and Technology (JUSST)
Center for International Programs and Exchange (CIPE)
The University of Electro-Communications
1-5-1 Chofugaoka, Chofu-shi, 182-8585
Tokyo, Japan
Phone: +81-424-43-5745
E-mail: jusst@fedu.uec.ac.jp

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JUSST Program Course Requirements

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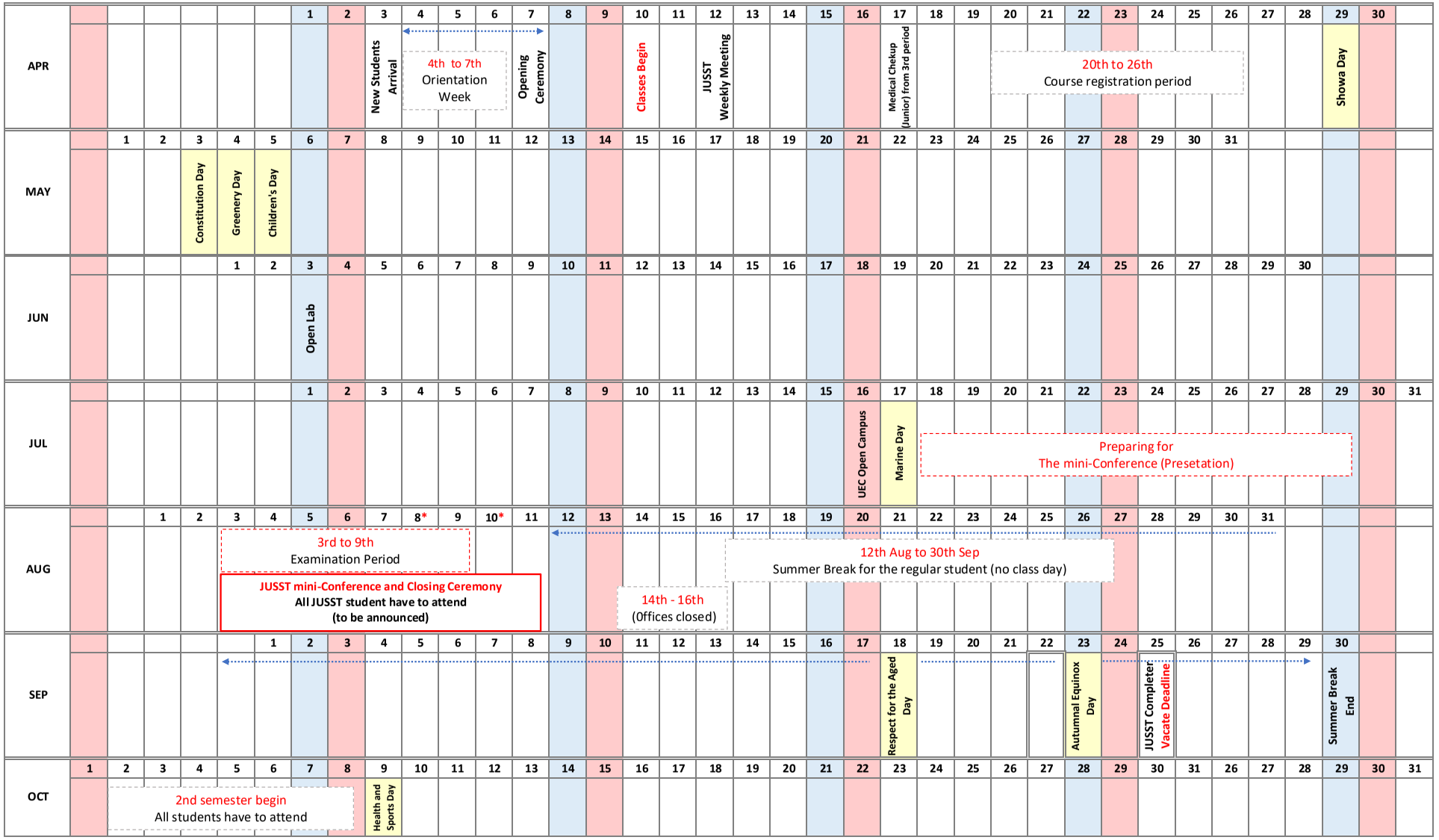
<tr><td rowspan="7">CORE SUBJECTS</td><td rowspan="2">LAB WORK
Research / Project
(Required for JUSST student)</td><td colspan="2">[UNDERGRADUATE STUDENTS]
<u>Individual Study Project</u> under the supervision of UEC faculty member. Minimum 8 hours/week
5 Credits/one academic year (2 Credits/one semester)</td></tr>
<tr><td colspan="2">[GRADUATE STUDENTS]
<u>Independent Research Project</u> under the supervision of UEC Faculty member. Minimum 8 hours/week
6 Credits/one academic year (3 Credits/one semester)</td></tr>
<tr><td>Academic Skills I
Academic Skills II</td><td>2 hours/week (2 Credits)</td><td>–</td></tr>
<tr><td>Academic Skills III</td><td>–</td><td>2 hours/week (2 Credits)</td></tr>
<tr><td>Japanese Language</td><td colspan="2">Elementary / Intermediate / Advanced *
8 - 14 hours/week (6 - 7 Credits)</td></tr>
<tr><td rowspan="3">Science and Engineering Subjects
(ELECTIVE)</td><td colspan="2">[UNDERGRADUATE STUDENTS]
Need to pass <u>3 subjects</u> at minimum **
in Each Semester. (H-6)</td></tr>
<tr><td colspan="2">[GRADUATE STUDENTS]
Need to pass <u>3 subjects</u> at minimum **
in One Academic Year. (H-9)</td></tr>
<tr><td colspan="2">Electronic Experiment Lab.
4 hours/week (2 Credits)
Required for all Undergraduate Students
Only offered in the FALL Semester</td></tr>
<tr><td rowspan="4">FREE ELECTIVE</td><td>Preparation for Overseas Study
English for Intercultural Communication</td><td colspan="2">2 hours/week (2 Credits)
Offered in the SPRING Semester only</td></tr>
<tr><td>Advanced Reading in Academic English
Research Writing</td><td colspan="2">2 hours/week (2 Credits)
Offered in the FALL Semester only</td></tr>
<tr><td>Sports Classes</td><td>–</td><td>2 hours/week (1 Credit)</td></tr>
</table>

