

# Course Description

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

**Spring Semester, 2019**

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



国立大学法人  
**電気通信大学**

**UEC JUSST Program Course Description**

Japanese University Studies in Science and Technology (JUSST)

Center for International Programs and Exchange (CIPE)

The University of Electro-Communications

1-5-1 Chofugaoka, Chofu-shi, 182-8585

Tokyo, Japan

E-mail: [jusst@fedu.uec.ac.jp](mailto:jusst@fedu.uec.ac.jp)

# Contents

<b>Guidance</b>	<b>i</b>
1.1 UEC JUSST Program's Enrollment Requirements . . . . .	i
1.2 Academic Calendar . . . . .	ii
1.3 Timetable . . . . .	iii
1.4 Campus Map . . . . .	iv
<b>Academic Skills Subjects</b>	<b>1</b>
2.1 UEC Academic Skills I (Computer Literacy) . . . . .	1
2.2 UEC Academic Skills II (Information literacy and Research) . . . . .	3
2.3 UEC Academic Skills III (Publishing literacy and Research) . . . . .	5
<b>Scientific Research Communication Subjects</b>	<b>7</b>
3.1 Preparation for Oversea Study . . . . .	7
3.2 English for Intercultural Communication . . . . .	9
<b>Informatics, Science and Engineering Subjects</b>	<b>11</b>
4.1 Advanced Engineering Science III (Advanced Quantum Mechanics) . . . . .	11
4.2 VLSI Low Power Circuit Design . . . . .	13
4.3 Advanced Communication Engineering and Informatics II (Optical Communication Engineering) . . . . .	14
4.4 Advanced Engineering Science I (Modern Optics and Photonics) . . . . .	16
4.5 Introduction to Computational Methods in Science and Engineering . . . . .	17
4.6 Advanced Theory of Systems Reliability . . . . .	19
4.7 Topics in Informatics II (Sustainable Supply Chain Management) . . . . .	20
4.8 Advanced Engineering Science II (Photonics and Opto-electronics) . . . . .	22
4.9 Advanced Communication Engineering and Informatics I (Information and Communication Networks) . . . . .	24

# JUSST Program Course Requirements

	Subject	1 <sup>st</sup> Semester	2 <sup>nd</sup> Semester
CORE SUBJECTS	LAB WORK Research / Project (Required for JUSST student)	[ 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 8 hours/week 6 Credits/one academic year (3 Credits/one semester)	
	Academic Skills I	2 hours/week (2 Credits)	—
	Academic Skills II		
	Academic Skills III	—	2 hours/week (2 Credits)
	Japanese Language	Elementary / Intermediate / Advanced * 8 - 14 hours/week (6 - 7 Credits)	
	Science and Engineering Subjects ( ELECTIVE )	[ UNDERGRADUATE STUDENTS ] Need to pass <u>3 subjects</u> at minimum ** in <i>Each Semester</i>	
		[ GRADUATE STUDENTS ] Need to pass <u>3 subjects</u> at minimum ** in <i>One Academic Year</i>	
		Electronic Experiment Lab. 4 hours/week (2 Credits) Required for all Undergraduate Students Only offered in the FALL Semester	
	FREE ELECTIVE	Preparation for Overseas Study	2 hours/week (2 Credits) Offered in the SPRING Semester only
English for Intercultural Communication			
English for Interpersonal Communication		2 hours/week (2 Credits) Offered in the FALL Semester only	
Preparation for Graduate School			
Sports Classes		—	2 hours/week (1 Credit)

\*) Japanese language classes may be exempted in the 2<sup>nd</sup> semester.

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

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

# 2019 SPRING SEMESTER CALENDAR

APR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
-----	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**Time-Table for Spring Semester, 2019**  
**2019年度秋学期（前期） 短期留学プログラム時間割**

Day 曜日	Period 授業時間	Subject 授業名	Department 学科等	Lecturer 教員名	Classroom 教室	Note 備考
Mon 月	1					
	2	Advanced Engineering Science III (Advanced Quantum Mechanics)	S	WATANABE Shin-ichi (渡邊 信一)	E6-237	*
		VLSI Low Power Circuit Design	I	ISHIBASHI Koichiro (石橋 孝一郎)	W2-106	*
	3					
	4					
	5	Advanced Communication Engineering and Informatics II (Optical Communication Engineering)	I	KISHI Naoto (来住 直人)	E6-201	
Tue 火	1	UEC Academic Skills I (Computer Literacy)	CIPE	CHOO	C-401	Old C building (Computer room)
	2	UEC Academic Skills II (Information literacy and Research)	CIPE	CHOO	C-401	
		Life Long Learning Sports (for Senior student only)	SPORTS	ANDO Soichi (安藤 創一)		For 2nd semester students only
	3	Japanese Language (日本語)	CIPE			
	4	Japanese Language (日本語)	CIPE			
	5	Preparation for Oversea Study	HLSS	UEHARA Suwako (上原 寿和子)	E1-806	
Wed 水	1	Advanced Engineering Science I (Modern Optics and Photonics)	S	TOMITA Yasuo (富田 康生)	W1-214	
		Introduction to Computational Methods in Science and Engineering	M	MATUTTIS Hans-Georg	C-401	Old C building (Computer room)
	2	Japanese Language (日本語)	CIPE			
	3	Japanese Language (日本語)	CIPE			
	4	Japanese Language (日本語)	CIPE			
	5					
Thu 木	1	UEC Academic Skills III (Publishing Literacy and Research)	CIPE	CHOO	E3-1st floor	Computer Room
	2	Advanced Theory of Systems Reliability	J	JIN Lu (金 路)	W5-209	*
	3					
	4	Topics in Informatics II (Sustainable Supply Chain Management)	J	YAMADA Tetsuo (山田 哲男)	W5-209	
	5					
Fri 金	1	Japanese Language (日本語)	CIPE			
	2	Japanese Language (日本語)	CIPE			
	3	Advanced Engineering Science II (Photonics and Opto-electronics)	S	UENO Yoshiyasu (上野 芳康)	W2-106	
	4					
	5	English for Intercultural Communication	HLSS	HAUSER Eric	E1-606	
Sat 土	1	Advanced Communication Engineering and Informatics I (Information and Communication Network)	I	OKI Eiji (大木 英司)	A101	Intensive Courses 4/13, 4/27, 5/18, 6/1, 6/15, 6/22, 7/6, 7/20, 8/3 (final exam)
	2					

