Time Table for JUSST Program and Global Education Subjects in 2010-Spring Semester
平成２２年度春学期（前期）短期留学プログラム時間割

Day 曜日	Class Period 授業時間	Subject Name 授業名	Department 所属学科等	Lecturer 教員名	Class Room 教室	Note 備考
Monday 月曜日	1 (0900-1030)	Communication Theory	CIPE	TOYAMA, Noboru (外山昇)	P-B114	
	2 (1040-1210)	Information and Communication Networks	I	OKI, Eiji (大木英司)	東(E)4-222	
		Antenna Engineering	CIPE	TOYAMA, Noboru (外山昇)	P-B114	
	3 (1300-1430)	Applicable Modelling with Mathematics #1	CIPE	SUZUKI, Masahisa (鈴木雅久)	P-B114	
	4 (1440-1610)	Micro-Mechatronics	M	AOYAMA, Hisayuki (青山尚之)	東(E)4-317	
	5 (1645-1745)	Optical Communication Engineering	J	KISHI, Naoto (來住直人)	西(W)2-201	
	6 (1750-1920)	UEC Academic Skills IVA (Comprehensive Reading & Summary Writing)	CIPE	SUZUKI, Masahisa (鈴木雅久)	P-B114	
Tuesday 火曜日	1 (0900-1030)					
	2 (1040-1210)	Japanese Language & Culture (日本語・日本文化)	CIPE		Class Room in P-Building 2F	*1
	3 (1300-1430)	Japanese Language & Culture (日本語・日本文化)	CIPE		Class Room in P-Building 2F	*1
	4 (1440-1610)	Japanese Language & Culture (日本語・日本文化)	CIPE		Class Room in P-Building 2F	*1
	5 (1645-1745)	Computational Methods in Science & Engineering using MATLAB	M	MATUTTIS, Hans-Georg	情報基盤センタ (GR-105)	
Wednesday 水曜日	1 (0900-1030)	Theory of Computation	I	OHTA, Kazuo (太田和夫)	総合研究棟 (GR-720)	
		Quantum Electronics	S	HAKUTA, Kohzo (白田耕藏) PHAM, Le Kien	東(E)6-337	
	2 (1040-1210)	UEC Academic Skills IA (Computer Literacy)	CIPE	SUZUKI, Masahisa (鈴木雅久)	C-401	
	3 (1300-1430)	Japanese Language & Culture (日本語・日本文化)	CIPE		Class Room in P-Building 2F	*1
	4 (1440-1610)	Japanese Language & Culture (日本語・日本文化)	CIPE		Class Room in P-Building 2F	*1
	5 (1645-1745)					
	6 (1750-1920)	UEC Academic Skills VA (Maths & Scientific Writing)	CIPE	SUZUKI, Masahisa (鈴木雅久)	P-B114	
Thursday 木曜日	1 (0900-1030)					
	2 (1040-1210)	Advanced Theory of Systems Reliability	I 院	SUZUKI, Kazuyuki (鈴木和幸)	西(W)5-209	
		Lifelong Learning in Sports (Aqua Sports, Footsal, Tennis, Fitness Training)	Sports Unit	Sports Instructors		
	3 (1300-1430)					
	4 (1440-1610)	Modern Physics	S	PHAM, Le Kien	東(E)6-201	
	5 (1645-1745)	Visual Communication	M	KANEKO, Masahide (金子正秀)	IS-103	
	6 (1750-1920)	UEC Academic Skills IIA (Cross-Cultural Communication)	CIPE	SUZUKI, Masahisa (鈴木雅久)	P-B117	
Friday 金曜日	1 (0900-1030)	Japanese Language & Culture (日本語・日本文化)	CIPE		Class Room in P-Building 2F	*1
	2 (1040-1210)	Japanese Language & Culture (日本語・日本文化)	CIPE		Class Room in P-Building 2F	*1
	3 (1300-1430)	UEC Academic Skills IIIA (Research & Presentation)	CIPE	SUZUKI, Masahisa (鈴木雅久)	情報基盤センタ (GR-105)	
	4 (1440-1610)	Nanophotonics	S	OKADA, Yoshiko (岡田佳子)	西(W)2-105	
		Digital Engineering in Broadcasting	CIPE	TOYAMA, Noboru (外山昇)	P-B114	
	5 (1645-1745)	Communication Theory Laboratory	CIPE	TOYAMA, Noboru (外山昇)	P-B114	

UEC Departments:
J: Department of Communication Engineering & Informatics　*1: Not Available for Regular Undergraduate Students(学部生聴講不可)
I: Department of Informatics
M:Department of Mechanical Engineering & Intelligent Systems