*) Japanese language classes are exempted for Graduate Students in their 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. (H-5, H-7)

2017 SPRING SEMESTER CALENDAR



National holiday

@ JUSST students Weekly Meeting on every Wed (start from 16:30)

JUSST Program Course Time-Table for Spring Semester, 2017

平成29年度春学期（前期）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	Advanced Quantum Mechanics	S	WATANABE Shin-ichi （渡邊 信一）	E6-204	
	3	VLSI Low Power Circuit Design	I	ISHIBASHI Koichiro（石橋 孝一郎）	W2-105	
	4	Media Design	J	KANEKO Masakatsu （兼子 正勝）	W2-105	
	5	Advanced Communication Engineering and Informatics II (Optical Communication Engineering)	I	KISHI Naoto (來住 直人)	E6-201	
Tue 火	1	UEC Academic Skills I (Computer Literacy)	CIPE	CHOO	C-401	Computer Room
	2	UEC Academic Skills II (Information literacy and Research)	CIPE	CHOO	C-401	Computer Room
		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					
Wed 水	1	Modern Optics and Photonics	S	TOMITA Yasuo (富田 康生)	W1-214	
		Introduction to Computational Methods in Science and Engineering	M	MATUTTIS Hans-Georg	C-401	Computer Room
		Life Long Learning Sports (for Senior student only)	SPORTS	ANDO Soichi (安藤 創一)		
	2	Japanese Language (日本語)	CIPE			
	3	Japanese Language (日本語)	CIPE			
	4	Japanese Language (日本語)	CIPE			
	5	English for Intercultural 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 Theory of Systems Reliability	J	JIN Lu (金 路)	W5-209	
	3					
	4					
	5	Preparation for Overseas Study	HLSS	SHI Jie (史 傑)	E1-606	
Fri 金	1	Japanese Language (日本語)	CIPE			
	2	Japanese Language (日本語)	CIPE			
	3	Photonics and Opto-Electronics	S	UENO Yoshiyasu（上野 芳康）	W2-B105	Basement floor
	4					
	5					
Sat 土	1	Advanced Communication Engineering and Informatics I (Information and Communication Networks)	I	OKI Eiji (大木 英司)	A101	Intensive Course 4/15, 4/22, 5/13, 6/3, 7/1, 7/15, 7/29
	2					

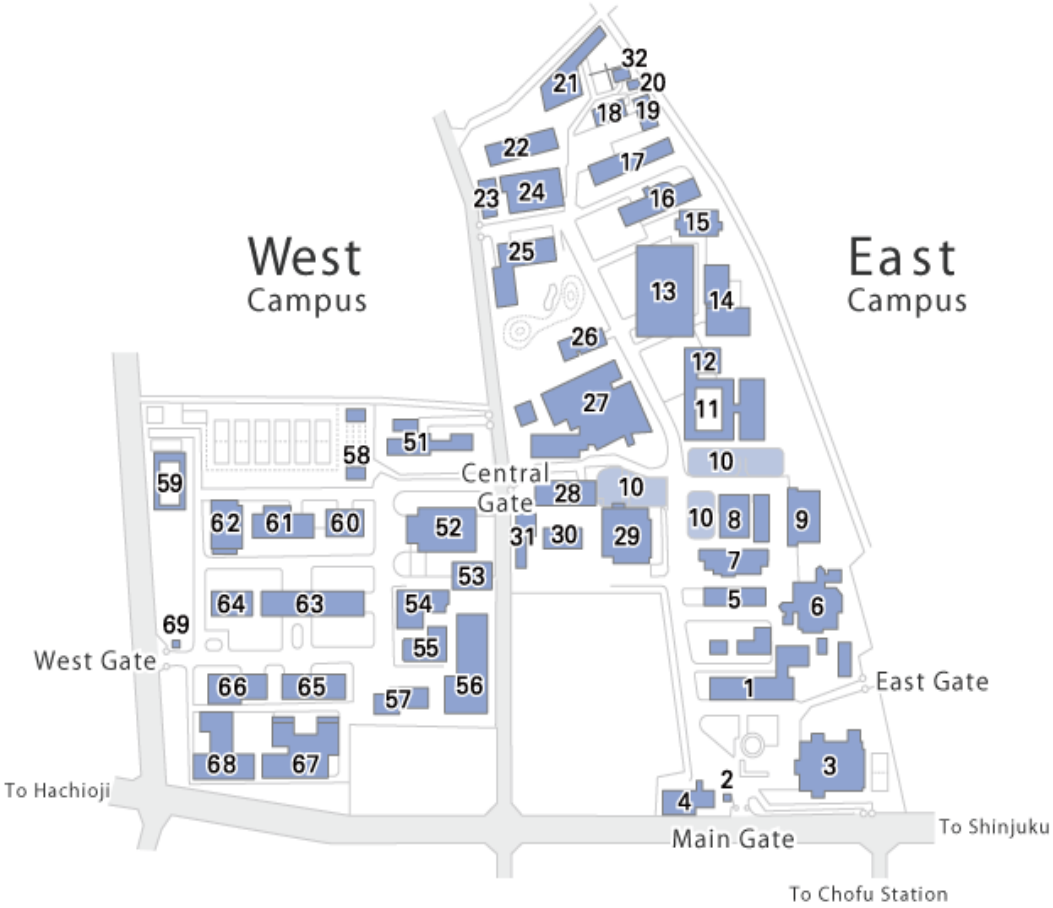
Department 学科等

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

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 name	UEC Academic Skills I（Computer Literacy）(上級科目)		
English Course name	UEC Academic Skills I（Computer Literacy）		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engineering		
Lecturer	Choo Cheow Keong		
Office	E2-305		
e-mail	uec-as1@jusst.fedu.uec.ac.jp		
Course's URL	http://www.fedu.uec.ac.jp/skills		
Last updated	2017/03/01 18:43:24	**Status**	Released