\* Joint classes with regular graduate students

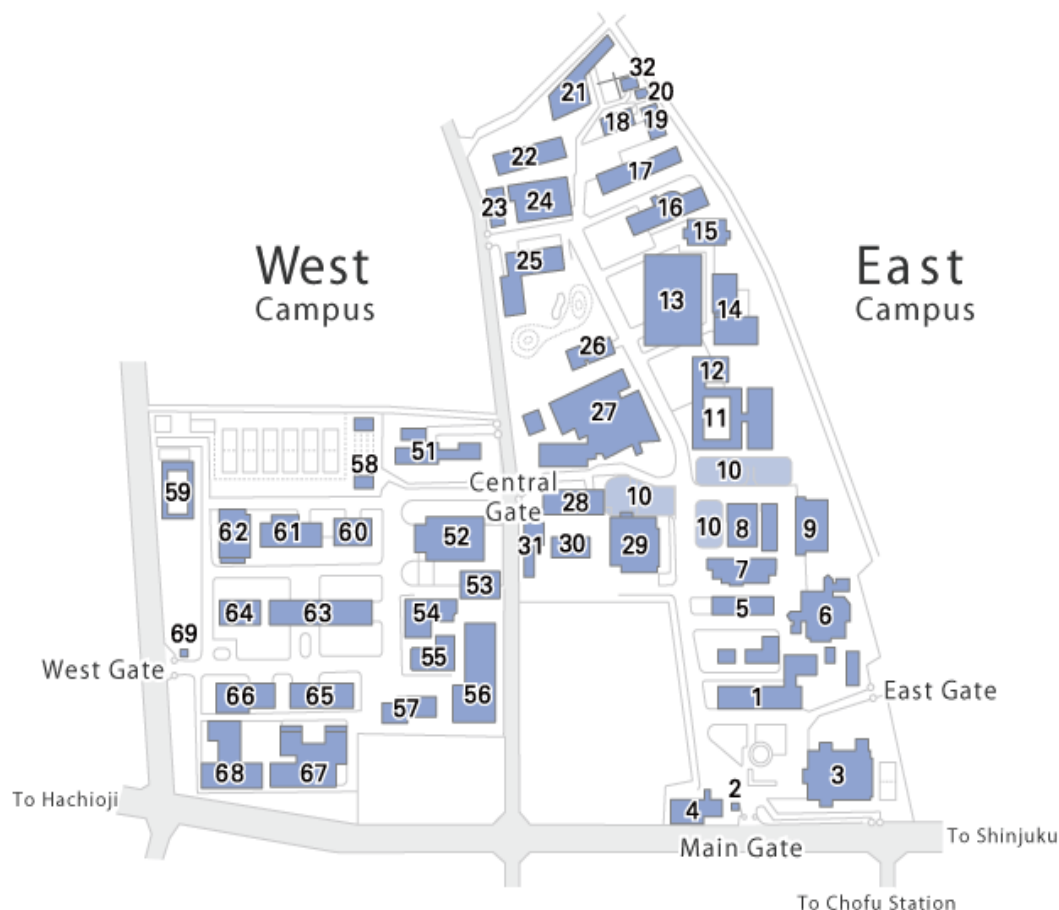
**Department 学科等**

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

**Period 授業時間**

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

# UEC CAMPUS MAP



- Main Building (1)
- Auditorium (3)
- 80th Anniversary Memorial Hall (4)
- Building E-1 (7)
- Building E-2 (28)
- Building E-3 (27)
- Building E-4 (11)
- Building E-5 (12)
- Building E-6 (13)
- Building E-7 (14)
- Building E-8 (15)
- Building E-9 (16)
- Building E-10 (17)
- Building A (5)
- Building B (6)
- Building C (8)
- Building D (9)
- Communication Park (10)
- University Center (29)
- Health Care Center (26)
- International House (21)
- Facilities for Extracurricular Activities (22)
- Judo Gymnasium (31)
- Personnel Clubhouse (20)
- Child-Care Facility (32)
- Building E-31 (18)
- Building E-32 (19)
- Building E-33 (23)
- Building E-34 (24)
- Building E-35 (25)
- Building E-36 (30)
- Security Office of the Main Gate (2)
- Building W-1 (65)
- Building W-2 (63)
- Building W-3 (66)
- Building W-4 (64)
- Building W-5 (54)
- Building W-6 (60)
- Building W-7 (61)
- Building W-8 (67)
- Building W-9 (68)
- Building W-10 (56)
- Building W-11 (62)
- Gymnasium (52)
- Gymnasium II (53)
- Archery Facility (58)
- Swimming Pool (59)
- West Cafeteria (55)
- Student Dormitory (51)
- Building W-31 (57)
- Security Office of West Gate (69)
- Center for International Programs and Exchange (28)
- University Library (27)
- Information Technology Center (27)
- Coordinated Center for UEC Research Facilities (13)
- Center for Industrial and Governmental Relations (14)
- Advanced Wireless Communication Research Center (17)
- UEC Museum of Communication (17)
- Center for Developing e-Learning (66)
- Institute for Laser Science (61)
- Center for Community Relations (1)
- Innovation Research Center for Fuel Cells (16)
- Center for Photonic Innovation (62)
- Research Center for Ubiquitous Networking and Computing (66)
- Advanced Ultrafast Laser Research Center (62)

