Course Description

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

Spring Semester, 2015

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
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JUSST Program Course Requirements

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<tr><th></th><th>Subject</th><th>1st Semester</th><th>2nd Semester</th></tr>
<tr><td rowspan="7">CORE SUBJECTS</td><td>Japanese Language</td><td colspan="2">Elementary / Intermediate / Advanced *
8~14 hours/week (6~7 Credits)</td></tr>
<tr><td>Academic Skills I</td><td>2 hours/week (2 Credits)</td><td rowspan="2">–</td></tr>
<tr><td>Academic Skills II</td><td>2 hours/week (2 Credits)</td></tr>
<tr><td>Academic Skills III</td><td>N/A</td><td>2 hours/week (2 Credits)</td></tr>
<tr><td rowspan="3">Scientific &
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)
All <u>Undergraduate Students</u> are required to take
Only offered in the FALL Semester</td></tr>
<tr><td>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)
< GRADUATE STUDENTS >
<u>Independent Research Project</u> under the supervision of UEC Faculty member. Minimum 8hours/week
(6 Credits/one academic year) (3 Credits/one semester)</td></tr>
<tr><td rowspan="5">FREE ELECTIVE</td><td>Preparation for Overseas Study</td><td colspan="2" rowspan="2">2 hours/week (2 Credits)
Offered in the SPRING Semester only</td></tr>
<tr><td>English for Intercultural Communication</td></tr>
<tr><td>Reading Scientific Research</td><td colspan="2" rowspan="2">2 hours/week (2 Credits)
Offered in the FALL Semester only</td></tr>
<tr><td>Research Presentation</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)

2015 SPRING SEMESTER CALENDAR

	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON
APR				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					
				New Students Arrival	2nd to 7th Orientation Week					Opening Ceremony	Classes Begin Weekly meeting										16th to 22rd Course registration period										Classes as usual (Showa Day)							
MAY						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	
								Constitution Day	Greenery Day	Children's Day	Substitute holiday																											
JUN		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						
					UEC Open Lab Classes as usual																																	
JUL				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			
																							Marine Day	Preparing for The mini-Conference (Presetation)														
AUG							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
											5th to 11th Examination Period							12th Aug to 30th Sep Summer Break																				
									JUSST mini-Conference and Closing Ceremony Every JUSST student have to attend (to be announced)									Univ. Holiday Offices closed																			
SEP			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					
																							Respect for the Aged Day	(Bridge) Public holiday	Autumnal Equinox Day		JUSST Completer Vacate Deadline					Summer Break End					
OCT					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		
					2nd semester begin All students have to attend																																	

@ JUSST students Weekly Meeting on every Wed (start from 18:00)

29th Apr Classess as usual (Showa Day)