Course Description

Topic, goals and objectives	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 preparation	コンピューターリテラシー Computer literacy
Course texts and materials	NIL
Course content and procedures	Course schedule and topics that will be covered ========== 1. Introduction (Usage: The Information Technology Center ITC, UEC campus network use policies) 2. Computer operating system and Tools (fundamentals) 3. Unix operating system (fundamentals) 4. Unix operating system (The Internet and computer network) 5. Word Processing (Basic; Desktop publishing, WYSIWYG, and LaTeX) 6. LaTeX (Environments and layout; LaTeX commands, Structure, Package, Class, style, Text typesetting) 7. LaTeX (Mathematical Formulas) 8. LaTeX (Displayed; Lists, Tabulator, Tables) 9. LaTeX (Displayed; Graphics, Drawing) 10. LaTeX (Labels, Cross-referencing, Citations and Bibliography) 11. World Wide Web (Overview; Web systems, applications, HTML) 12. HTML (Basic; Structure, Tag, color, typesetting) 13. HTML (Links and Multimedia; Images, Sound, and Movies) 14. HTML (Forms, Tables, and Frames) 15. HTML (Interactivity, Cascading Style Sheet; CSS) ========== 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. The lectures will take place in the computer room at the Information Technology Center (E-3 building). Note that the lecture schedule is subject to constant revisions throughout the course.

Study time (preparing and reviewing)	Students have 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.
Evaluation method and grading scale（target and standard）	Evaluation is given as follows; (Attendance 20%, Tasks 50%, Mid-Semester presentation 20%, Final presentation 10%) 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.
A message for students	We expect students to be the active part of the learning process. We encourage the participation of students with questions, discussions, and comments. If you have anything interesting to say about the topics of this course covers please feel free to share with the others in class.
Others	Students are expected to come to class on time and stay for the 1.5 hours. Absences are excused in case of emergency, sickness, and trips to conferences.
Keywords	Unix, HTML, Latex

UEC Academic Skills II（Information Literacy and Research）

General Information

Course name	UEC Academic Skills II（Information Literacy and Research）（上級科目）		
English Course name	UEC Academic Skills II（Information Literacy and Research）		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engineering		
Lecturer	Choo Cheow Keong		
Office	E2-305		
e-mail	uec-as2@jusst.fedu.uec.ac.jp		
Course's URL	http://www.fedu.uec.ac.jp/skills		
Last updated	2017/03/01 18:44:19	**Status**	Released

Course Description

Topic, goals and objectives	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 preparation	NIL
Course texts and materials	NIL
Course content and procedures	Course schedule and topics that will be covered ========== 1. Introduction (Usage: The Information Technology Center etc.) 2. Academic Integrity (Referencing, citing) 3. Mind mapping, brain storming 4. Scientific literatures and resources retrieval 1/2 5. Scientific literatures and resources retrieval 2/2 (UEC Library) 6. Managing resources 7. Managing, accessing and sharing resources, and Create bibliographies 8. Logical and Critical reading (comprehend, examine, evidence, utilize) 9. Graphical information (Inkscape, GIMP) 10. Tables, Graphs, Charts, Diagrams and Timelines (SciDAVis) 11. Formula editor (word processing and computation) 12. Desktop publishing for poster presentation (Scribus) 13. Preparation for presentation 14. Poster presentation 1/2 15. Poster presentation 2/2 ========== The course gives an introduction to the use of some powerful tools for research scientists and engineer, and the lectures include hands-on learning and applicable exercises. The lectures will take place in the computer room at the Information Technology Center (E-3 building). Note that the lecture schedule is subject to constant revisions throughout the course.
Study time (preparing and reviewing)	Students have to read 1 to 3 articles about varied topics and in the final exam, students are expected to make a postal presentation.

Evaluation method and grading scale（target and standard）	Evaluation is given as follows; (Attendance 20%, Assignments 30%, 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.
A message for students	We expect students to be the active part of the learning process. We encourage the participation of students with questions, discussions, and comments. If you have anything interesting to say about the topics of this course covers please feel free to share with the others in the class.
Others	Students are expected to come to class on time and stay for the 1.5 hours. Absences are excused in case of emergency, sickness, and trips to conferences.
Keywords	Research, library, Desktop publishing, poster presentation

UEC Academic Skills III（Publishing Literacy and Research）

General Information

Course name	UEC Academic Skills III（Publishing Literacy and Research）		
English Course name	UEC Academic Skills III（Publishing Literacy and Research）		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engineering		
Lecturer	Choo Cheow Keong		
Office	E2-305		
e-mail	uec-as3@jusst.fedu.uec.ac.jp		
Course's URL	http://www.fedu.uec.ac.jp/skills		
Last updated	2017/03/01 18:45:33	**Status**	Released

Course Description

Topic, goals and objectives	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 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 preparation	UEC Academic Skills II (Information Literacy and Research)
Course texts and materials	NIL
Course content and procedures	Course schedule and topics that will be covered ========== 1. Introduction (Usage: The Information Technology Center etc.) 2. Academic Integrity (interesting and Unpublished, Scientific misconduct) 3. Researcher's outputs (Why, How, Where) 4. Planning the research/research protocol (LaTeX editor, Mind mapping and brainstorming etc.) 5. Proposing and Reporting on Research 6. Making a scientific presentation 7. Midterm Presentation 1/2 8. Midterm Presentation 2/2 9. Brush up on your skills (Handling Q&A) 10. Communication and Correspondence (Peer, Researcher, Editor, etc.) 11. Academic publishing (Overviews; Dissertation, Monograph, Scientific paper) 12. Academic publishing (Procedures, Processes and standards) 13. Assessment and evaluation 14. Oral presentation 1/2 15. Oral presentation 2/2 ========== 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). The lectures will take place in the computer room at the Information Technology Center (E-3 building). Note that the lecture schedule is subject to constant revisions throughout the course.