S:Department of Engineering Science

Lecture Code	2010AJ01
Lecture Title	Elementary Japanese I
Credit	6 ([Contact Hour: 9.0h/w + Self-Study Hour: 3.0 h/w] x 15 weeks)
Day of Class	Tuesday #2, #3、#4 Wednesday #2 #3 & Friday #1 & #2
Lecturer	Section of Japanese Language and Japanese Culture
Extension	
E-mail	
Textbook	
Prerequisites	NIL: There is a placement test for Japanese Classes.
Course Description	
Lecture Code	2010AJ02
Lecture Title	Elementary Japanese II
Credit	6 ([Contact Hour: 9.0h/w + Self-Study Hour: 3.0 h/w] x 15 weeks)
Day of Class	Tuesday #2, #3、#4 Wednesday #2 #3 & Friday #1 & #2
Lecturer	Section of Japanese Language and Japanese Culture
Extension	
E-mail	
Textbook	
Prerequisites	NIL: There is a placement test for Japanese Classes.
Course Description	Elementary Japanese II is designed for students who completed Elementary Japanese I or who have equivalent standards with over 150 Kanji vocabulary.
Lecture Code	2010AJ03
Lecture Title	Intermediate Japanese Language I
Credit	6 ([Contact Hour: 9.0h/w + Self-Study Hour: 3.0 h/w] x 15 weeks)
Day of Class	Tuesday #2, #3、#4 Wednesday #2 #3 & Friday #1 & #2
Lecturer	Section of Japanese Language and Japanese Culture
Extension	
E-mail	
Textbook	
Prerequisites	NIL: There is a placement test for Japanese Classes.
Course Description	Intermediate Japanese Language I is designed for students who completed Elementary Japanese II or who have equivalent standards with over 300 Kanji vocabulary and reasonable communication skills.
Lecture Code	2010AQ01
Lecture Title	UEC Academic Skills I A (Computer Literacy)
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 2.5h/w] x 15 weeks)
Day of Class	Wednesday #2
Lecturer	Dr Masahisa SUZUKI
Extension	5746
E-mail	suzuki@fedu.uec.ac.jp
Textbook	
Prerequisites	
Course Description	UEC Academic Class is designed to give you some grapes of all sorts of computer experience. It aims to

	give you an opportunity to get familiar with very basic computer skills for Academic Work and Study. You will learn introductory parts of UNIX Networking Computer, Fortran, C Language, TeX and HTML (Homepage Making). No advanced contents will be taught, but it is a core subject for all new JUSST Students.
Lecture Code	2010AQ02
Lecture Title	UEC Academic Skills II A (Cross-Cultural Communication)
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 2.5h/w] x 15 weeks)
Day of Class	Thursday #6
Lecturer	Dr Masahisa SUZUKI
Extension	5746
E-mail	suzuki@fedu.uec.ac.jp
Textbook	
Prerequisites	
Course Description	You will learn a presentation skill for oral / poster presentation. At the end of semester, all new/senior JUSST Students are required to give a presentation on their major study and research. New JUSST Students will be required to give poster presentation with 1-2 panel space given. Senior JUSST Students of Postgraduate will be required to give an oral presentation for 20 minutes. No advanced contents will be taught, but it is a core subject for all new JUSST Students.