# UEC Academic Skills I (Computer Literacy)

## General Information

<b>Course title (Japanese)</b>	UEC Academic Skills I (Computer Literacy) (上級科目)		
<b>Course title (English)</b>	UEC Academic Skills I (Computer Literacy)		
<b>Course Code</b>	INT001z INT101z		
<b>Academic year</b>	2019	<b>Year offered</b>	3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	School of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	General culture subjects		
<b>Cluster/Department</b>	School of Informatics and Engineering		
<b>Lecturer(s)</b>	Choo Cheow Keong		
<b>Office</b>	E2-305		
<b>e-mail</b>	uec-as1@fedu.uec.ac.jp		
<b>Course website</b>	<a href="http://www.fedu.uec.ac.jp/skills">http://www.fedu.uec.ac.jp/skills</a>		
<b>Last updated</b>	2019/03/15 19:50:19	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	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.
<b>Prerequisites</b>	NIL
<b>Recommended prerequisites and preparation</b>	コンピューターリテラシー Computer literacy
<b>Course textbooks and materials</b>	NIL
<b>Course outline and weekly schedule</b>	<p>Course schedule and topics that will be covered</p> <p>=====</p> <ol style="list-style-type: none"> <li>1. Introduction (Usage: The Information Technology Center ITC, UEC campus network use policies)</li> <li>2. Computer operating system and Tools (fundamentals)</li> <li>3. Unix operating system (fundamentals)</li> <li>4. Unix operating system (The Internet and computer network)</li> <li>5. Word Processing (Basic; Desktop publishing, WYSIWYG, and LaTeX)</li> <li>6. LaTeX (Environments and layout; LaTeX commands, Structure, Package, Class, style, Text typesetting)</li> <li>7. LaTeX (Mathematical Formulas)</li> <li>8. LaTeX (Displayed; Lists, Tabulator, Tables)</li> <li>9. LaTeX (Displayed; Graphics, Drawing)</li> <li>10. LaTeX (Labels, Cross-referencing, Citations and Bibliography)</li> <li>11. World Wide Web (Overview; Web systems, applications, HTML )</li> <li>12. HTML (Basic; Structure, Tag, color, typesetting)</li> <li>13. HTML (Links and Multimedia; Images, Sound, and Movies)</li> <li>14. HTML (Forms, Tables, and Frames)</li> <li>15. HTML (Interactivity, Cascading Style Sheet; CSS)</li> </ol> <p>=====</p> <p>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.</p> <p>Note that the lecture schedule is subject to constant revisions throughout the course.</p>
<b>Course content utilizing practical experience</b>	NIL
<b>Preparation and review outside class</b>	Students are required to create/design a homepage and present it in class at the end of the semester. Thus, student may need some extra time to create the homepage.



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

# UEC Academic Skills II (Information Literacy and Research)

## General Information

<b>Course title (Japanese)</b>	UEC Academic Skills II (Information Literacy and Research) (上級科目)		
<b>Course title (English)</b>	UEC Academic Skills II (Information Literacy and Research)		
<b>Course Code</b>	INT002z		
<b>Academic year</b>	2019	<b>Year offered</b>	3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	School of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	General culture subjects		
<b>Cluster/Department</b>	School of Informatics and Engineering		
<b>Lecturer(s)</b>	Choo Cheow Keong		
<b>Office</b>	E2-305		
<b>e-mail</b>	uec-as2@fedu.uec.ac.jp		
<b>Course website</b>	<a href="http://www.fedu.uec.ac.jp/skills">http://www.fedu.uec.ac.jp/skills</a>		
<b>Last updated</b>	2019/03/15 19:51:46	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	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.
<b>Prerequisites</b>	UEC Academic Skills I (Computer Literacy) or コンピューターリテラシー
<b>Recommended prerequisites and preparation</b>	NIL
<b>Course textbooks and materials</b>	NIL
<b>Course outline and weekly schedule</b>	<p>Course schedule and topics that will be covered</p> <p>=====</p> <ol style="list-style-type: none"> <li>1. Introduction (Usage: The Information Technology Center etc.)</li> <li>2. Academic Integrity (Referencing, citing)</li> <li>3. Mind mapping, brain storming</li> <li>4. Scientific literatures and resources retrieval 1/2</li> <li>5. Scientific literatures and resources retrieval 2/2 (UEC Library)</li> <li>6. Managing resources</li> <li>7. Managing, accessing and sharing resources, and Create bibliographies</li> <li>8. Logical and Critical reading (comprehend, examine, evidence, utilize)</li> <li>9. Graphical information (Inkscape, GIMP)</li> <li>10. Tables, Graphs, Charts, Diagrams and Timelines (SciDAVis)</li> <li>11. Formula editor (word processing and computation)</li> <li>12. Desktop publishing for poster presentation (Scribus)</li> <li>13. Preparation for presentation</li> <li>14. Poster presentation 1/2</li> <li>15. Poster presentation 2/2</li> </ol> <p>=====</p> <p>The course gives an introduction to the use of some powerful tools for scientific research and engineering, and the lectures include hands-on learning and applicable exercises.</p> <p>Note that the lecture schedule is subject to constant revisions throughout the course.</p>
<b>Course content utilizing practical experience</b>	NIL
<b>Preparation and review outside class</b>	Students have to read 1 to 3 articles about varied topics, and at the end of the semester, the students are expected to make a postal presentation.
<b>Evaluation and grading</b>	Evaluation is given as follows; (Assignments 50%, midterm presentation 20%, Poster presentation 30%)

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

## UEC Academic Skills III (Publishing Literacy and Research)

### General Information

<b>Course title (Japanese)</b>	UEC Academic Skills III (Publishing Literacy and Research)		
<b>Course title (English)</b>	UEC Academic Skills III (Publishing Literacy and Research)		
<b>Course Code</b>	INT003z		
<b>Academic year</b>	2019	<b>Year offered</b>	3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	School of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	General culture subjects		
<b>Cluster/Department</b>	School of Informatics and Engineering		
<b>Lecturer(s)</b>	Choo Cheow Keong		
<b>Office</b>	E2-305		
<b>e-mail</b>	uec-as3@fedu.uec.ac.jp		
<b>Course website</b>	<a href="http://www.fedu.uec.ac.jp/skills">http://www.fedu.uec.ac.jp/skills</a>		
<b>Last updated</b>	2019/03/15 19:52:45	<b>Update status</b>	Released

### Course Description

<b>Topic and goals</b>	This course 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 the semester, there will be an international mini-conference that has participants of all the JUSST Exchange Students and other regular UEC Students.
<b>Prerequisites</b>	UEC Academic Skills I (Computer Literacy) or コンピューターリテラシー
<b>Recommended prerequisites and preparation</b>	UEC Academic Skills II (Information Literacy and Research)
<b>Course textbooks and materials</b>	NIL
<b>Course outline and weekly schedule</b>	<p>Course schedule and topics that will be covered</p> <p>=====</p> <ol style="list-style-type: none"> <li>1. Introduction (Usage: The Information Technology Center etc.)</li> <li>2. Academic Integrity (interesting and Unpublished, Scientific misconduct)</li> <li>3. Researcher's outputs (Why, How, Where)</li> <li>4. Planning the research/research protocol (LaTeX editor, Mind mapping and brainstorming etc.)</li> <li>5. Proposing and Reporting on Research</li> <li>6. Making a scientific presentation</li> <li>7. Midterm Presentation 1/2</li> <li>8. Midterm Presentation 2/2</li> <li>9. Brush up on your skills (Handling Q&amp;A)</li> <li>10. Communication and Correspondence (Peer, Researcher, Editor, etc.)</li> <li>11. Academic publishing (Overviews; Dissertation, Monograph, Scientific paper )</li> <li>12. Academic publishing (Procedures, Processes and standards)</li> <li>13. Assessment and evaluation</li> <li>14. Oral presentation 1/2</li> <li>15. Oral presentation 2/2</li> </ol> <p>=====</p> <p>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).</p> <p>Note that the lecture schedule is subject to constant revisions throughout the course.</p>
<b>Course content utilizing practical experience</b>	NIL