Study time (preparing and reviewing)	Students have to read 2 to 3 articles about varied topics and at the mid and end of term, students are expected to make an oral presentation. 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 method and grading scale（target and standard）	Evaluation is given as follows; (Attendance 20%, Assignments 30%, Writing paper 20%, Oral 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 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.
A message for students	We expect students to be the active part of the learning process. We encourage the participation of students with questions, discussions, and comments. If you have anything interesting to say about the topics of this course covers please feel free to share with the others in class.
Others	Students are expected to come to class on time and stay for the 1.5 hours. Absences are excused in case of emergency, sickness, and trips to conferences.
Keywords	Research, Publishing paper, oral presentation

English for Intercultural Communication

General Information

Course name	English for Intercultural Communication		
English Course name	English for Intercultural Communication		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engineering		
Lecturer	Shi Jie		
Office	East 1-609		
e-mail	shi.jie@uec.ac.jp		
Course's URL	Nil		
Last updated	2017/03/02 14:02:41	**Status**	Released

Course Description

Topic, goals and objectives	We are going to learn the basics essential English for the coming increasingly grown of the cooperation and takes an active part with the foreign scientist/engineers in the global world. The learning content is all the so-called four skills, aiming to improve your comprehensive English ability by self analyzing your own strengths and weak points in detail. Particularly, to learn about yourself and your field of expertise, about Japan (culture, economy, politics, etc.), foreign countries you interested (culture, economy, politics, etc.), the things that are required in order to relate with other foreigners, and learn how to express them in English. The language used is English, and when there is a part which can't be understood, Japanese is also used. This course also relates to a program of the language learning support center in (C Ridge 4th floor, C402). English pronunciation (rhythm) measurement (April and July) and English pronunciation (rhythm) practice (beginner, intermediate, and advanced) is performed. In addition, English examination such as TOEIC or TOEFL is applied to objectively evaluate the improvement of the student's English skills. For preparations the TOEIC examination (training), the ALC self-study materials of the language learning support center (C Ridge 4th floor, C402) will be used.
Prerequisites	All the 1st and 2nd year compulsory subjects
Recommended preparation	Academic Spoken English Ⅰ, Academic Spoken English Ⅱ, Academic Written English Ⅰ, Academic Written English Ⅱ, Academic English for the 2nd Year Ⅰ, Academic English for the 2nd Year Ⅱ
Course texts and materials	Teaching materials are prepared by both the professor and students
Course content and procedures	1 Introduction 2 Self-introduction 3 Introduction of Japan 4 Introduction of Self countries 5 Introduction of a third country 6 Language as an international language for communication 7 Cross-cultural conflicts and solutions 8 Cross-cultural communication taboos 9 Learning presentation from TED talks 10 Learning presentation from TED talks 11 Group research presentation preparation 12 Group research presentation 13 Group research presentation 14 Group research presentation 15 Feedback on presentation; course evaluation

Study time (preparing and reviewing)	Students are expected to work in groups in and outside the class.
Evaluation method and grading scale（target and standard）	1. Class participation 20% 2. Homework 20% 3. Presentation 40% 4. Research (reading and writing) 30%
Office hours	Students can make appointments for meetings by email or come to my office hours in Tue 4.
A message for students	Students are encouraged to participate in the course actively and critically. Expressing ideas vocally and collaborating with other students are expected.
Others	This course requires students to keep good attendance in order to fulfill the collaborative tasks.
Keywords	Intercultural communication, discussion, presentation, cooperative learning, active learning, academic research

Preparation for Overseas Study

General Information

Course name	Preparation for Overseas Study		
English Course name	Preparation for Overseas Study		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engineering		
Lecturer	Shi Jie		
Office	E1-609		
e-mail	shi.jie@uec.ac.jp		
Course's URL	Nil		
Last updated	2017/03/02 14:02:55	**Status**	Released

Course Description

Topic, goals and objectives	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 preparation	Some Advanced English courses focusing on academic English, presentation and writing
Course texts and materials	Teaching materials will be prepared by the teacher and students based on the needs of the syllabus.
Course content and procedures	Week 1: Guidance/Course Orientation Week 2: Purposes for overseas study; Differences between Japanese and overseas universities Week 3: English language skills needed for living overseas Week 4: English language skills needed for living overseas Week 5: Campus communication Week 6: Campus communication Week 7: English language skills needed for overseas academic study: reading and discussion Week 8: English language skills needed for overseas academic study: reading and presentation Week 9: English language skills needed for overseas academic study: presentation and writing Week 10: English language skills needed for overseas academic study: presentation and writing Week 11: Critical thinking skills Week 12: Problem-solving skills Week 13: Self-management skills Week 14: Utilizing campus facilities of overseas universities Week 15: Self-evaluation and course evaluation
Study time (preparing and reviewing)	Group work or research for presentations may take up a lot of time outside of the classes.
Evaluation method and grading scale（target and standard）	Performance and attitude in class: 20% PPT Presentation: 30% Poster Presentation: 20% Abstract writing: 20%

	Reading assignments: 10%
Office hours	Tue 4 or based on appointment arranged by email.
A message for students	Never allow English to ride on you; you should ride on it (A Chinese proverb). Logic, logic, logic!
Others	Students interested in independent learning and corpus-analysis of English for Science and Technology are specially welcome.
Keywords	graduate school, academic English, presentation, abstract, journal article, research

Advanced Quantum Mechanics

General Information

Course name	量子物理工学基礎		
English Course name	Advanced Quantum Mechanics		
Academic Year	2016	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	Specialized Subject		
Department	Department of Engineering Science		
Lecturer	WATANABE Shinichi (渡邊　信一)		
Office	East 6-512		
e-mail	shin.watanabe@PC (Replace PC by uec.ac.jp)		
Course's URL	none		
Last updated	2017/03/21 10:23:45	**Status**	Released