Lecture Code	2010AQ03
Lecture Title	UEC Academic Skills III A (Research & Presentation)
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 2.5h/w] x 15 weeks)
Day of Class	Friday #3
Lecturer	Dr Masahisa SUZUKI
Extension	5746
E-mail	suzuki@fedu.uec.ac.jp
Textbook	
Prerequisites	
Course Description	This Class is also a core subject for all JUSST Exchange Students in their SECOND semester. This class focuses attention on the exercise of strategic research project. Students are required to carry out a study/research project for more than a half of year with a specific topic. Then, they have to proceed their own project after they choose their own topic and make a monthly plan. At the end of semester, there will be an international mini-conference that has participants of all new and senior JUSST Exchange Students and other regular UEC Students. Students are required to give a presentation on their projects that they decide at the beginning of class. Postgraduate Students will be required to give an oral presentation for 20 minutes in the conference.
Lecture Code	2010AQ04
Lecture Title	UEC Academic Skills IV A (Comprehensive Reading & Summary Writing)
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 2.5h/w] x 15 weeks)
Day of Class	Monday #6
Lecturer	Dr Masahisa SUZUKI and Associates
Extension	5746
E-mail	suzuki@fedu.uec.ac.jp
Textbook	
Prerequisites	
Course Description	In this class, you will learn comprehensive reading skills and summary skills 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 skills of keywords in a text. No advanced contents will be taught, but it is a core subject for all new JUSST Students.

Lecture Code	2010AQ05
Lecture Title	UEC Academic Skills V A (Math & Scientific Writing)
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 2.5h/w] x 15 weeks)
Day of Class	Wednesday #6
Lecturer	Dr Masahisa SUZUKI and Associates
Extension	5746
E-mail	suzuki@fedu.uec.ac.jp
Textbook	
Prerequisites	High School Math
Course Description	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 math books will be used for the beginning of semester. You will probably be able to read out most university math expressions by the end of this semester. IELTS base English writing exercise will also be carried out in this class. No advanced contents will be taught, but it is a core subject for all new JUSST Students.
Lecture Code	2010ATLR09
Lecture Title	Communication Theory
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Monday #1
Lecturer	Professor Noboru TOYAMA
Extension	5744
E-mail	toyama@fedu.uec.ac.jp
Textbook	Modern Digital and Analog Communication Systems, Third Edition by B.P. Lathi (Oxford University Press, 1998)
Prerequisites	Trigonometric identities, Integrals, Fourier series, some basic knowledge of probabilities and LCR circuits .Students are encouraged to take "Communication Systems" open at the fall semester.
Course Description	**Objectives:** This course must be taken concurrently with the course "Communications Theory Laboratory." First two classes will review theory of probability and basic knowledge of mathematics that are necessary to understand the subjects in the course. They will include all the items listed in the Prerequisites. Students who are not very familiar with the knowledge in those basics are strongly encouraged to concentrate their efforts on acquiring the knowledge during the first two classes. This course together with "Communications Theory Laboratory" discusses in depth how digital and analog communication systems work in the presence of noise. Topics covered in the course are behavior of FM systems in noisy channels, probability density functions, random variables, the Gaussian PDF, the Rayleigh PDF, the Rice PDF, Wiener-Hopf optimum filter, AFK, FSK, PSK, and QAM. Shannon's information theory and spread spectrum systems are also included. This course will cover from chapter 10 up to Chapter 15 in the textbook. Chapter 16 (Error correcting codes) will not be included. **The assessment policy:** Final: 60%, Midterm: 20%, Class participation: 10%, Lab class scores: 10%.
Lecture Code	2010ATLA05
Lecture Title	Information and Communication Networks
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Monday #2
Class Room	E4-222
Lecturer :	Eiji OKI
Extension	5195
E-mail	oki@ice.uec.ac.jp
Textbook	No assigned textbook. Hand-out will be prepared in the class.
