Course Description

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

Spring Semester, 2014

Center for International Programs and Exchange
The University of Electro-Communications

国立大学法人
電気通信大学

Contents

JUSST Program Course Requirements

	Subject	1st Semester	2nd Semester
C O R E S U B J E C T S	Japanese Language	Elementary / Intermediate / Advanced * 8~14 hours/week (6~7 Credits)	
	Academic Skills I	2 hours/week (2 Credits)	–
	Academic Skills II	2 hours/week (2 Credits)	
	Academic Skills III	N/A	2 hours/week (2 Credits)
	Scientific & Engineering Subjects (ELECTIVE)	< UNDERGRADUATE STUDENTS > Need to pass **3 subjects** at minimum** in *Each Semester*. (H-6)	
		< GRADUATE STUDENTS > Need to pass **3 subjects** at minimum** in *One Academic Year*. (H-9)	
		Electronic Experiment Lab. 4 hours/week (2 Credits) All **Undergraduate Students** are required to take Only offered in the FALL Semester	
	LAB WORK Research / Project (**Required for JUSST student**)	< UNDERGRADUATE STUDENTS > **Individual Study Project** under the supervision of UEC faculty member. Minimum 8 hours/week (5 Credits/one academic year) (2 Credits/one semester)	
		< GRADUATE STUDENTS > **Independent Research Project** under the supervision of UEC Faculty member. Minimum 8hours/week (6 Credits/one academic year) (3 Credits/one semester)	
F R E E E L E C T I V E	Academic Skills IV A	2 hours/week (2 Credits) Offered in the SPRING Semester only	
	Academic Skills V A		
	Reading Scientific Research		
	Research Presentation		
	English for Interpersonal Communication	2 hours/week (2 Credits) Offered in the FALL Semester only	
	Preparation for Graduate School		
	Sports Classes	–	2 hours/week (1 Credit)

*) Japanese language classes 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)

2014 SPRING SEMESTER CALENDAR

APR

SUN	MON	TUE	WED	THU	FRI	SAT
		1 New Students Arrival	2	3	4	5
6	7 Opening Ceremony	8 Classes Begin	9 Weekly Meeting Begin	10	11	12
13	14	15	16 Medical Checkup 18:00	17	18	19
20	21	22	23	24	25	26
27	28	29 Showa Day	30			

- 2nd to 7th — Orientation Week
- 16th to 23rd — Course registration period

MAY

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3 Constitution Day
4 Greenery Day	5 Children's Day	6 Substitute holiday	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

JUN

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

JUL

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

AUG

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

- 6th to 12th — Examination Period
- **JUSST mini-Conference and Closing Ceremony (expected on 7th and 8th) — Every JUSST student have to attend (to be announced)**
- Preparing for The mini-Conference
- 13th Aug – 30th Sep — Summer Break
- Univ. Holiday — Offices closed

SEP

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15 Respect for the Aged Day	16	17	18	19	20
21	22	23 Autumnal Equinox Day	24	25 JUSST Completer Vacate Deadline	26	27
28	29	30 Summer Break End				