National holiday

Univ. center exam and UEC entrance exams

2015/04/03

JUSST Class Time-Table for Spring Semester, 2015
平成27年度春学期（前期）　短期留学プログラム時間割

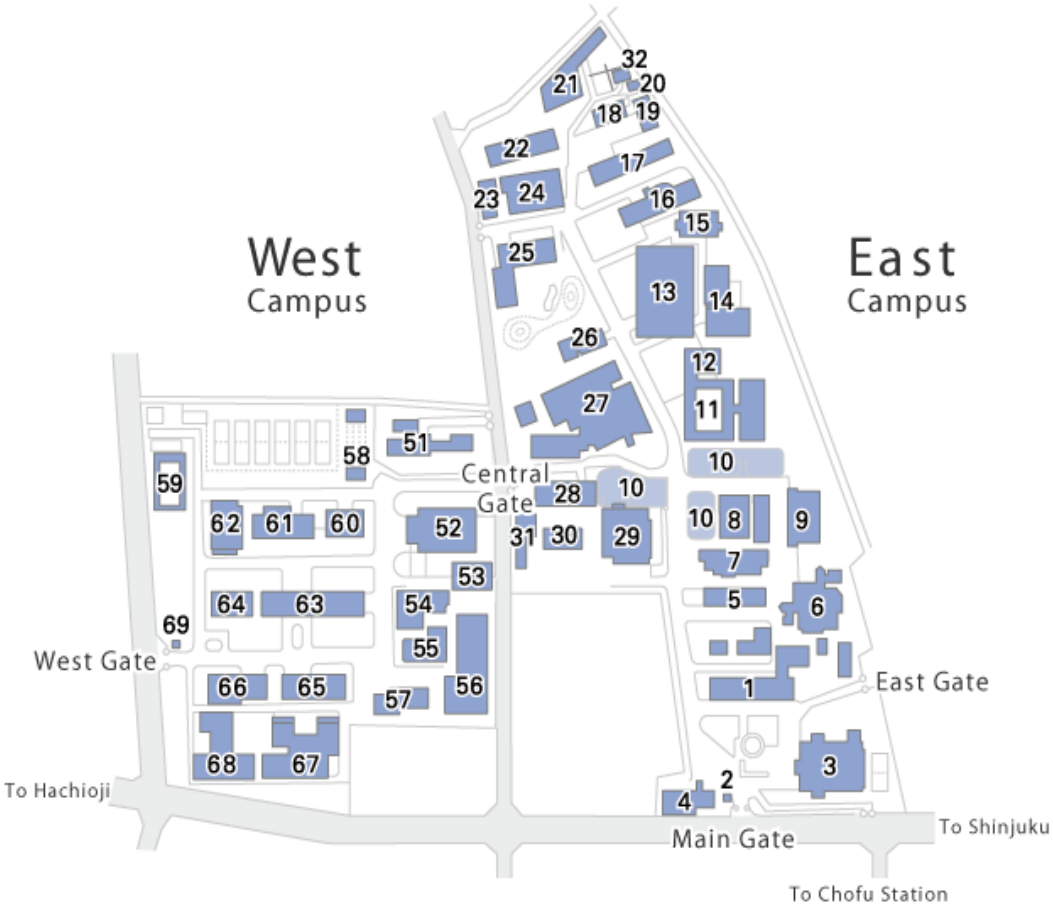
Day 曜日	Period 授業時間	Subject　授業名	Department 学科等	Lecturer 教員名	Classroom 教室	Note 備考
Mon 月	1	UEC Academic Skills III (Publishing literacy and Research)	CIPE	CHOO	E3(1F)	Computer Room 1
	2	Advanced Communication Engineering and Informatics I	I	OKI Eiji (大木　英司)	A101	
	3	VLSI Low Power Circuit Design	S	ISHIBASHI Koichiro（石橋 孝一郎）	W8-132	
	4	Media Design	J	KANEKO Masakatsu（兼子　正勝）	W2-105	
		Introduction to Mechatronics	M	AOYAMA Hisayuki (青山 尚之)	E4-317	
	5	Advanced Communication Engineering and Informatics II	I	KISHI Naoto (來住 直人)	E6-201	
Tue 火	1	UEC Academic Skills I (Computer Literacy)	CIPE	CHOO	E3(1F)	Computer Room 1
	2	UEC Academic Skills II (Information literacy and Research)	CIPE	CHOO	E3(1F)	Computer Room 1
		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	Introduction to Computational Methods in Science and Engineering	M	MATUTTIS Hans-Georg	C-401	Old C building
		Modern Optics and Photonics	S	TOMITA Yasuo (富田　康生)	W1-214	
	2	Japanese Language (日本語)	CIPE			
		Advanced Quantum Mechanics	S	WATANABE Shin-ichi (渡邊 信一)	E6-237	
	3	Japanese Language (日本語)	CIPE			
	4	Japanese Language (日本語)	CIPE			
	5	Preparation for Oversea Study	HLSS	SHI Jie (史　傑)	E1-606	
Thu 木	1					
	2	Advanced Theory of Systems Reliability	J	SUZUKI Kazuyuki (鈴木 和幸)	W5-209	
	3					
	4					
	5					
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）	W5-214	
	4					
	5	English for Intercultural Communication	HLSS	SHI Jie (史　傑)	E1-606	

Department 学科等
J: Department of Informatics (総合情報学専攻)
I: Department of Communication Engineering Informatics(情報通信工学専攻)
M: Department of Engineering and Intelligent Systems(知能機械工学専攻)
S: Department of Engineering Science(先進理工学専攻)
CIPE: Center for International Programs and Exchange(国際交流センター)
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