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

# Preparation for Overseas Study

## General Information

<b>Course title (Japanese)</b>	Preparation for Overseas Study		
<b>Course title (English)</b>	Preparation for Overseas Study		
<b>Course Code</b>	ENG504z		
<b>Academic year</b>	2019	<b>Year offered</b>	3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	School of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	General culture subjects		
<b>Cluster/Department</b>	School of Informatics and Engineering		
<b>Lecturer(s)</b>	UEHARA Suwako (上原 寿和子)		
<b>Office</b>	East 1-803		
<b>e-mail</b>	uehara.suwako@bunka.uec.ac.jp		
<b>Course website</b>	nil		
<b>Last updated</b>	2019/03/07 22:36:42	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	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.
<b>Prerequisites</b>	1st and 2nd year compulsory English courses of UEC
<b>Recommended prerequisites and preparation</b>	Some Advanced English courses focusing on academic English, presentation and writing
<b>Course textbooks and materials</b>	Teaching materials will be prepared by the teacher and students based on the needs of the syllabus.
<b>Course outline and weekly schedule</b>	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
<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	Group work or research for presentations may take up a lot of time outside of the classes.
<b>Evaluation and grading</b>	Performance and attitude in class: 20% PPT Presentation: 30%

	Poster Presentation: 20% Abstract writing: 20% Reading assignments: 10%
<b>Office hours</b>	Tue 4 or based on appointment arranged by email.
<b>Message for students</b>	This class will be taught through English.
<b>Others</b>	Students interested in independent learning and corpus-analysis of English for Science and Technology are specially welcome.
<b>Keyword(s)</b>	graduate school, academic English, presentation, abstract, journal article, research

# English for Intercultural Communication

## General Information

<b>Course title (Japanese)</b>	English for Intercultural Communication		
<b>Course title (English)</b>	English for Intercultural Communication		
<b>Course Code</b>	ENG503z		
<b>Academic year</b>	2019	<b>Year offered</b>	3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	School of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	General culture subjects		
<b>Cluster/Department</b>	School of Informatics and Engineering		
<b>Lecturer(s)</b>	Eric Hauser		
<b>Office</b>	East 1-614		
<b>e-mail</b>	hauser@bunka.uec.ac.jp		
<b>Course website</b>	Nil		
<b>Last updated</b>	2019/02/28 12:34:36	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	<p>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.</p> <p>This course also relates to a program of the language learning support center in (C Ridge 4th floor, C402). English pronunciation (rhythm) measurement (April and July) and English pronunciation (rhythm) practice (beginner, intermediate, and advanced) is performed. In addition, English examination such as TOEIC or TOEFL is applied to objectively evaluate the improvement of the student's English skills. For preparations the TOEIC examination (training), the ALC self-study materials of the language learning support center (C Ridge 4th floor, C402) will be used.</p>
<b>Prerequisites</b>	1st and 2nd year required courses
<b>Recommended prerequisites and preparation</b>	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 YearII
<b>Course textbooks and materials</b>	Teaching materials are prepared by both the professor and students
<b>Course outline and weekly schedule</b>	1 Introduction 2 Self-introduction 3 Introduction of Japan 4 Introduction of Self countries 5 Introduction of a third country 6 Language as an international language for communication 7 Cross-cultural conflicts and solutions 8 Cross-cultural communication taboos 9 Learning presentation from TED talks 10 Learning presentation from TED talks 11 Group research presentation preparation 12 Group research presentation 13 Group research presentation 14 Group research presentation 15 Feedback on presentation; course evaluation
<b>Course content utilizing practical experience</b>	



<b>Preparation and review outside class</b>	Students are expected to work in groups in and outside the class.
<b>Evaluation and grading</b>	1 . Class participation 20% 2 . Homework 20% 3 . Presentation 40% 4 . Research (reading and writing) 30%
<b>Office hours</b>	Students can make appointments for meetings by email or come to my office hours in Tue 4.
<b>Message for students</b>	Students are encouraged to participate in the course actively and critically. Expressing ideas vocally and collaborating with other students are expected.
<b>Others</b>	This course requires students to keep good attendance in order to fulfill the collaborative tasks.
<b>Keyword(s)</b>	intercultural communication, discussion, presentation, cooperative learning, active learning, academic research

# Advanced Engineering Science III (Fundamentals of Quantum Physics)

## General Information

<b>Course title (Japanese)</b>	量子物理学基礎		
<b>Course title (English)</b>	Fundamentals of Quantum Physics		
<b>Course Code</b>			
<b>Academic year</b>	2019	<b>Year offered</b>	All years
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	Master's Program
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	Graduate school core education subjects - Core subjectsI		
<b>Cluster/Department</b>	Department of Engineering Science		
<b>Lecturer(s)</b>	WATANABE Shinichi (渡邊 信一)		
<b>Office</b>	East 6-521/E6-521		
<b>e-mail</b>	shin.watanabe@PC (replace PC with uec.ac.jp)		
<b>Course website</b>	NIL		
<b>Last updated</b>	2019/02/25 16:16:31	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	<p>The theme and goal of this course will be based on "Advanced Quantum Mechanics" this year.</p> <p>Subject: We aim to master the fundamental principle of quantum phenomenon which is essential to science and technology of contemporary society.</p> <p>Achievement goal: To learn quantum treatment of angular momentum, approximation methods, scattering problem, interaction between matter and radiation field, and to deepen the understanding of natural phenomena therewith, and also to understand the quantization of the radiation field.</p>
<b>Prerequisites</b>	On top of topics in undergraduate level quantum mechanics, we learn about approximation methods not dealt with in quantum mech I and II, and the interaction of light and matter.
<b>Recommended prerequisites and preparation</b>	Analytical mechanics, applied mathematics (Preferably some knowledge of applied math. Common knowledge of basic math for engineering courses such as elementary calculus, linear algebra, the Fourier series and integrals.)
<b>Course textbooks and materials</b>	<p>Textbook : 「量子力学II」 江沢 洋著 (裳華房)</p> <p>Reference materials : 「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)</p>
<b>Course outline and weekly schedule</b>	<p>The theme and goal of this course will be based on "Advanced Quantum Mechanics" this year.</p> <p>(Course content)</p> <ol style="list-style-type: none"> <li>1. Review of elementary quantum mechanics</li> <li>2. Theory of time-development perturbation 1: Formulate the problem and learn its necessity through a concrete example.</li> <li>3. Theory of time-development perturbation 2: Learn about the density of states, derive the golden rule formula and understand the transition probability.</li> <li>4. Exercises: Solve problems and consolidate the understanding of the perturbation theory</li> <li>5. From transition probability to differential cross section; 1st order perturbation theory applied to the Coulomb scattering problem.</li> <li>6. Elementary example of the variational method and application to He</li> <li>7. A day reserved for delay or Q&amp;A</li> <li>8. Mid-term test</li> <li>9. Box quantization</li> <li>10. Elementary quantization and application of the radiation field</li> <li>11. Electromagnetic field in free space</li> <li>12. Electronic Hamiltonian</li> <li>13. Emission and absorption of radiation Part 1: Quantization of E&amp;M fields.</li> <li>14. Emission and absorption of radiation Part 2: Learn about spontaneous emission, and evaluate the life time of the excited hydrogen,</li> </ol>