- Sign for the Scholarship — During Summer Break

OCT

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

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

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

Legend: National Holiday

JUSST Class Time-Table for Spring Semester, 2014
平成26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)	
	2	Advanced Communication Engineering and Informatics I	I	OKI Eiji（大木　英司）	A302	
	3	Media Design	J	KANEKO Masakatsu（兼子　正勝）	W6-705	
		VLSI Low Power Circuit Design	S	ISHIBASHI Koichiro（石橋 孝一郎）	W8-132	
	4	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)	
	2	UEC Academic Skills II (Information literacy and Research)	CIPE	CHOO	E3(1F)	
		Life　Long　Learning　Sports(シニアのみ)	SPORTS	ANDO Soichi (安藤　創一) KIKKAWA Kazutoshi（吉川 和利）		*
	3	Japanese Language (日本語)	CIPE			
	4	Japanese Language (日本語)	CIPE			
	5	UEC Academic Skills IVA (Comprehensive Reading & Summary Writing)	CIPE	SUGAWARA Junko (菅原　淳子)	A302	
		Reading Scientific Research	HLSS	SHI Jie (史　傑)	A402	
Wed 水	1	Introduction to Computational Methods in Science and Engineering	M	MATUTTIS Hans-Georg	C401	
	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			
		Life　Long　Learning　Sports(シニアのみ)	SPORTS	ANDO Soichi (安藤　創一) KIKKAWA Kazutoshi（吉川 和利）		*
	5	Research Presentation	HLSS	SHI Jie (史　傑)	A402	
Thu 木	1	Modern Optics and Photonics	S	TOMITA Yasuo(富田　康生)	W5-214	
	2	Advanced Theory of Systems Reliability	J	SUZUKI Kazuyuki (鈴木 和幸)	W5-209	
	3					
	4					
	5	UEC Academic Skills VA (Maths & Scientific Writing)	CIPE	SUGAWARA Junko (菅原　淳子)	A403	
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					

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

West Campus

East Campus

Central Gate

East Gate

West Gate

To Hachioji

Main Gate

To Shinjuku

To Chofu Station

- 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）

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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	2014	**Offered to year**	1/2/3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	General science and engineering 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	2014/03/19 19:47:37	**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 Compter literacy
Course texts and materials	Nil
Course outline and schedule	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.
Grading Criteria	Evaluation is given as follows; (Attendance 20%, Tasks 20%, Mid-Semester Examination 30%, Final Examination 30%)
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. Attendance is weighted at 20% of the final grade. To obtain this 20% the student should have to attend 90% of all classes of the semester.
Keywords	Unix, HTML, Latex

UEC Academic Skills Ⅱ (Imformation Literacy and Research)

General Information

Course name	UEC Academic Skills Ⅱ (Imformation Literacy and Research)（上級科目）
English Course name	UEC Academic Skills Ⅱ (Imformation Literacy and Research)

Academic Year	2014	**Offered to year**	2/3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2

Classification	General science and engineering 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	2014/03/19 19:56:27	**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.
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 outline and schedule	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 (Zetero) 7. Managing, accessing and sharing resources, and Create bibliographies (iLibrarian) 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.

Grading Criteria	Evaluation is given as follows; (Attendance 20%, Assignments 20%, midterm presentation 20%, Poster presentation 40%)
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. Attendance is weighted at 20% of the final grade. To obtain this 20% the student should have to attend 90% of all classes of the semester.
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	2014	**Offered to year**	1/2/3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2

Classification	General science and engineering 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	2014/03/19 19:51:55	**Status**	Released

Course Description

Topic, goals and objectives	This course is designed to provide students the research, publishing and presentation skills for graduate research in the areas of sciences and engineering.
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 outline and schedule	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.
Grading Criteria	Evaluation is given as follows; (Attendance 20%, Assignments 20%, Writing paper 20%, Oral presentation 40%)
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. Attendance is weighted at 20% of the final grade. To obtain this 20% the student should have to attend 90% of all classes of the semester.
Keywords	Research, Publishing paper, oral presentation

(G)UEC Academic Skills IV A (Comprehensive Reading and Summary Writing)

General Information

Course name	(G)UEC Academic Skills IV A (Comprehensive Reading and Summary Writing)
English Course name	(G)UEC Academic Skills IV A (Comprehensive Reading and Summary Writing)

Academic Year	2014	**Offered to year**	1/2/3/4
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	SUGAWARA Junko (菅原　淳子)
Office	East 2-　205
e-mail	j-sugawara@uec.ac.jp
Course's URL	NIL