Course Description

Topic, goals and objectives	Subject: We aim to master the fundamental principle of quantum phenomenon which is essential to science and technology of contemporary society. Achievement goal: To learn quantum treatment of angular momentum, approximation methods, scattering problem, interaction between matter and radiation field, and to deepen the understanding of natural phenomena therewith, and also to understand the quantization of the radiation field.
Prerequisites	Preferably elementary quantum mechanics at an undergraduate level.
Recommended preparation	Preferably analytical mechanics and some subjects of applied mathematics such as the Fourier series and transforms and vector analysis.
Course texts and materials	Text book: none Reference books: Any standard text book on elementary quantum mechanics,「量子力学II」 江沢　洋著（裳華房）,「量子力学II」 小出昭一郎著（裳華房）,「量子力学上下」 シッフ著（吉岡書店）
Course content and procedures	(Course content) 1. Review of elementary quantum mechanics 2. Theory of time-development perturbation 1 3. Theory of time-development perturbation 2 4. Application of perturbation theory 5. Principle of Variational Method 6. Elementary example of the variational method 7. Handling of helium atoms by variational method 8. Essence of scattering problem 9. Box quantization 10. From the transition probability to the differential sectional area: the case of Yukawa potential 11. Elementary quantization and application of the radiation field 12. Electromagnetic field in free space 13. Electronic Hamiltonian 14. Emission and absorption of radiation Part 1 15. Emission and absorption of radiation Part 2 (How to proceed) The course centers on lectures and simple exercises. If the students are found to be familar with the subject, emphasis is placed on the part after the perturbation theory. Note: The contents are subject to change without notice. Especially, this year we are considering new topics with a view to rapid progress of science in recent years. The contents may change without notice. Check with the instructor.
Study time (preparing and reviewing)	Read through any standard textbook on quantum mechanics.
Evaluation method and grading scale	(a) The grade will be based on an oral presentation and the term paper. (b) It is required that the student understands the classroom materials to such an extent that they

（target and standard）	can explain the basic concepts by heart.
Office hours	After class or make an appointment by email or phone.
A message for students	The student is encouraged to grasp the logical structure of the quantum theory by working out each problem presented in class.
Others	Reviewing the class room materials without leaving too much interval after the lecture is highly recommended. Please do enjoy the counterintuitive behavior of quantum mechanicsl systems.
Keywords	Quantum, atomic energy levels, spin, matter wave, quantum interference, laser, atomic clock, photon

VLSI Low Power Circuit Design

General Information

Course name	VLSI Low Power Circuit Design		
English Course name	VLSI Low Power Circuit Design		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	Course subject		
Department	Department of Engineering Science		
Lecturer	ISHIBASHI Koichiro (石橋　孝一郎)		
Office	W2-306		
e-mail	ishibashi@ee.uec.ac.jp		
Course's URL	http://mtm.es.uec.ac.jp/index.html		
Last updated	2017/03/13 16:02:40	**Status**	Released

Course Description

Topic, goals and objectives	VLSI Low Power Circuit Design
Prerequisites	Fundamental electric circuit theorems
Recommended preparation	Fundamental electric circuit theorems
Course texts and materials	Original lecture materials will be delivered on the class
Course content and procedures	Thanks of low power LSI, we nowadays enjoy ITC society with electronics appliances such as cell phones, electric cars and so on. The purpose of this lecture is to understand not only fundamentals of VLSI circuits, but low power circuit technologies which have made this ICT society into reality. Outline of Class and Contents 1) Introduction to rolls of VLSI on ICT society 2) Structure of MOSFET and its characteristics 3) Moore’s law and Scaling law 4) Fundamentals of CMOS LSI circuits 5) Power on CMOS LSI 6) Low power digital circuit design techniques 7) Low power CPU design techniques 8) Practice of Circuit Simulation Interim and final exam will be done during the course.
Study time (preparing and reviewing)	Investigation by web is recommended before the lectures.
Evaluation method and grading scale（target and standard）	Interim and final exams will be done for evaluation. Students who get the score more than 50% will pass the class.
Office hours	Send e-mail before going to the room of Ishibashi (W2-306)
A message for students	This class is focusing on not only low power circuit design but overview and fundamentals of VLSI technology . This class could make you access to semiconductor industry which is nowadays a kind of infrastructures.
Others	The class is held in English. Contents of class are based on lectures held in foregn universities done by Prof. Ishibashi as guest professors.
Keywords	VLSI, Low power, Circuit design

Media Design

General Information

Course name	Media Design		
English Course name	Media Design		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	Course subject		
Department	Department of Informatics		
Lecturer	KANEKO Masakatsu (兼子　正勝)		
Office	W6-409		
e-mail	kaneko@inf.uec.ac.jp		
Course's URL	http://oz.hc.uec.ac.jp/lectures/		
Last updated	2017/03/13 16:20:56	**Status**	Released

Course Description

Topic, goals and objectives	The purpose of the lectures is to understand how and of what elements visual media contents are constructed. As representative examples of visual media, we consider movie (video) and manga (comic). Movie is composed not only of what you see (picturesque images), but also of what limits those images (frames) and what “is” between the images (montage). The montage, one of the key concepts of visual media, is “temporal” for movie, and “spacial” for manga. At the first half of lectures, we give theoretical explanations, and at the second half, we lean in practice by making a “movie-comic” content.
Prerequisites	non
Recommended preparation	Media Literacy
Course texts and materials	non
Course content and procedures	Outline of Class and Contents: 1. Introduction 2. Historical Overview of visual media 3. Elements of visual media: frame and montage 4. Frame 1: size, angle 5. Frame 2: composition 6. Temporal montage: video 7. Spatial montage: manga 8. (Extra) 9. Content making practice 1: Guidance 10. Content making practice 2: Planning 11. Content making practice 3: Shooting and editing 12. Content making practice 4: Editing and programming 13. Content making practice 5: Editing and programming 14. Review and discussion 15. Conclusion
Study time (preparing and reviewing)	personal works and laboratory works required
Evaluation method and grading scale（target and standard）	The second half of lectures is a kind of workshop. Assessment in this class will take account of (1) achievement of the workshop 60% and (2) participation 40%.
Office hours	Mon 16:15-17:45
A message for students	Join to foreign students
Others	non
Keywords	Visual Media, video, comics, video control