	<p>15. Final exam (take-home)</p> <p>(How to proceed) The course centers on lectures and simple exercises. If the students are found to be familiar with the subject, emphasis is placed on the part after the perturbation theory.</p> <p>Note: The contents are subject to change without notice. Especially, this year we are considering new topics with a view to rapid progress of science in recent years.</p>
<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	There are numerous enlightening books on quantum mechanics. It is beneficial for the student to be acquainted with such books.
<b>Evaluation and grading</b>	<p>a) Evaluation:            Grades will be based on mid-term and final reports unless otherwise announced.</p> <p>b) Criteria:            The credits may be earned if the following conditions are met.</p> <ol style="list-style-type: none"> <li>1. To be able to solve elementary problems using approximation methods.</li> <li>2. To be able to understand simple scattering problems.</li> <li>3. To be able to understand the interaction of matter with light.</li> </ol>
<b>Office hours</b>	Questions will be accepted immediately after class. If time permitting, a meeting will be arranged by way of a prior appointment by phone or e-mail.
<b>Message for students</b>	Please make an effort to understand the logical structure and flow of quantum mechanics as a whole.
<b>Others</b>	Please spend time on the materials before and after each class. Also pay attention to quantum phenomena around us.
<b>Keyword(s)</b>	Quantum mechanics, time-dependent perturbation theory, scattering problem.

# VLSI Low Power Circuit Design

## General Information

<b>Course title (Japanese)</b>	VLSI Low Power Circuit Design		
<b>Course title (English)</b>	VLSI Low Power Circuit Design		
<b>Course Code</b>			
<b>Academic year</b>	2019	<b>Year offered</b>	All years
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	Master's Program
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	Graduate school core education subjects - Core subjectsI		
<b>Cluster/Department</b>	Department of Communication Engineering and Informatics		
<b>Lecturer(s)</b>	ISHIBASHI Koichiro (石橋 孝一郎)		
<b>Office</b>	W2-306		
<b>e-mail</b>	ishibashi@ee.uec.ac.jp		
<b>Course website</b>	<a href="http://mtm.es.uec.ac.jp/index.html">http://mtm.es.uec.ac.jp/index.html</a>		
<b>Last updated</b>	2019/03/02 19:37:47	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	VLSI Low Power Circuit Design
<b>Prerequisites</b>	Fundamental electric circuit theorems
<b>Recommended prerequisites and preparation</b>	Fundamental electric circuit theorems
<b>Course textbooks and materials</b>	Original lecture materials will be delivered on the class
<b>Course outline and weekly schedule</b>	<p>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.</p> <p>Outline of Class and Contents</p> <ol style="list-style-type: none"> <li>1) Introduction to rolls of VLS I on ICT society</li> <li>2) Structure of MOSFET and its characteristics</li> <li>3) Fundamentals of CMOS LSI circuits</li> <li>4) Power on CMOS LSI</li> <li>5) Moore?s law and Scaling law</li> <li>6) Low power digital circuit design techniques <ul style="list-style-type: none"> <li>- AC power reduction techniques</li> <li>- DC power reduction techniques</li> </ul> </li> <li>7) Practice of Circuit Simulation</li> </ol> <p>Final exam will be done during the course.</p>
<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	Investigation by web is recommended before the lectures.
<b>Evaluation and grading</b>	<p>Final exams will be done for evaluation.</p> <p>Evaluation category (Score) are shown as bellow</p> <p>A(<math>\geq 80</math>), B(<math>\geq 70</math>), C(<math>\geq 60</math>), and D(<math>&lt; 60</math>)</p>
<b>Office hours</b>	Send e-mail before going to the room of Ishibashi (W2-306)
<b>Message for students</b>	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.
<b>Others</b>	The class is held in English. Contents of class are based on lectures held in foregn universities done by Prof. Ishibashi as guest professors.
<b>Keyword(s)</b>	VLSI, Low power, Circuit design