Last updated	2014/03/13 14:08:19	**Status**	Released

Course Description

Topic, goals and objectives	Course Description In this class, you will learn comprehensive reading and summary writing for scientific and business purpose. Every week, you will do short or long article reading on scientific and business topics. We expect that you will increase your vocabulary and pick-up short summary skills with keywords. This class is designed for multi-entry of English Proficiency.
Prerequisites	You must graduated from a high school with English Study experience.
Recommended preparation	Not applicable.
Course texts and materials	Cambridge Practice Tests For IELTS Cambridge IELTS 1~4
Course outline and schedule	Short Summary Writing Practice within 80-100 words #1 Orientation #2 Concept of Inference Reading & Summary Writing #3 Birthday Party #4 Skippy #5 My Name #6 TV #7 Cultural Festival #8 Mid-Semester Examination (Presentation) #9 Writing Concepts of Diagrams and Figures #10 Unemployment Rates in Japan and US #11 Usages of Computers at high schools in US #12 Workforce Distribution in Great Britain in 1932 and 1992 #13 Social Participation in Education and Science in Developing and Industrialized Countries #14 Review of Writing #15 Final Examination (Rewriting of #10-#13) *According to circumstances, the topics may change.
Study time (preparing and reviewing)	You have to read 2 to 3 articles about varied topics in the class and you may take a short test for writing or usages. In the mid-term exam, you are expected to make a presentation. In order to make good preparation for the class, you need to spend more than 1 hour of 3 times every week before the class.
Grading Criteria	Evaluation is given as follows; Attendance 20 % Class Participation 20 % Mid-Semester Examination 20%

	Final Examination 40% Total 100 %
Office hours	Tuesday 14:00-15:00 at 205, E-2. Appointment Essential by E-mail in advance.
A message for students	This is the most practical class to improve English. However, you need to be active to express your thoughts or opinions in the class.
Others	Attendance and Punctuality Students are expected to come to class on time and stay for the 1.5 hours. Absences are excused in case of emergency, sickness, trips to conferences. Attendance is weighted as 10% of the final grade. To obtain this 10% the student should have to attend 90% of all classes of the semester. ────────── Class Participation 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 to say about the topics of this course covers please feel free to share with the others in open forum. ────────── Assigments Assignments have to be done during the class time. At the end of the theoretical explanation, students are given enough time to make the exercises and finish the assignment for the class. There will be some homework to be done.
Keywords	Comprehensive Reading, Summary writing, inference

(G)UEC Academic Skills V A (Maths and Scientific Writing)

General Information

Course name	(G)UEC Academic Skills V A (Maths and Scientific Writing)
English Course name	(G)UEC Academic Skills V A (Maths and Scientific Writing)

Academic Year	2014	**Offered to year**	1/2/3/4
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	SUGAWARA Junko (菅原　淳子)
Office	East 2-　205
e-mail	j-sugawara@uec.ac.jp
Course's URL	NIL

Last updated	2014/03/13 14:09:18	**Status**	Released

Course Description

Topic, goals and objectives	In this class, you will develop your mathematical writing skills and scientific writing skills through many writing exercises. Teachers and tutors will correct your writing every week in/out of this class. High School Maths books will be used for the beginning of semester. You will probably be able to read out most university maths expressions by the end of this semester. IELTS base English writing exercise will also be carried out in this class.
Prerequisites	You must graduated from a high school with English Study.
Recommended preparation	Not applicable.
Course texts and materials	Not applicable.
Course outline and schedule	#1 Writing Comparison between Arts, Diary and Science. #2 Writing Comparison between Journal and Scientific Research #3 Writing Comparison between Mathematics and Sciences #4 Writing Mathematics #1 : Vocabursaries and Expressions #5 Writing Mathematics #2 : Functions and Graphs #6 Writing Physics #1 : Vocabursaries and Expressions in Physical Sciecne #7 Writing Physics #2 : Forces and Energy #8 Writing Physics #3 : Electro-Magnatic Waves and Sound Waves #9 Writing Physics #4 : Climate and Geo-science #10 Writing Chemistry #1 : Vocabursaries and Expressions in Chemical Sciecne #11 Writing Chemistry #2 : Chemical Action and Reaction #12 Writing Biology #1 : Vocabursaries and Expressions in Biological Sciecne #13 Writing Biology #2 : Cells and progress natures in Biology #14 Computer Literacy: Coding for Watermarks #15 Network Communication: Optical Communication and Device Engineering ＊ According to circumstances, the topics may change.
Study time (preparing and reviewing)	Homeworks for vocabursary checks, one-article writing every week
Grading Criteria	There is no examination at the end of semester. However, the evaluation wiil be given according to the following policies: －－－－－－－－－－ Assignments Except for the projects, all other assignments are designed to be done during the class time. At the end of the theoretical explanation, students are given enough time to make the exercises and have to finish the assignment in class. Assignments sum 20% of the final grade. －－－－－－－－－－ Evaluation is given as follows;