Prerequisites	None

Course Description	**Objectives:** The course Objectives are to understand the fundamental structures and functions of modern networks. The course is also aiming that students get ability to read the reference books and papers, and to obtain the new knowledge regarding future network technologies. **Outline of Class and Contents:** The following subjects are lectured in English. The subjects include mainly three parts, which are Internet Protocol (IP)-based networks, performance analysis and network design, network optimization. Part I: IP-based networks - Network basis - TCP/IP overview - Tools for IP network monitoring - Routing protocols - Transport Layer Protocols - Exercise Part II: Performance analysis and network design: - Analysis and network design basis - Traffic model - Traffic theory - Traffic simulation - Exercise Part III: network optimization - Linear programming (LP) - Exercise Part IV: Recent research topics - Topic I - Topic II **Assessment Policy:** Methods: Homework (70%) : several reports are required to submit On-site quiz (30%) : several quizzes are required to submit in the class. Criteria: Fundamental knowledge (50%) Understanding of advanced concepts (50%)
Lecture Code	2010ATLR03
Lecture Title	Antenna Engineering
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Monday #2
Lecturer	Professor Noboru TOYAMA
Extension	5744
E-mail	toyama@fedu.uec.ac.jp
Textbook	Time-Harmonic Electromagnetic Fields" written by R.F. Harrington (McGRAW-HILL)
Prerequisites	Electromagnetic Theory
Course Description	**Objectives:** A device whose primary purpose is to radiate or receive radio waves is called antenna. Wherever we are, We can see one or two antennas around us that are sending you signals or waiting for you to send signals. The purpose of this course is to enable students to understand the basic concepts of various antennas. **Outline of Class and Contents:** 1. Brief explanatins of various antennas, 2. transmission-line concepts, 3. waveguide concepts, 4. resonator concepts, 5. radiation, 6. antenna pattern calculation, 7. practical examples of recently developed antennas. 8. Some experiments on the selected items from the above will also given. **Assessment Policy:** Report, final examination and attendance rate.

Lecture Code	2010ATLE01
Lecture Title	Micro Mechatronics
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Monday #4
Lecturer	Professor Hisayuki Aoyama
Extension	5751
E-mail	aoyama@mce.uec.ac.jp
Textbook	Mechatronics, 3rd Edition. Electronics and Control System in Mechanical and Electrical Engineering, W.Bolton
Prerequisites	Mechanical and Electrical Engineering, Control Engineering
Course Description	**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. **Outline of Class and Contents:** [1]: Mechatronics Appreciate what mechatronics is about. Comprehend the various forms and elements of control systems: open-loop, closed-loop and sequential. Recognise the need for models of systems in order to predict their behaviour. [2]: Sensors and transducers Describe the performance of commonly used sensors. Evaluate sensors used in the measurement of: displacement, position and proximity; velocity and motion; force; fluid pressure; liquid flow; liquid level; temperature; light. Explain the problem of bouncing when mechanical switches are used for inputting data. [3]: Signal conditioning Explain the requirements for signal conditioning. Explain how operational amplifiers can be used, the requirements for protection and filtering, the principle of the Wheatstone bridge and, in particular, how it is used with strain gauges, the principles and main methods of analogue- to-digital and digital-to-analogue converters, multiplexers and data acquisition using DAQ boards. Explain the principle of digital signal processing. Explain the principle of pulse-modulation. [4]: Data presentation systems Explain the problem of loading. Describe the basic principles of use of commonly used data presentation elements: meters, analogue chart recorders, oscilloscopes, visual display units, printers. Explain the principles of magnetic recording on floppy and hard discs. Explain the principles of displays and, in particular, the use of LED seven-segment and dot matrix displays and the use of driver circuits. Explain how data presentation can occur with the use of DAQ boards. Design measurement systems. [5]: Pneumatic and hydraulic actuation systems Interpret system drawings, and design simple systems, for sequential control systems involving valves and cylinders. Explain the principle of process control valves, their characteristics and sizing. [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: relays, solid-state switches (thyristors, bipolar transistors and MOSFETs, solenoid actuated systems, d.c. motors, a.c. motors and steppers). [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. Identify the effect of pole location on transient response. Use MATLAB and SIMULINK to model systems. [12]: Frequency response Analyze the frequency response of systems subject to sinusoidal inputs. Plot and interpret Bode plots, using such plots for system identification. [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, recognizing the widespread use of embedded systems. Analyse case studies of mechatronics solutions. Design mechatronics solutions to problems. **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.lementary Japanese IIA is designed for students who completed Elementary Japanese IA or who have equivalent standards with over 150 Kanji vocabulary.