Advanced Communication Engineering and Informatics II (Optical Communication Engineering)

General Information

Course name	Advanced Communication Engineering and Informatics II (Optical Communication Engineering)		
English Course name	Advanced Communication Engineering and Informatics II (Optical Communication Engineering)		
Academic Year	2017	**Offered to year**	4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	Course subject		
Department	Department of Communication Engineering and Informatics		
Lecturer	KISHI Naoto (來住　直人)		
Office	East 3-1027		
e-mail	kishi@ice.uec.ac.jp		
Course's URL	http://www.opt.cei.uec.ac.jp/optc/		
Last updated	2017/02/20 9:53:57	**Status**	Released

Course Description

Topic, goals and objectives	The main subject of this course is "Optical Communication". Optical communication is one of the key technologies for the contemporary information society. The history is still young, just about 30 years after being practically used, but it is developing rapidly nowadays, the communication ability is extremely outstanding and which is a communication technology that will be used in all parts of the society in the future. The goal of the course is to learn the fundamental principle and technical element of communication system, as well as introduce you to some of the latest communication technologies.
Prerequisites	Physics Introduction (wave and light), Electromagnetism related subjects, Electrical circuit
Recommended preparation	Knowledge of Fourier analysis, Fourier and concept of time- and frequency-domain.
Course texts and materials	No textbooks needed. All course materials will be provided online via the URL listed above. (Password is required to access from off-campus)
Course content and procedures	The content is as follows,. 1. Introduction to optical fiber communication. 2. Characteristic of light transmission medium of the optical communication and the difference with the low frequency electromagnetic wave. 3. Structure of the optical fiber transmission channel and a principle of optical waveguide. 4. Important characteristic of the optical fiber, i.e. the linear and non-linear characteristics and the relations with the signal transmission characteristics. 5. Principle of basic optical signal source, i.e. photogeneration principle. 6. Semiconductor laser light signal source, the light emitting diode structure characteristic and application. 7. Single frequency or a multiwavelength source and pulse light source that specialized in optical communication. 8. Theory of optical amplifier in a long-distance optical communication system. 9. Characteristic of various optical amplifiers. 10. Light elements required in an optical communication system. 11. Encoding of the digital light signal, the quality evaluation system of the signal reception. 12. The forms of the optical communication system. 13. Characteristic and the development of the optical communication system. 14. End uses optical fiber communication system. 15. Optical fiber sensor, light and optical fiber measurements.
Study time (preparing and reviewing)	Students are required to review (by accessing to the online material and other texts).

Evaluation method and grading scale（target and standard）	Submission of a report will be required at the end of the term. Assessment of this course (pass) will be made over the report at a minimum of 60%.
Office hours	Wed (12:30 to 14:30) or after class.
A message for students	Optical communications play a vital role and came to be indispensable for a nowadays information and communication network. Gained knowledge of the technology and the principle, will come in useful for all aspects in information and communication fields.
Others	For regular students: 1) "Department of Communication Engineering" and "Department of Engineering Science" students are not permitted to select the course (there is a Optical communication engineering course offered in the 3rd year). 2) Double enroll in Optical communication engineering course is not pemitted.
Keywords	Telecommunications opticalfibers, dispersion properties, non-linearintensity modulation, direct detection, opticalrepeater, wavelength division multiplexing, laser diode, photo diode, opticalamplifiers, optical network, opticalfiber sensor.

Modern Optics and Photonics

General Information

Course name	Modern Optics and Photonics		
English Course name	Modern Optics and Photonics		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	Course subject		
Department	Department of Engineering Science		
Lecturer	TOMITA Yasuo (富田　康生)		
Office	205 West 1		
e-mail	ytomita@uec.ac.jp		
Course's URL	http://talbot.es.uec.ac.jp/optics.html		
Last updated	2017/02/23 14:40:53	**Status**	Released

Course Description

Topic, goals and objectives	This is an introductory-level course in the ever-increasing field of modern optics. It includes ray- and wave-descriptions of light propagation and image formation with coherent light. An introduction to holography and optical information processing is also given as an example of parallel and multi-dimensional data handling capabilities of light. Furthermore, it contains discussions of photonic devices (such as lasers, amplifiers, light modulators and detectors) and fiber-optic communications systems.
Prerequisites	A good understanding of introductory electromagnetics and linear systems theory may be helpful.
Recommended preparation	A good understanding of introductory electromagnetics and linear systems theory may be helpful.
Course texts and materials	F. Graham Smith and Terry A. King, Optics and Photonics, Wiley, New York, 2000 E. Hecht, Optics, 4th ed., Addison-Wesley, New York, 2001
Course content and procedures	Topics in 90-minute lectures will include: 1. Preliminaries (Concept of waves and their mathematical expressions) 2. Wave optics 3. Fourier optics 4. Electromagnetic and crystal optics 5. Guided-wave and fiber optics 6. Introduction to fiber-optic communications
Study time (preparing and reviewing)	Reading textbooks and solving homework problem sets
Evaluation method and grading scale (target and standard)	The grades will be based 20% on the homework, 30% on the mid-term exam and 50% on the final exam.
Office hours	Monday 16:00-17:00
A message for students	It is very interesting to learn the ever-increasing field of photonics through this lecture. The knowledge of photonics is very useful to grasp operational principles of many devices and systems around us. These include DVD, laser pointers, fiber optic communication systems etc.
Others	Photonics is the technology of using waves and photons!
Keywords	Wave optics, Diffraction, Interference, Electromagnetic wave, Maxwell equations, Wave polarization, Crystals, Guided-wave and fiber optics

Introduction to Computational Methods in Science and Engineering

General Information

Course name	Introduction to Computational Methods in Science and Engineering		
English Course name	Introduction to Computational Methods in Science and Engineering		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Department of Mechanical Engineering and Intelligent Systems		
Lecturer	Hans-Georg Matuttis		
Office	E4-721		
e-mail	hg@mce.uec.ac.jp		
Course's URL	http://webclass.cdel.uec.ac.jp/		
Last updated	2017/02/28 15:44:05	**Status**	Released