	Attendance 10 % Paritipation by Discussion 10 % Weekly Assignments 60 % Project Assignments 20 % Total 100 %
Office hours	Tuesday 14:00–15:00 at 205 E-2. Appointment Essential by E-mail in advance
A message for students	This is the most useful practice for your research presentation in English at UEC, since more than 20 international students participates in this excercises from more than 10 countries.
Others	Attendance and Punctuality Students are expected to come to class on time and stay for the 2.0 hours. Absences are excused in case of emergency, sickness, trips to conferences. Attendance is weighted as 10% of the final grade. To obtain this 10% the student should have assist 90% of all classes of the semester. —————————— Class Participation 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 this course covers please feel free to share with the others in open forum.
Keywords	writing for mathematics and sciences

Reading Scientific Research

General Information

Course name	Reading Scientific Research		
English Course name	Reading Scientific Research		
Academic Year	2014	**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.jie@uec.ac.jp		
Course's URL	Nil		
Last updated	2014/03/12 18:10:29	**Status**	Released

Course Description

Topic, goals and objectives	In this course, students learn the genre-based characteristics about scientific English language, journal articles and other genres that are related to UEC disciplines and research areas. Group discussions and presentations are required. You are asked to review and critique scientific research articles/papers (Scientific American, Physics Today)
Prerequisites	Nil
Recommended preparation	Nil
Course texts and materials	No fixed
Course outline and schedule	Each class will consist of topic-oriented discussions, reading and mini presentations. Article reading is conducted in the following style. (The syllabus is subject to change) 1. Introduction to scientific journal literature 2. to 7. Reading scientific reserach articles (1-2) 8. Midterm presentations 9. to 14. Reading scientific reserach articles (3-4) 15. Final presentations 16. Assessment
Study time (preparing and reviewing)	Reading scientific journal literature, Ted.com
Grading Criteria	Off-class studies: 20% Midterm presentations: 30% Classroom performance: 20%
Office hours	Tue, 5th period
A message for students	Be a user and not a learner forever.
Others	Nil
Keywords	autonomous learning, critical thinking, presentation, group discussion

Research Presentation

General Information

Course name	Research Presentation		
English Course name	Research Presentation		
Academic Year	2014	**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	2014/03/12 18:11:24	**Status**	Released