Lecture Code	2010ATLA02
Lecture Title	Optical Communication Engineering
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Monday #5
Lecturer	Professor KISHI, Naoto
Extension	5199
E-mail	kishi@ice.uec.ac.jp,
Textbook	on-line materials available at http://pcwave3.ice.uec.ac.jp/kishi/optc (internal only)
Prerequisites	Knowledge of basic engineering/ scientific concepts
Course Description	**Objective:** 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. This course covers several topics in such optical communication technologies. **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 **Assessment Policy:** 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.
Lecture Code	2010 ATLE02
Lecture Title	Introduction to Computational Methods in Science and Engineering using MATLAB
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 2.5h/w] x 15 weeks)
Day of Class	Tuesday #5
Lecturer	Dr Matuttis Hans-Georg
Extension	5401
E-mail	hg@mce.uec.ac.jp

Textbook	Hand-outs will be prepared in the class Further Reading: ● Steve Macconnell, Code Complete, Microsoft Press, 1993, ISBN 1-55615-484-4 ● C.W. Ueberhuber: Numerical Computation 1 Springer, 1997, ISBN 3-540-62058-3 ● C.W. Ueberhuber: Numerical Computation 2 Springer, 1997, ISBN 3-540-59152-4 ● Hairer, Norsett and Wanner: Solving Ordinary Differential Equations I, 2nd edition. Springer, 1993, ISBN 3-540-56670-8 ● E. Hairer and G. Wanner, Solving Ordinary Differential Equations II 2nd edition, Springer 1996, ISBN 3-540-60452-9
Prerequisites	Knowledge of 1 procedural Computer language (Fortan, C, Pascal ....)
Course Description	**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. **Outline of Class and Contents:** 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 10. Performance analysis: Which algorithm take long, which are fast, and when does it matter 11. Programming Paradigms: From spaghetti-code to object-orientation, and what does one really need in science and engineering **Assessment policy:** Presence in the lecture, weekly homework during the term and one mid-term exam and one at the end of the term. **Comment:** Participants should apply for an account at the Computer Center 1 Week before the start of the lecture, if possible !!!
Lecture Code	2010ATLA01
Lecture Title	Theory of Computation
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Wednesday #1
Lecturer	Professor Kazuo OHTA
Extension	5362
E-mail	ota@ice.uec.ac.jp
Textbook	Introduction to The Theory of Computation, Michael Sipser, ISBN 0-534-94728-X
Prerequisites	The knowledge of the Introduction part of the text book will be required at least, for example, the basic concepts of sets, functions, relations, and Boolean logics.
Course Description	**Objectives:** The course will cover the automata and languages as the introduction part of the computation theory. The mathematical logics will be exercised. **Outline of Class and Contents:** 0. Introduction 0.1 Definitions, Theorems, and Proofs 0.2 Types of Proofs 1. Regular Language 1.1 Finite Automata 1.2 Nondeterminism 1.3 Regular Expression 1.4 Non-regular Languages 2. Context-Free Languages

	2.1 Context-free Grammars 2.2 Pushdown Automata 2.3 Non-context-free Languages **Assessment policy:** Reports giving the answers of the exercises in the text book, contribution in the class discussions.