Course Description

Topic, goals and objectives	Computational methods have replaced analytical methods already in many fields of science and engineering, and their importance is still increasing. The aim of the lecture is to provide fundamental criteria for the choice of numerical methods, give an overview about some available methods in some fields, and give ideas about performance-oriented implementation for such methods. Depending on the background and interest of the auditory, some subjects can be changed.
Prerequisites	First year Analysis and Linear Algebra, one procedural Programming Language
Recommended preparation	Nil
Course texts and materials	criptum can be downloaded from http://webclass.cdel.uec.ac.jp/, further reading: A. L. Garcia, Numerical Methods for Physics, Benjamin-Cummings Pub Co,1999 G.J. Borse: Numerical Methods with Matlab, International Thomson Publishing, 1997
Course content and procedures	1. Simple MATLAB-Synthax 2. How to write better programs 3. Non-numerical methods: Monte-Carlo techniques 4. Representation of Numbers 5. Elementary numerical analysis I: What are numerical errors 6. Elementary numerical analysis II: How to get "correct" results from calculations "with error" 8. MATLAB Graphics 9. Introduction to numerical Linear algebra I: Repetition 1st year Linear Algebra 10. Introduction to numerical Linear algebra II: How to draw a line through more than 2 points (or maybe not) 11. Introduction to numerical Linear algebra III: Least squared fitting 12. Polynomials and Roots 13. Solving ordinary differential equations I: Basics, Initial conditions, analytic solutions, Euler Method 14. Solving ordinary differential equations II: Higher order Methods, Approaches to construct higher order methods, Runge-Kutta methods 15. Solving ordinary differential equations III: Advanced methods, Adaptive Timesteps, energy conservation systems, stiff problems
Study time (preparing and reviewing)	Nil
Evaluation method and grading scale（target and standard）	Participation in the Lecture and Homework in the E-Learning System Depending on the activity level of the students, Mid-Term and End-Term exams will be held.

Office hours	Friday, second slot, in East-4, Room 721、but if you contact me by E-Mail, other times are possible.
A message for students	Lecture starts after the the introduction to the computer system in the Jusst-Program has been held.
Others	Lecture starts after the the introduction to the computer system in the Jusst-Program has been held.
Keywords	Numerical Analysis, Scientific Programming

Advanced Theory of Systems Reliability

General Information

Course name	システム信頼性特論		
English Course name	Advanced Theory of Systems Reliability		
Academic Year	2017	**Offered to year**	All
Semester offered	Spring semester	**Offered for**	Master and doctoral program
Teaching methods	Lecture	**Credits**	2
Classification	Specialized subject for graduate school		
Department	Department of Informatics		
Lecturer	JIN Lu (金　路)		
Office	West 5-607		
e-mail	jinlu@inf.uec.ac.jp		
Course's URL	http://www.rm.inf.uec.ac.jp		
Last updated	2017/03/02 16:25:23	**Status**	Released

Course Description

Topic, goals and objectives	How to develop a high reliability system, the pursuit of the "reliability engineering" operation, and the theoretical background pursuit of the "reliability theory" will be discussed from the system reliability viewpoint. In particular, the current state of the reliability system, and the improvement methods as well as the future problems will be covered. The application of quality control in Japan's developed quality realiability also discussed. Reliability engineering and reliability theory require a correcting analysis based on the actual fact and quantitative analysis, and model building, design, reliability test, mathematical learning in data analysis, especially the theory of probability and statistics are much applied. The goals this course is to master the course contents, and some case studies as how the Sasago tunnel accident can be prevented are also taken into consideration.
Prerequisites	NIL
Recommended preparation	Probability Statistics
Course texts and materials	No textbook, Handouts and PowerPoint slides will be used as a guide for the class.
Course content and procedures	Each class will be conducted by using handouts and powerpoints, no textbook needed. Reliability engineering and reliability theory, design, reliability tests, mathematical learning in data analysis, especially the theory of probability and statistics are much applied. It is also aims to learn the applied mathematics sophistication by learning those knowledge mentioned above. Classes are carried out in English. The lesson will be mainly described the theories and ideas. 3 to 4 drills will be carried out during the class period and a chance for reviewing the course contents will be provided. #1：Guidance #2：Introduction to Reliability Engineering and Course Outline #3：Three Elements of Reliability (1) Durability #4：Three Elements of Reliability (2) Maintainability #5：Three Elements of Reliability (3) Design reliability #6：Maintenance (1) Scheduled Maintenance and Condition Monitoring Maintenance #7：Maintenance (2) Optimal Maintenance Plan #8：Systems Reliability(1) Series system, parallel system, redundant design #9：Systems Reliability(2) Structure function and reliability assessment #10：Reliability Testing and Fault Analysis #11：Design Reliability and Prevention (FTA) #12：Design Reliability and Prevention (FMEA) #13：Reliability Data Analysis (1) #14：Reliability Data Analysis (2) #15：Summary of the course
Evaluation method and grading scale（target and standard）	Several assignments will be conducted.
Office hours	To be announced in class

A message for students	For the sake of one's future, the reliability engineering and quality assurance that importance in manufacturing will be conducted along with case studies.
Others	The coures is taught in English, and Japanese is also added as the need arises.
Keywords	The reliability, Quality assurance, Maintainability

Photonics and opto-electronics

General Information

Course name	Photonics and opto-electronics		
English Course name	Photonics and opto-electronics		
Academic Year	2017	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engineering
Teaching methods	Lecture	**Credits**	2
Classification	Course subject		
Department	Department of Engineering Science		
Lecturer	UENO Yoshiyasu (上野　芳康)		
Office	Room no. 313, Building no. West-2 (W2-313).		
e-mail	uenoy@ultrafast.ee.uec.ac.jp		
Course's URL	http://www.ultrafast.ee.uec.ac.jp/ueno-classes.html		
Last updated	2017/03/08 20:39:08	**Status**	Released