Course Description

Topic, goals and objectives	This course is designed for the students who intend to continue to study in the graduate school and have little previous experiences conducting academic research and making presentations. Students will first learn the basic research elements, e.g. research methods, and how to compile research data using computer aided devices, and then learn and experience how to make presentations in English, e.g. making presentation files and delivery methods.
Prerequisites	All required English courses in first and second years at UEC.
Recommended preparation	Technical English course for undergraduates
Course texts and materials	Textbooks and reading materials will be prepared by the teacher.
Course outline and schedule	This course has the following core parts: Weeks 1-3: Basic elements of research. Research methodology for science and humanity majors. Weeks 4-7: Data and results making and analysis in English. Compiling data into visuals. Week 8-10: How to create research presentation files using computer-aided devices and software, e.g. how to use Power-Point software, file organization (outline and structure), design, and documentation, etc. Weeks 11-13: Delivery of presentation in English, e.g. delivery methods, fluency, pronunciation, body language, verbal skills, how to manage nervousness, eye-contact and how to handle Q&A. Weeks 14-15: Conducting presentations & Course evaluation
Study time (preparing and reviewing)	Students will need to work outside of class on their research, projects and presentations.
Grading Criteria	This course adopts an accumulative grading system which divides the final grades into percentages. It is important to note that there will NOT be a final test that counts for 100% of your grade. Assessment: Those students who are absent for two times or more without any official excuses will not be eligible for Grade "S"; Those students who miss over 30% of total classes without any official excuses will fail automatically. In-class Performance: 20% Presentations: 40% Essay: 20% Tests: 20%
Office hours	Office Hours: Period 2, Tuesday. (or else schedule an appoitment)

A message for students	Your attendance and your participation in class activities are two of the most important elements of the course and your achievement. You must try to use English in class all the time. Inappropriate use of Japanese in class will be considered unacceptable behaviors in class and will lead to lower final grade. You are encouraged to ask questions actively in class. In addition, you are expected to make contributions to the class materials and group collaboration for research and group work.
Others	Nil
Keywords	Research, presentation, impromptu speech, group work, visuals

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	2014	**Offered to year**	1/2/3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2

Classification	Free elective subjects
Department	Department of 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	2014/03/06 12:58:03	**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	Textbook, E. Oki, Linear Programming and Algorithms for Communication Networks, CRC Press, Boca Raton, 2012. The contents of this course are almost covered by the textbook.
Course outline and schedule	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 I 3. Algorithms for basic problems II 4. Disjoint path routing 5. Liner programming I 6. Liner programming II 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 I 12. Routing and traffic demand model II 13. Mathematical puzzles I 14. Mathematical puzzles II 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.
Grading Criteria	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

Media Design

General Information

Course name	Media Design		
English Course name	Media Design		
Academic Year	2014	**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 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	2014/03/06 14:29:15	**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 outline and schedule	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
Grading Criteria	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) attendance 40%.
Office hours	Mon 16:15-17:45
A message for students	Join to foreign students
Others	non

VLSI Low Power Circuit Design

General Information

Course name	VLSI Low Power Circuit Design
English Course name	VLSI Low Power Circuit Design

Academic Year	2014	**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	2014/03/08 14:44:03	**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 materials will be delivered on the class
Course outline and schedule	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 ITC society true. 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 with web is recommended before the lectures.
Grading Criteria	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 has enormous market WW.
Others	The class is held in English. Contents of class is based on lectures held in foregn universities done by Prof. Ishibashi as guest professors.
Keywords	VLSI, Low power, Circuit design

Introduction to Mechatronics

General Information

Course name	Introduction to Mechatronics		
English Course name	Introduction to Mechatronics		
Academic Year	2014	**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	2014/03/07 19:13:42	**Status**	Released

Course Description

Topic, goals and objectives	Introduction to Mechatronics (Objective) 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 outline and schedule	[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
Grading Criteria	(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	2014	**Offered to year**	1/2/3/4
Semester offered	Spring semester	**Offered for**	Faculty of Informatics and Engneering
Teaching methods	Lecture	**Credits**	2
Classification	Free elective subjects
Department	Department of 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	2014/03/04 13:51:00	**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	Knowledge of basic engineering/scientific concepts
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 outline and schedule	Outline of Class and Contents: The following subjects are treated. 1. Tutorial introduction to optical fibre communication 2. Properties of lightwave for communication 3. Optical fibre transmission lines 4. Lightsources 5. Optical amplifiers 6. Various optical devices 7. Digital codings for optical communications 8. Optical communication systems 9. Optical fibre sensing systems
Study time (preparing and reviewing)	Students are required to review (by accessing to the online material and other texts).
Grading Criteria	Submission of a report will be required at the end of the term. Its subject may be fixed according to one's interested topics in the course. Assessment of this course will be made over the report and discussion in the class at the score proportion of 80% and 20%, respectively.
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, help with 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	2014	**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 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	2014/03/14 14:26:04	**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 outline and schedule	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