# Advanced Communication Engineering and Informatics II (Optical Communication Engineering)

## General Information

<b>Course title (Japanese)</b>	Advanced Communication Engineering and Informatics II (Optical Communication Engineering)		
<b>Course title (English)</b>	Advanced Communication Engineering and Informatics II		
<b>科目番号 /Code</b>			
<b>Academic year</b>	2019	<b>Year offered</b>	4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	Faculty of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	Core subjects		
<b>Cluster/Department</b>	Department of Communication Engineering and Informatics		
<b>Lecturer(s)</b>	KISHI Naoto (来住 直人)		
<b>Office</b>	East 3-1027		
<b>e-mail</b>	kishinaoto@uec.ac.jp		
<b>Course website</b>	<a href="http://www.opt.cei.uec.ac.jp/optc/">http://www.opt.cei.uec.ac.jp/optc/</a>		
<b>Last updated</b>	2019/02/26 10:57:56	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	The main subject of this course is "Optical Communication". Optical communication is one of the key technologies for the contemporary information society. The history is still young, just about 30 years after being practically used, but it is developing rapidly nowadays, the communication ability is extremely outstanding and which is a communication technology that will be used in all parts of the society in the future. The goal of the course is to learn the fundamental principle and technical element of communication system, as well as introduce you to some of the latest communication technologies.
<b>Prerequisites</b>	Physics Introduction (wave and light), Electromagnetism related subjects, Electrical circuit
<b>Recommended prerequisites and preparation</b>	Knowledge of Fourier analysis, Fourier and concept of time- and frequency-domain
<b>Course textbooks and materials</b>	No textbooks needed. All course materials will be provided on-line via the URL listed above. (Password is required to access from off-campus)
<b>Course outline and weekly schedule</b>	<p>The content is as follows,.</p> <ol style="list-style-type: none"> <li>1. Introduction to optical fiber communication.</li> <li>2. Characteristic of light transmission medium of the optical communication and the difference with the low frequency electromagnetic wave.</li> <li>3. Structure of the optical fiber transmission channel and a principle of optical waveguide.</li> <li>4. Important characteristic of the optical fiber, i.e. the linear and non-linear characteristics and the relations with the signal transmission characteristics.</li> <li>5. Principle of basic optical signal source, i.e. photo-generation principle.</li> <li>6. Semiconductor laser light signal source, the light emitting diode structure characteristic and application.</li> <li>7. Single frequency or a multi-wavelength source and pulse light source that specialized in optical communication.</li> <li>8. Theory of optical amplifier in a long-distance optical communication system.</li> <li>9. Characteristic of various optical amplifiers.</li> <li>10. Light elements required in an optical communication system.</li> <li>11. Encoding of the digital light signal, the quality evaluation system of the signal reception.</li> <li>12. The forms of the optical communication system.</li> <li>13. Characteristic and the development of the optical communication system.</li> <li>14. End uses optical fiber communication system.</li> <li>15. Optical fiber sensor, light and optical fiber measurements.</li> </ol>

<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	Students are required to review (by accessing to the on-line material and other texts).
<b>Evaluation and grading</b>	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%.
<b>Office hours</b>	Wed (12:30 to 14:30) or after class.
<b>Message for students</b>	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.
<b>Others</b>	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 permitted.
<b>Keyword(s)</b>	Telecommunications opticalfibers, dispersion properties, non-linear intensity modulation, direct detection, opticalrepeater, wavelength division multiplexing, laser diode, photo diode, opticalamplifiers, optical network, opticalfiber sensor.

# Advanced Engineering Science I (Modern Optics and Photonics)

## General Information

<b>Course title (Japanese)</b>	Advanced Engineering Science I (Modern Optics and Photonics) (学域)		
<b>Course title (English)</b>	Advanced Engineering Science I (Modern Optics and Photonics)		
<b>Course Code</b>	INT001k INT001m INT001n INT001p		
<b>Academic year</b>	2019	<b>Year offered</b>	3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	School of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	Core subjects		
<b>Cluster/Department</b>	Cluster III (Fundamental Science and Engineering)		
<b>Lecturer(s)</b>	TOMITA Yasuo (富田 康生)		
<b>Office</b>	205 West 1		
<b>e-mail</b>	ytomita@uec.ac.jp		
<b>Course website</b>	<a href="http://talbot.es.uec.ac.jp/optics.html">http://talbot.es.uec.ac.jp/optics.html</a>		
<b>Last updated</b>	2019/02/22 14:59:20	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	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.
<b>Prerequisites</b>	A good understanding of introductory electromagnetics and linear systems theory may be helpful.
<b>Recommended prerequisites and preparation</b>	A good understanding of introductory electromagnetics and linear systems theory may be helpful.
<b>Course textbooks and materials</b>	F. Graham Smith and Terry A. King, Optics and Photonics, Wiley, New York, 2000 E. Hecht, Optics, 4th ed., Addison-Wesley, New York, 2001
<b>Course outline and weekly schedule</b>	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
<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	Reading textbooks and solving homework problem sets
<b>Evaluation and grading</b>	The grades will be based 20% on the homework, 30% on the mid-term exam and 50% on the final exam.
<b>Office hours</b>	Monday 16:00-17:00
<b>Message for students</b>	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.
<b>Others</b>	Photonics is the technology of using waves and photons!
<b>Keyword(s)</b>	Wave optics, Diffraction, Interference, Electromagnetic wave, Maxwell equations, Wave polarization, Crystals, Guided-wave and fiber optics

# Introduction to Computational Methods in Science and Engineering

## General Information

<b>Course title (Japanese)</b>	Introduction to Computational Methods in Science and Engineering		
<b>Course title (English)</b>	Introduction to Computational Methods in Science and Engineering		
<b>Course Code</b>	INT505z		
<b>Academic year</b>	2019	<b>Year offered</b>	3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	School of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	General culture subjects		
<b>Cluster/Department</b>	School of Informatics and Engineering		
<b>Lecturer(s)</b>	Hans-Georg Matuttis		
<b>Office</b>	E4-721		
<b>e-mail</b>	hg@mce.uec.ac.jp		
<b>Course website</b>	<a href="http://webclass.cdel.uec.ac.jp/">http://webclass.cdel.uec.ac.jp/</a>		
<b>Last updated</b>	2019/03/01 13:18:47	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	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 topics may be subject to changes.
<b>Prerequisites</b>	First year Analysis and Linear Algebra, one procedural Programming Language
<b>Recommended prerequisites and preparation</b>	NIL
<b>Course textbooks and materials</b>	Scriptum can be downloaded from <a href="http://webclass.cdel.uec.ac.jp/">http://webclass.cdel.uec.ac.jp/</a> , 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
<b>Course outline and weekly schedule</b>	<ol style="list-style-type: none"> <li>1. Simple MATLAB-Syntax</li> <li>2. How to write better programs</li> <li>3. Non-numerical methods: Monte-Carlo techniques</li> <li>4. Representation of Numbers</li> <li>5. Elementary numerical analysis I: What are numerical errors</li> <li>6. Elementary numerical analysis II: How to get "correct" results from calculations "with error"</li> <li>8. MATLAB Graphics</li> <li>9. Introduction to numerical Linear algebra I: Repetition 1st year Linear Algebra</li> <li>10. Introduction to numerical Linear algebra II: How to draw a line through more than 2 points (or maybe not)</li> <li>11. Introduction to numerical Linear algebra III: Least squared fitting</li> <li>12. Polynomials and Roots</li> <li>13. Solving ordinary differential equations I: Basics Initial conditions, analytic solutions, Euler Method</li> <li>14. Solving ordinary differential equations II: Higher order Methods Approaches to construct higher order methods, Runge-Kutta methods</li> <li>15. Solving ordinary differential equations III: Advanced methods Adaptive Timesteps, energy conservation systems, stiff problems</li> </ol>
<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	NIL