* Regular students are not eligible to enroll
正規学生の聴講は不可

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）		
English Course name	UEC Academic Skills I（Computer Literacy）		
Academic Year	2015	**Offered to year**	1/2
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engneering		
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/uec-as1		
Last updated	2015/03/12 18:16:46	**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	Compter 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, colour, 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 participantion in class is obligatory. Only students who have 1)maintained at least 2/3 of the 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）		
English Course name	UEC Academic Skills II（Information Literacy and Research）		
Academic Year	2015	**Offered to year**	2
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engneering		
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/uec-as2		
Last updated	2015/03/12 18:23:12	**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)
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 participantion in class is obligatory. Only

	students who have 1)maintained at least 2/3 of the 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	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engneering		
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/uec-as3		
Last updated	2015/03/12 18:19:33	**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 participantion in class is obligatory. Only students who have 1)maintained at least 2/3 of attendance, 2) submitted the writting 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

Preparation for Overseas Study

General Information

Course name	Preparation for Overseas Study		
English Course name	Preparation for Overseas Study		
Academic Year	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engneering		
Lecturer	Shi Jie		
Office	E1-609		
e-mail	shi.jie@uec.ac.jp		
Course's URL	Nil		
Last updated	2015/03/18 21:00:29	**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

English for Intercultural Communication

General Information

Course name	English for Intercultural Communication		
English Course name	English for Intercultural Communication		
Academic Year	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Faculty of Informatics and Engneering		
Lecturer	Shi Jie		
Office	East 1-609		
e-mail	shi@bunka.uec.ac.jp		
Course's URL	Nil		
Last updated	2015/03/18 20:27:40	**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 building 4F 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 the fourth 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 Group research presentation 10 Exploring Ted Talks(1) 11 Exploring Ted Talks(2) 12 Group Presentation (1) 13 Group Presentation (2) 14 Group Presentation (3) 15 Final class: self-evaluation; course evaluation
Study time (preparing and reviewing)	The important content will be pasted on the Web site(http://webclass.cdel.uec.ac.jp)

Evaluation method and grading scale (target and standard)	Evaluation method: 1) Class participation 10% 2) Homework 20% 3) Presentation 40% 4) Research (reading and writing) 30%
Office hours	* Send an e-mail for a quick question or inquiry. * If needs time, schedule an appointment.
A message for students	English proficiency not required. English ability at any levels are welcome. The students who wish to find their real English skills are very welcome to enroll in this course.
Others	Attend 2/3 or more of the classes.
Keywords	Presentation, cooperative learning, active learning, academic research

Advanced Communication Engineering and Informatics I

General Information

Course name	Advanced Communication Engineering and Informatics I		
English Course name	Advanced Communication Engineering and Informatics I		
Academic Year	2015	**Offered to year**	4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	Free elective subjects		
Department	Department of Communication Engineering and Informatics		
Lecturer	OKI Eiji (大木　英司)		
Office	East 3-1021		
e-mail	eiji.oki at uec dot ac dot jp		
Course's URL	http://oki.ice.uec.ac.jp/		
Last updated	2015/03/04 17:31:54	**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: Book (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
Study time (preparing and reviewing)	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.
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	Monday 9:15-10:15 E-mail eiji.oki [at] uec.ac.jp
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

VLSI Low Power Circuit Design

General Information

Course name	VLSI Low Power Circuit Design		
English Course name	VLSI Low Power Circuit Design		
Academic Year	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification			
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	2015/03/09 18:15:48	**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 ITC 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	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
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	2015/03/18 14:46:12	**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

Introduction to Mechatronics

General Information

Course name	Introduction to Mechatronics		
English Course name	Introduction to Mechatronics		
Academic Year	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	Free elective subjects		
Department	Department of Machanical Engineering and Intellignet Systems		
Lecturer	AOYAMA Hisayuki (青山　尚之)		
Office	E4-304		
e-mail	aoyama@mce.uec.ac.jp		
Course's URL	http://www.aolab.mce.uec.ac.jp		
Last updated	2015/03/04 23:29:45	**Status**	Released