Course Description

Topic, goals and objectives	Modern photonics and electronics have been deeply spread to both academy and industry of our Real World, without country borders. It is because photonics and opto-electronics have realized terabit-per-second network infrastructures, optical-disk memories (DVD&CD's), compact and accurate laser diodes (from infrared to blue), and flat displays, in industry uses and home uses. In these science and technology, particle-based photonic properties of representative materials are almost always fully combined with their wave-based optical properties, in "bright" manners. In this course, typically 15 weeks, participants are expected to study and understand the scientific fundamentals of these photonic technology, and also to develop interests to on-going, long-term (i.e. large-scale) R&D activities in our world.
Prerequisites	fundamentals of electro-magnetic waves (propagating in speed of light). fundamentals of electronics such as basic diodes and transistors.
Recommended preparation	fundamentals of quantum mechanics (particles and waves). fundamentals of crystalline materials and their basic, electronic properties.
Course texts and materials	1) Saleh and Teich, Fundamentals of Photonics, 2nd edition, Wiley, 2007. 2) Amnon Yariv and Pochi Yeh, Photonics: Optical Electronics in Modern Communications, 6th edition, Oxford, 2006.
Course content and procedures	1st-5th weeks: (1) Areas of science and technology where photonics and opto-electronics play particularly important roles in our world. (2) Representative photonic devices and materials that many of us must use and rely on, in these areas of science and technology. (3) Fundamental properties of silicon and other few important types of semiconductor crystals. Basics of direct transition (for light-emitting diodes and lasers), in contrast to indirect transition (for sensors and solar cells, for example). Then, basics of quantum-particle-based properties such as conservation laws in unit of electron-volts, in contrast to quantum-wave-based properties. (All of these are well understood and designed in all LED's, laser diodes, optical sensors, solar cells, for example.) 6th-10th weeks: (4) General relationship from electrons to electron waves. That from lightwaves (em waves) to photons. (5) Device's internal structures (of light-emitting diodes and light-absorbing sensors), and their working principles. (6) Energy conversion law and general limits in energy-conversion efficiency, from electronic energy to photonic energy. That in the opposite direction, that is, from photonic energy to electronic energy. 11th-15th weeks:

	(7) advanced groups of lasers, consisting of cavities and waveguides, which are deeply and broadly used in advanced systems such as network infrastructures (terabit per second), optical-disk memories (DVD&CD's), compact and accurate laser diodes (from infrared to blue). (8) high-density light energy in time and 3D-space dimensions (total four dimensions), that is rather simply generated by laser oscillators in particular. (Several kinds of experimental research are going on in our UEC campus, as well.)
Study time (preparing and reviewing)	Both personal and group studies, efficiently before and after each weekly classroom, are encouraged.
Evaluation method and grading scale（target and standard）	Understanding level of each student is evaluated, in the final test in the end of the 15-week course.
Office hours	6th period, Tuesdays. (Notify me Ueno by email, when I was not available in the period of tuesday.)
A message for students	The number of participants to this course will be around 10, too, and, could be slightly less. So, this lecturer Ueno welcomes questions from participants sometimes in the middle of 90 minutes, rather than after it. Your asking good questions to lecturer inspires the other participants, too, basically.
Others	Lecturer Ueno's international activities: http://www.ultrafast.ee.uec.ac.jp/ueno-cv.html
Keywords	photonics, opto-electronics, quantum mechanics, electro-magnetic waves, light-emitting diodes (spontaneous emission), lasers (stimulated emission), optical sensors, solar batteries, silicon, galium arsenide, semiconductor.

Advanced Communication Engineering and Informatics I (Information and Communication Networks)

General Information

Course name	Advanced Communication Engineering and Informatics I (Information and Communication Networks)		
English Course name	I Advanced Communication Engineering and Informatics I (Information and Communication Networks)		
Academic Year	2017	**Offered to year**	All
Semester offered	Spring semester	**Offered for**	Master's program
Teaching methods	Lecture	**Credits**	2
Classification	Specialized subject for graduate school		
Department	Department of Communication Engineering and Informatics		
Lecturer	OKI Eiji (大木　英司)		
Office			
e-mail	eijioki@ieee.org		
Course's URL	http://oki.ice.uec.ac.jp/		
Last updated	2017/02/19 9:59:17	**Status**	Released

Course Description

Topic, goals and objectives	Communication networks serve as the most important infrastructure for the today's information society. This course deals with mathematical programming and algorithms for communication networks. The course objectives are to understand the fundamental concepts communication networks and theories for network designs and controls, and bridge the gap between the theories and practices.
Prerequisites	The minimum requirement to understand this course is a knowledge of linear algebra and computer logic.
Recommended preparation	Undergraduate courses related to information, communications, networks, probability and statistics, and mathematical programming.
Course texts and materials	Book 1: Textbook, E. Oki, Linear Programming and Algorithms for Communication Networks, CRC Press, Boca Raton, 2012. Book 2: Japanese version, 大木英司, 通信ネットワークのための数理計画法, コロナ社, 2012. The contents of this course are almost covered by Book 1.
Course content and procedures	The subjects include the following items. The topics may be subject to change due to the progress. 1. Introduction and Basic problems for communication networks 2. Algorithms for basic problems (Shortest path routing max flow problem) 3. Algorithms for basic problems (Minimum-cost flow problem) 4. Disjoint path routing 5. Liner programming basics 6. Application of liner programming 7. Mid-term exercise/examination 8. GLPK (GNU Liner Programming Kit) 9. Basic problems solved by LP 10. Disjoint path routing and wavelength assignment solved by LP 11. Routing and traffic demand model (basics) 12. Routing and traffic demand model (hose models and others) 13. Mathematical puzzles 14. Advanced mathematical puzzles 15. Advanced topics and final exercise/examination
Evaluation method and grading scale（target and standard）	Methods: Homework, and mid-term and final examinations Criteria: Fundamentals and theories (50%), Practices (50%)

Office hours	After lecture. Others make appointment by email.
A message for students	The students are required to study the textbook to understand the contents of this course. Lecture will be given mainly in English. Both Japanese and English is allowable for question.
Others	Nil
Keywords	Information and communication, communication network, design and control, mathematical programming, algorithm