<b>Evaluation and grading</b>	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.
<b>Office hours</b>	Friday, second slot, in East-4, Room 721, but if you contact me by E-Mail, other times are possible.
<b>Message for students</b>	Lecture starts after the the introduction to the computer system in the Jusst-Program has been held.
<b>Others</b>	Lecture starts after the the introduction to the computer system in the Jusst-Program has been held.
<b>Keyword(s)</b>	Numerical Analysis, Scientific Programming

# Advanced Theory of Systems Reliability

## General Information

<b>Course title (Japanese)</b>	システム信頼性特論		
<b>Course title (English)</b>	Advanced Theory of Systems Reliability		
<b>Course Code</b>			
<b>Academic year</b>	2019	<b>Year offered</b>	All years
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	Master's Program, Doctoral Program
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	Graduate school core education subjects - Core subjects II		
<b>Cluster/Department</b>	Department of Informatics		
<b>Lecturer(s)</b>	JIN Lu (金 路)		
<b>Office</b>	West 5-607		
<b>e-mail</b>	jinlu@inf.uec.ac.jp		
<b>Course website</b>	<a href="http://www.rm.inf.uec.ac.jp">http://www.rm.inf.uec.ac.jp</a>		
<b>Last updated</b>	2019/02/28 01:06:40	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	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. Also, recent development of information technology has been changing the methods of Reliability Engineering. These new aspects are also dealt with.
<b>Prerequisites</b>	None
<b>Recommended prerequisites and preparation</b>	It would be helpful if the students have a background of probability and statistic.
<b>Course textbooks and materials</b>	No textbooks, just original handout
<b>Course outline and weekly schedule</b>	<p>Course Outline</p> <p>#1: Introduction: Quality Control and Reliability Engineering in Japan</p> <p>#2: Principal Models of Reliability</p> <p>#3: Advanced Models of Reliability</p> <p>#4: System Reliability Design(1)</p> <p>#5: System Reliability Design(2)</p> <p>#6: Reliability Testing and Fault Analysis</p> <p>#7: Reliability Data Analysis (1) Models for Accelerated Life Testing</p> <p>#8: Reliability Data Analysis (2) Hazard Rate Model</p> <p>#9: Preventive Maintenance and Inspection</p> <p>#10: Model and Theory for Maintenance(1) Decision-making and Optimal Maintenance Policy</p> <p>#11: Model and Theory for Maintenance(2) On-line Condition Monitoring</p> <p>#12: Prediction and Prevention of Failures</p> <p>#13: Quality and Reliability Assurance(1)FMEA</p> <p>#14: Quality and Reliability Assurance(2)FTA</p> <p>#15: Quality and Reliability Assurance(3)Group Discussion</p>
<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	None
<b>Evaluation and grading</b>	Assessment will be based on the level of understanding
<b>Office hours</b>	After the class
<b>Message for students</b>	There are also many foreign student in this class. So it is also a good change to make foreign friends. I will prepare the handout in both English and Japanese, furthermore, the important part will be explained in both languages, so the students do not need to worry about their English.
<b>Others</b>	This lecture will be given in English.
<b>Keyword(s)</b>	Reliability, Quality Control, Maintenance

## Topics in Informatics II (Sustainable Supply Chain Management)

### General Information

<b>Course title (Japanese)</b>	Sustainable Supply Chain Management (学部)		
<b>Course title (English)</b>	Sustainable Supply Chain Management		
<b>Course Code</b>			
<b>Academic year</b>	2019	<b>Year offered</b>	2/3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	Faculty of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	Core subjects		
<b>Cluster/Department</b>	Department of Informatics		
<b>Lecturer(s)</b>	YAMADA Tetsuo (山田 哲男)		
<b>Office</b>	Room #507 in Building West 5		
<b>e-mail</b>	tyamada@uec.ac.jp		
<b>Course website</b>	<a href="http://webclass.cdel.uec.ac.jp/webclass/">http://webclass.cdel.uec.ac.jp/webclass/</a>		
<b>Last updated</b>	2019/03/05 9:35:47	<b>Update status</b>	Released

### Course Description

<b>Topic and goals</b>	Supply Chain is that product and information flows among suppliers, factories, distribution centers and markets by manufacturing and logistics. This supply chain is now globally networked consisting of not only domestic but also overseas suppliers, factories and markets. Therefore, the global supply chain management is required to pursue higher profit for companies. On the other hand, the environmental issues such as global warming and material starvation have been more serious because manufacturing and logistics inevitably consume natural resources for materials and energy and emitted Greenhouse Gases (GHG) including CO <sub>2</sub> throughout their product lifecycle and supply chain. In order to not to become more serious for the environmental issues, it is necessary for the supply chain to minimize the material and energy consumptions during the whole product lifecycle economically. This course gives variety topics in supply chain management and sustainability, and acquire how to harmonize the supply chain and sustainability simultaneously.
<b>Prerequisites</b>	None
<b>Recommended prerequisites and preparation</b>	Production Management, Operations Research, Introduction to Operations Research
<b>Course textbooks and materials</b>	No textbook, Handouts will be used as a guide for the class.
<b>Course outline and weekly schedule</b>	#1 Guidance #2 Supply Chain #3 Supply Chain Management #4 Supply Chain Network #5 Global Supply Chain #6 Assembly Line System #7 Scheduling #8 Sustainable Manufacturing #9 Low-carbon Supply Chain #10 Life Cycle Assessment #11 Carbon Tax #12 Closed-loop Supply Chain #13 Disassembly, Reuse and Recycling #14 Sustainable Product Design #15 Summary
<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	Several assignments will be conducted.
<b>Evaluation and grading</b>	Evaluation: Presentations (30%), Activities (40%) and Assignments (30%)
<b>Office hours</b>	Mondays at the 4th class. Make an appointment by e-mail in advance.