Course Description

Topic, goals and objectives	The integration of electronic engineering, electrical engineering, computer technology and control engineering with mechanical engineering is increasingly forming a crucial part in the design, manufacture and maintenance of a wide range of engineering products and processes. A consequence of this is the need for engineers and technicians to adopt an interdisciplinary and integrated approach to engineering. The term mechatronics is used to describe this integrated approach. A consequence of this approach is that engineers and technicians need skills and knowledge that are not confined to a single subject area. They need to be capable of operating and communicating across a range of engineering disciplines and linking with those having more specialised skills. In this class, an attempt to provide a basic background to mechatronics and provide links through to more specialised skills is given.
Prerequisites	Mechanical and Electrical Engineering, Control Engineering
Recommended preparation	Mechanical and Electrical Engineering, Control Engineering
Course texts and materials	Mechatronics, 3rd Edition. Electronics and Conrol System in Mechanical and Eletrical Engineering, W.Bolton
Course content and procedures	[1]: Mechatronics Appreciate what mechatronics is about. [2]: Sensors and transducers Describe the performance of commonly used sensors. [3]: Signal conditioning Explain the requirements for signal conditioning. [4]: Data presentation systems Explain the problem of loading. [5]: Pneumatic and hydraulic actuation systems Interpret system drawings, and design simple systems, for sequential control systems involving valves and cylinders. [6]: Mechanical actuation systems Evaluate mechanical systems involving linkages, cams, gears, ratchet and pawl, belt and chain drives, and bearings. [7]: Electrical actuation systems Evaluate the operational characteristics of electrical actuation systems [8]: Basic system models Devise models from basic building blocks for mechanical, electrical, fluid and thermal systems. [9]: System models Devise models for rotational-translational, electro-mechanical and hydraulic-mechanical systems. [10]: Dynamic responses of systems Model dynamic systems by means of differential equations. Determine the response of first- and second-order systems to [11]: System transfer functions

	Define the transfer function and determine the responses of systems to simple inputs by its means, using Laplace transforms. [12]: Frequency response Analyse the frequency response of systems subject to sinusoidal inputs. [13]: Closed-loop controllers Predict the behaviour of systems with proportional, integral, derivative, proportional plus integral, proportional plus derivative and PID control. [14]: Mechatronics systems Compare and contrast possible solutions to design problems when considered from the traditional and the mechatronic points of view, recognising the widespread use of embedded systems.
Study time (preparing and reviewing)	Nil
Evaluation method and grading scale（target and standard）	(Assessment Policy) There will be some report requirements on the topics mentioned above during the semester. And the practical mechatronics development will be given to inprove 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 proportion of 30%, 30% and 40%, respectively.
Office hours	Monday 16:00-17:00
A message for students	Nil
Others	Nil
Keywords	Micro-mechatronics

Advanced Communication Engineering and Informatics Ⅱ

General Information

Course name	Advanced Communication Engineering and Informatics Ⅱ		
English Course name	Advanced Communication Engineering and Informatics Ⅱ		
Academic Year	2015	**Offered to year**	4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	Other departments 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://pcwave3.ice.uec.ac.jp/kishi/optc/		
Last updated	2015/02/17 10:04:31	**Status**	Released

Course Description

Topic, goals and objectives	The main subject of this lecture is "Optical Communication". Optical communication is one of the key technologies for the contemporary information society. It is hence important to understand the basic engineering concepts of optical communication. The goal of the cource is to learn the fundametal priciple and technical element of communication system, as well as introduce you to some the latest communication technologies.
Prerequisites	Introduction to Physics (wave and optics), 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 following subjects are covered. 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 rating system of the signal reception. 12. The forms of the optical communication system. 13. Characteristic and the development of the optical communication system. 14. Optical fiber communication system end uses. 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.