Grading Criteria	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

Advanced Quantum Mechanics

General Information

Course name	Advanced Quantum Mechanics
English Course name	Advanced Quantum Mechanics

Academic Year	2014	**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 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	NIL

Last updated	2014/03/08 13:50:22	**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 outline and schedule	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.
Grading Criteria	(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.

Modern Optics and Photonics

General Information

Course name	Modern Optics and Photonics
English Course name	Modern Optics and Photonics

Academic Year	2014	**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	TOMITA Yasuo（富田　康生）
Office	
e-mail	ytomita@uec.ac.jp
Course's URL	http://talbot.es.uec.ac.jp/optics.html

Last updated	2014/02/24 11:44:10	**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 outline and schedule	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
Grading Criteria	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 Theory of Systems Reliability

General Information

Course name	Advanced Theory of Systems Reliability		
English Course name	Advanced Theory of Systems Reliability		
Academic Year	2014	**Offered to year**	3/4
Semester offered	Spring semester	**Offered for**	For all
Teaching methods	Lecture	**Credits**	2
Classification			
Department	Department 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	2014/02/18 09:47:04	**Status**	Released

Course Description

Topic, goals and objectives	This lecture deals with Reliability Engineering and its theory which focus on the philosophy, ideas and scientific methods to build in quality and reliability into systems. Here, up-stream management plays an important roles. Also, recent development of information technology has been changing the methods of Reliability Engineering. This new aspects is also dealt with.
Prerequisites	Calculus
Recommended preparation	None
Course texts and materials	Hand out Print
Course outline and schedule	1) Information Technology and Reliability 2) TQM(Total Quality Management) and Reliability 3) Quality Assurance and Reliability Assurance 4) Reliability Failure Model and its Theory 5) Reliability Design and Systems Reliability 6) Reliability Testing and Data Analysis 7) Design of Experiments in reliability 8) Maintainability and Condition Monitoring Maintenance Every lecture is done in English.
Study time (preparing and reviewing)	None
Grading Criteria	Assessment will be based on the level of understanding
Office hours	Any question is welcome after the lecture
A message for students	Every student is welcome. Even if you are not good at mathmatics, that is ok.
Others	None
Keywords	Reliability Engineering, Weibull Analysis, FMEA・FTA

Photonics and opto-electronics

General Information

Course name	Photonics and opto-electronics		
English Course name	Photonics and opto-electronics		
Academic Year	2014	**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	2014/03/05 18:42:31	**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, second edition, John Wiley & Sons, Inc., 2007. (this is the primary textbook for this course.) (2) Amnon Yariv, Optical Electronics in Modern Communications, 5th edition, Oxford University Press, 1997. (the secondary textbook.) *1) UEC's main library and UEC-CIPE's library holds total eleven (3+3+5) copies of the above textbook (1). Authorized participants to this course this year may borrow one copy, officially. Contact Prof. Choo, CIPE. Number of participants will be around ten. *2) Textbook (1) is thick, consisting of 24 chapters. Never try to study all of these, from its beginning through the end, because that is the least exciting way! In this course, basic portions in chapters 12-18 are selected by lecturer Ueno so that it fits to industry and R&D in coming 10-20 years. *3) Table of contents of the above textbook (1): http://www.amazon.ca/gp/reader/0471358320/ref=sib_dp_ptu/180-2038632-4885556#reader-link
Course outline and schedule	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.
Grading Criteria	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.