<b>Message for students</b>	Let's discuss how to harmonize supply chain and sustainability and enjoy it!
<b>Others</b>	No assignment, No success. This course is taught in English, and Japanese is also added as the need arises.
<b>Keyword(s)</b>	Global Supply Chain, Sustainable Manufacturing, Reuse and Recycling, Low-carbon and Closed-loop Supply Chain, Sustainable Product Design, Assembly/Disassembly, Scheduling

# Advanced Engineering Science II (Photonics and Opto-electronics)

## General Information

<b>Course title (Japanese)</b>	Advanced Engineering Science II (Photonics and Opto-electronics) (学域)		
<b>Course title (English)</b>	Advanced Engineering Science II (Photonics and Opto-electronics)		
<b>科目番号 /Code</b>	INT002k INT002m INT002n INT002p		
<b>Academic year</b>	2019	<b>Year offered</b>	3/4
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	School of Informatics and Engineering
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	Core subjects		
<b>Cluster/Department</b>	Cluster III (Fundamental Science and Engineering)		
<b>Lecturer(s)</b>	UENO Yoshiyasu (上野 芳康)		
<b>Office</b>	Room no. 313, Building no. West-2 (W2-313).		
<b>e-mail</b>	uenoy@ultrafast.ee.uec.ac.jp		
<b>Course website</b>	<a href="http://www.ultrafast.ee.uec.ac.jp/ueno-classes.html">http://www.ultrafast.ee.uec.ac.jp/ueno-classes.html</a>		
<b>Last updated</b>	2019/03/11 11:17:12	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	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.
<b>Prerequisites</b>	fundamentals of electro-magnetic waves (propagating in speed of light). fundamentals of electronics such as basic diodes and transistors.
<b>Recommended prerequisites and preparation</b>	fundamentals of quantum mechanics (particles and waves). fundamentals of crystalline materials and their basic, electronic properties.
<b>Course textbooks and materials</b>	1) Saleh and Teich, Fundamentals of Photonics, 2nd edition, Wiley, 2007. 2) Amnon Yariv and Pochi Yeh, Photonics: Optical Electronics in Modern Communications, 6th edition, Oxford, 2006.
<b>Course outline and weekly schedule</b>	<p>1st-5th weeks:</p> <p>(1) Areas of science and technology where photonics and opto-electronics play particularly important roles in our world.</p> <p>(2) Representative photonic devices and materials that many of us must use and rely on, in these areas of science and technology.</p> <p>(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).</p> <p>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.)</p> <p>6th-10th weeks:</p> <p>(4) General relationship from electrons to electron waves. That from lightwaves (em waves) to photons.</p> <p>(5) Device's internal structures (of light-emitting diodes and light-absorbing sensors), and their working principles.</p> <p>(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.</p> <p>11th-15th weeks:</p>

	<p>(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&amp;CD's), compact and accurate laser diodes (from infrared to blue).</p> <p>(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.)</p>
<b>Course content utilizing practical experience</b>	
<b>Preparation and review outside class</b>	Both personal and group studies, efficiently before and after each weekly classroom, are encouraged.
<b>Evaluation and grading</b>	Understanding level of each student is evaluated, in the final test in the end of the 15-week course.
<b>Office hours</b>	6th period, Tuesdays. (Notify me Ueno by email, when I was not available in the period of tuesday.)
<b>Message for students</b>	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.
<b>Others</b>	Lecturer Ueno's international activities: <a href="http://www.ultrafast.ee.uec.ac.jp/ueno-cv.html">http://www.ultrafast.ee.uec.ac.jp/ueno-cv.html</a>
<b>Keyword(s)</b>	photonics, opto-electronics, quantum mechanics, electro-magnetic waves, light-emitting diodes (spontaneous emission), lasers (stimulated emission), optical sensors, solar batteries, silicon, gallium arsenide, semiconductor.

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

## General Information

<b>Course title (Japanese)</b>	Advanced Communication Engineering and Informatics I (情報通信ネットワーク)		
<b>Course title (English)</b>	Advanced Communication Engineering and Informatics I (Information and Communication Networks)		
<b>Course Code</b>			
<b>Academic year</b>	2019	<b>Year offered</b>	All years
<b>Semester(s) offered</b>	Spring semester	<b>Faculty offering the course</b>	Master's Program
<b>Teaching method</b>	Lecture	<b>Credits</b>	2
<b>Category</b>	Graduate school core education subjects - Core subjectsI		
<b>Cluster/Department</b>	Department of Communication Engineering and Informatics		
<b>Lecturer(s)</b>	OKI Eiji (大木 英司)		
<b>Office</b>			
<b>e-mail</b>	oki@i.kyoto-u.ac.jp		
<b>Course website</b>	<a href="http://oki.ice.uec.ac.jp/">http://oki.ice.uec.ac.jp/</a>		
<b>Last updated</b>	2019/03/18 13:14:48	<b>Update status</b>	Released

## Course Description

<b>Topic and goals</b>	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.
<b>Prerequisites</b>	The minimum requirement to understand this course is a knowledge of linear algebra and computer logic.
<b>Recommended prerequisites and preparation</b>	Undergraduate courses related to information, communications, networks, probability and statistics, and mathematical programming.
<b>Course textbooks and materials</b>	<p>Book 1: E. Oki, Linear Programming and Algorithms for Communication Networks, CRC Press, Boca Raton, 2012.</p> <p>Book 2: Book 1 (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.</p> <p>The contents of this course are almost covered by Book 1.</p>
<b>Course outline and weekly schedule</b>	<p>The lecture including materials in this course, type I, is offered in English. The subjects include the following items. The topics may be subject to change due to the progress.</p> <ol style="list-style-type: none"> <li>1. Introduction and Basic problems for communication networks</li> <li>2. Algorithms for basic problems (Shortest path routing max flow problem)</li> <li>3. Algorithms for basic problems (Minimum-cost flow problem)</li> <li>4. Disjoint path routing</li> <li>5. Liner programming basics</li> <li>6. Application of liner programming</li> <li>7. Mid-term exercise/examination</li> <li>8. GLPK (GNU Liner Programming Kit)</li> <li>9. Basic problems solved by LP</li> <li>10. Disjoint path routing and wavelength assignment solved by LP</li> <li>11. Routing and traffic demand model (basics)</li> <li>12. Routing and traffic demand model (hose models and others)</li> <li>13. Mathematical puzzles</li> <li>14. Advanced mathematical puzzles</li> <li>15. Advanced topics</li> </ol>
<b>Course content utilizing practical experience</b>	

<b>Preparation and review outside class</b>	As preparation, read the corresponding chapter of the textbook.
<b>Evaluation and grading</b>	Methods: Homework and examination  Criteria: Understanding of the fundamentals and theories (50%) Practical skills (50%)
<b>Office hours</b>	After lecture. Others make an appointment by email.
<b>Message for students</b>	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.
<b>Others</b>	None.
<b>Keyword(s)</b>	Information and communication, communication network, design and control, mathematical programming, algorithm