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	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	General culture subjects		
Department	Department of Machanical Engineering and Intellignet Systems		
Lecturer	Hans-Georg Matuttis		
Office	旧C401		
e-mail	hg@mce.uec.ac.jp		
Course's URL	http://webclass.cdel.uec.ac.jp/		
Last updated	2015/03/11 14:52:37	**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	Scriptum 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: What are numerical errors, and how to get "correct" results from calculations "with error" 6. Graphics 7. Introduction to numerical Linear algebra and how to draw a line through more than 2 points (or maybe not) 8. Polynomials and Roots 9. Solving ordinary differential equations
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
A message for students	This is not a programming course for beginners, participants should already know the basics of programming.
Others	Lecture starts after the the introduction to the computer system in the Jusst-Program has been held.
Keywords	Numerical Analysis, Scientific Programming

Modern Optics and Photonics

General Information

Course name	Modern Optics and Photonics		
English Course name	Modern Optics and Photonics		
Academic Year	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	Course subject		
Department	Department of Engineering Science		
Lecturer	TOMITA Yasuo (富田　康生)		
Office	W1-205		
e-mail	ytomita@uec.ac.jp		
Course's URL	http://talbot.es.uec.ac.jp/optics.html		
Last updated	2015/03/02 11:16:38	**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

Advanced Quantum Mechanics

General Information

Course name	Advanced Quantum Mechanics		
English Course name	Advanced Quantum Mechanics		
Academic Year	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	Free elective subjects		
Department	Department of Engineering Science		
Lecturer	WATANABE Shinichi (渡邊　信一)		
Office	East 6-512		
e-mail	shin@PC (Replace PC by pc.uec.ac.jp)		
Course's URL	none		
Last updated	2015/02/28 20:19:42	**Status**	Released

Course Description

Topic, goals and objectives	Theme: To understand the basic principles of quantum mechanics that apply to various quantum phenomena serving as foundations of Modern Science and Technology. Goals: To understand the quantization of energy, momentum and angular momentum. To understand the quantum interference. To understand how light interacts with matter. To understand the quantization of the Electro-Magnetic fields and of the matter wave.
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	This course is assigned "English I". The lectures will be given in English at the level suitable for anyone with the background of high school English. Contents (tentative): (1) What's an atom? (2) What's spin? (3) What's the atomic clock? (4) Quantum interference and interferometric measurements (5) Quantization of Electric and Magnetic fields (6) Quantization of the Matter Wave (7) Laser and atoms 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 (target and standard)	(a) The grade will be based on an oral presentation and the term paper. (b) It is required that the student understands the class room materials to such an extent that they can explain the basic concepts by heart.
Office hours	Period 4 on Saturday at E6-Rm 521. Questions should be asked in and/or immediately after each class.
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

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	2015	**Offered to year**	all
Semester offered	Spring semester	**Offered for**	Master and Doctor course
Teaching methods	Lecture	**Credits**	2
Classification	Graduate school major subjects: Technical subjects		
Department	Graduate school of Informatics		
Lecturer	SUZUKI Kazuyuki (鈴木　和幸)		
Office	West 5-605		
e-mail	suzuki@se.uec.ac.jp		
Course's URL	http://www-suzuki.se.uec.ac.jp/		
Last updated	2015/03/11 18:13:02	**Status**	Released

Course Description

Topic, goals and objectives	How both of 1) the high reliability system develops and the operating of Reliability Engineering, and 2) the pursuit of theoretical background reliability theory, will be discussed from the point of view of the system reliability. In particular the current state of the reliability system, the technique of enhancement as well as the future and the problems will be investigated. Also, we will discuss concerning the application of the reliability assurance and Japanese quality management that Japan has achieved and developed.
Prerequisites	NIL
Recommended preparation	Calculus
Course texts and materials	Print Hand out
Course content and procedures	1) Japanese way of TQM(Total Quality Management) and Reliability 2) afety/reliability accident prevention by prediction 3) Quality Assurance and Reliability Assurance with FMEA and FTA 4) Reliability Failure Model and its Theory 5) Reliability Design 6) Reliability Testing and Data Analysis 7) Maintainability and Condition Monitoring Maintenance （The lecture is done in English. Foreign students are welcome.）
Evaluation method and grading scale（target and standard）	Assessment will be based on the level of understanding and reports.
Office hours	Any question is welcome after the lecture
A message for students	Let's discuss the prevention of the lack of reliability, such as the Sasako tunnel accident together.
Others	NIL
Keywords	Reliability Engineering, Quality Assurance, Reliability Theory, Quality Control, Ccondition-based Maintenance

Photonics and opto-electronics

General Information

Course name	Photonics and opto-electronics		
English Course name	Photonics and opto-electronics		
Academic Year	2015	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification			
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	2015/03/23 19:11:47	**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	
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.