Lecture Code	2010ATLD01
Lecture Title	Quantum Electronics
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Wednesday #1
Lecturer	Professor K. Hakuta and Dr. Fam Le KienI
Extension	5476
E-mail	fam@kiji.pc.uec.ac.jp
Textbook	● Quantum Mechanics, by C. Cohen-Tannoudji, B. Diu, and F. Laloe (John Wiley & Sons, New York, 1977). ● Optical Resonance and Two-Level Atoms, by L. Allen and J. H. Eberly (John Wiley & Sons, New York, 1975). ● The Quantum Theory of Light, by R. Loudon (Oxford University Press, Oxford, 2000). ● Quantum Optics, by M. O. Scully and M. S. Zubairy (Cambridge University Press, New York, 1997).
Prerequisites	elementary quantum mechanics
Course Description	**Objectives:** Resonant and near-resonant interaction of light with matter is a subject of study in various branches of physics, such as atomic and molecular physics, quantum electronics, nonlinear and quantum optics, and solid state physics. In this course, we present some fundamentals for the study of the interaction between atoms and light. The course opens with a brief description of real atoms and the model of two-level atoms. We then describe the electromagnetic field and its mode expansion. We explain the principles and elementary theory of the laser. We describe the interaction between atoms and laser fields. The density operator for atoms interacting with light is introduced. Interesting optical effects such as Rabi oscillations, spontaneous emission, absorption, emission, power broadening, coherent trapping, and electromagnetically induced transparency are discussed. **Outline of Class and Contents:** 1.Classical theory of the interaction of light with matter. 2.Real atoms and the model of two-level atoms. 3.Electromagnetic field and its mode expansion. 4.Principles of the laser. 5.Interaction between atoms and laser fields. 6.Atom excitation and Rabi oscillations. 7.Spontaneous emission of an atom. 8.Density operator formalism. 9.Optical Bloch equations. 10.Absorption, saturation, and power broadening. 11.Propagation of light in an atomic medium. Susceptibility, refractive index, and absorption coefficient of the medium. 12.Coherent trapping and dark states. 13.Electromagnetically induced transparency. **Assessment policy:** At the end of the course, the student has to write a short report on a topic from the list. In the report, the student should demonstrate his understanding of the topic. Assessment in this class will take account of the attendance, discussion, and report.
Lecture Code	2010ATLF01
Lecture Title	Advanced Theory of Systems Reliability
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Thursday #2
Lecturer	Professor Kazuyuki SUZUKI
Extension	5265
E-mail	suzuki@se.uec.ac.jp
Textbook	nothing (handout prints)
Prerequisites	Calculus

Course Description	**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 role. Also, recent development of information technology has been changing the way of Reliability Engineering. This new aspects is also dealt with. (Outline of Contents) 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 6) Reliability Testing and Data Analysis 7) Design of Experiments in reliability 8) Maintainability and Condition Monitoring Maintenance **Assessment policy:** Assessment will be based on the level of understanding.
Lecture Code	2010 ATLD03
Lecture Title	Modern Physics
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Thursday #4
Lecturer	Dr. Fam Le Kien
Extension	5476
E-mail	fam@kiji.pc.uec.ac.jp
Textbook	"Concepts of Modern Physics" by Arthur Beiser (McGraw-Hill, sixth edition, 2003).
Prerequisites	NIL
Course Description	**Objectives:** The theory of special relativity and the theory of "quanta" emerged at the turn of the 20th century as a fundamental framework for understanding macroscopic and microscopic aspects of the world. The theory of special relativity treats problems related to space and time. The quantum mechanics treats problems related to the building blocks of our world, namely atoms, molecules, and subatomic particles. This course consists of a series of lectures on the theory of special relativity and quantum mechanics. It presents basic concepts required of all branches of modern physics. The focus however is on ideas rather than on technical details or practical applications. **Outline of Class and Contents:** 1) Length contraction 2) Time dilation 3) Relativistic mass 4) Doppler shift 5) De Broglie waves 6) Particle diffraction 7) Uncertainty principle 8) Atomic spectra 9) Correspondence principle 10) Principles of lasers 11) Wave equation: the Schroedinger equation 12) Particle in a box 13) Tunnel effect **Assessment policy:** A written report on a topic is to be submitted toward the end of the semester. An oral presentation based on the written report is also required. Assessment in this class will take account of this report, attendance rate, and contribution for class discussions.
Lecture Code	2010ATLC03
Lecture Title	Visual Communications
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Thursday #5
Lecturer	Professor Masahide KANEKO
Extension	5216

E-mail	kaneko@ee.uec.ac.jp
Textbook	Handouts will be prepared in the class.
Prerequisites	NIL
Course Description	**Objectives:** As represented by the famous proverb "Seeing is believing", visual information plays a very important role in our daily lives. In this class, the fundamentals of visual communication, especially image coding techniques, are lectured from the viewpoint of efficient transmission of image information and better communication through visual media. International activities to establish the common standards of image coding are also introduced. **Outline of Class and Contents:** [1] Visual media Definition of "visual media" Classification of "visual media" Use of visual information in the fields of information and communication [2] Fundamentals to handle digital images Definition of "digital image / digital picture" Digitization : sampling + quantization Amount of information contained in digital images Characteristics of human vision [3] Visual communication and Image / Video Coding Role of visual communication and image / video coding Redundancies contained in images Basic methods of image data compression predictive coding, transform coding, interframe coding, motion compensation, coding of facsimile (MH, MR, MMR) [4] International standards of image / video coding JPEG, JPEG2000, Motion-JPEG2000, JBIG, H.261, H.263, H-264 (MPEG-4 / AVC) MPEG-1, MPEG-2, MPEG-4, MPEG-7, MPEG-21 ◯JPEG ==> Digital camera, Pictures used in Web site MPEG-2 ==> Digital broadcasting (satellite, terrestrial), DVD MPEG-4 ==> Digital movie camera, Video by mobile phone (One segment broadcasting), and so on [5] Video over Internet and over mobile network Internet as transmission media of video Streaming Mobile network as transmission media of video Error resilience coding # Samples of coded and decoded images will be demonstrated by OHP and video tapes. **Assessment policy:** There will be some report requirements on the topics mentioned above during the semester. One examination will be carried out at the end of semester. Assessment in this class will take account of these reports, examination, attendance-rate and contribution for class discussions at the score proportion of 30%, 30%, 20%, and 20% respectively. ※Tour to my laboratory will be arranged in July. Some of recent research results will be demonstrated by doctor and master course students in my laboratory.
Lecture Code	2010ATLC04
Lecture Title	Nanophotonics
Credit	([Contact Hour: h/w + Exercise Hour: h/w] x 15 weeks)
Day of Class	Friday #4
Class Room	W2-105
Lecturer	Yoshiko OKADA-SHUDO
Extension	5167
E-mail	okada@ee.uec.ac.jp
Textbook	None. Some handouts include photographs and figures from various sources: internet, articles, textbooks, academic books, etc. will be prepared.

Reference book	Satoshi KAWATA ed. "Nano-Optics" Springer
Prerequisites	The fundamentals of Optics, Electromagnetism, introductory course of applied (engineering) mathematics
Course Description	(a) Nanophotonics or nano-optics is a new optical science dealing with photons confined in nanometre-scale structures. To understand this new science, the fundamentals of nonlinear spectroscopy and near-field optics are lectured. Application of nanophotonics to chemistry, quantum device physics, and biological science are also introduced. (b) This lecture is aimed at graduate students. Students will study fundamentals of nonlinear spectroscopy and near-field optics and then learn the most advanced photon technologies for measurement, control, and fabrication in nanometre-scale. **Outline of Class and Contents:** (a) Contents 1. Introduction 2. Current situation of optical science and technology 3. Concepts of super-resolution 4. Super-resolution by nonlinear optics -Nonlinear effect- 5. Super-resolution by nonlinear optics -Frequency mixing processes- 6. Super-resolution by nonlinear optics -Multi photon processes- 7. Nanofabrication: Multiphoton laser fabrication ・Scanning laser maicroscope system 8. Nano imaging: Imaging of biological molecule 9. Evanescent wave 10. Generation of optical near-field ・Photon tunneling 11. Super-resolution by near-field optics -Probe technology- 12. Super-resolution by near-field optics -Near-field maicroscope system- 13. Super-resolution by near-field optics -Spectroscopy and analysis- 14. Nanofabrication I : Recording of evanescent field 15. Nanofabrication II : Nanophotonic devices (b)This course uses a communicative methodology which demands active participation from students. Students will be expected to prepare work for classes and homework will be set. Students have to revise their exercises using the webclass system.
Lecture Code	2010ATLR04
Lecture Title	Digital Engineering in Broadcasting
Credit	2 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Friday #4
Lecturer	Professor Noboru TOYAMA
Extension	5744
E-mail	toyama@fedu.uec.ac.jp
Textbook	:Digital Television" written by H Beoit (Arnold)
Prerequisites	Some knowledge of Fourier Analysis and Probability
Course Description	**Objectives:** Digital terrestrial broadcasting is a very hot topic in Japan. Students will see some of the related items almost every day in the newspaper. Digital broadcasting uses the most sophisticated digital techniques. The purpose of the course is to give students, as simply and as completely as possible, the various aspects of the very complex problems to be solved in realizing digital broadcasting. **Outline of Class and Contents:** 1. A review of current analogue TV, 2. digitization of video signals, 3. compression of video signals using Fourier cosine transform, 4. compression of video signals using motion compensation technique, 5. error correction using Reed-Solomon coding, 6. error correction using Viterbi decoding algorithm, 7. Trellis coded 8 PSK modulation, 8. Some experiments on the selected items from the above will also given. 9. Orthogonal frequency division multiplex. **Assessment policy:** Report, final examination and attendance rate.
Lecture Code	2010ATLR10
Lecture Title	Communication Theory Laboratory

Credit	1 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Friday #5
Lecturer	Professor Noboru TOYAMA
Extension	5744
E-mail	toyama@fedu.uec.ac.jp
Textbook	"Modern Digital and Analog Communication Systems, Third Edition, by B.P.Lathi (Oxford University Press, 1998).
Prerequisites	Trigonometric identities, Integrals, Fourier series, some basic knowledge of probabilities and LCR circuits. Students are encouraged to take "Communication Systems" open at the fall semester.
Course Description	This course is an exercise session for the course "Communications Theory. “This course must be taken concurrently with the course "Communications Theory." Students will be given problems directly related to the lecture given in "Communications Theory." By solving the problems students can understand the real aspects of the theory given in the lecture. Some experiments related to the lectures will also be given. **Assessment policy:** The same scores given in the course "Communications Theory."
Lecture Code	2010ATLZ01~04
Lecture Title	Lifelong Learning in Sports (Futsal, Aqua Sports, Tennis, Fitness Training)
Credit	1 ([Contact Hour: 1.5h/w + Exercise Hour: 0.5h/w] x 15 weeks)
Day of Class	Thursday #2
Lecturer	Prof. Hisashi YANAGISAWA
Extension	5583
E-mail	yanagi@e-one.uec.ac.jp
Textbook	
Prerequisites	
Course Description	**Objectives:** Sport is a vital part of human culture affecting both our physical and mental lives. Participation in sport fulfills a basic need to exercise, provides psychological satisfaction and contributes to overall health and fitness. In addition, as sport is played with common rule around the world, it helps to overcome language barriers, promotes international understanding and increases world friendship and good will as a common global culture. The Objectives of the course are to acquire skills and knowledge for enjoying sport throughout lifelong and develop health and fitness. **Assessment policy:** Attendance of Lessons: 60% Achievement of Skill: 20% Reports: 10% Positive Collaboration Attitude: 10%