平成25年度春学期

Spring Semester, 2013

電気通信大学・短期留学プログラム

UEC Exchange Program

Japanese University Studies in Science and Technology (JUSST)

Center for International Programs and Exchange (CIPE)

The University of Electro-Communications (UEC), Japan

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INDEX

Information and Communication Networks

Day of Class Monday #2

Credit 2

Lecturer Eiji OKI

E-mail eiji.oki@ uec.ac.jp

Objectives:

Communication networks serve as the most important infrastructure for the today's information society. This course deals with mathematical programming and algorithms for communication networks. The course objectives are to understand the fundamental concepts communication networks and theories for network designs and controls, and bridge the gap between the theories and practices.

Outline of Class and Contents:

The subjects include the following items. The topics may be subject to change due to the progress.

1. Introduction and Basic problems for communication networks
2. Algorithms for basic problems I
3. Algorithms for basic problems II
4. Disjoint path routing
5. Liner programming I
6. Liner programming II
7. Mid-term exercise/examination
8. GLPK (GNU Liner Programming Kit)
9. Basic problems solved by LP
10. Disjoint path routing and wavelength assignment solved by LP
11. Routing and traffic demand model I
12. Routing and traffic demand model II
13. Mathematical puzzles I
14. Mathematical puzzles II
15. Advanced topics and final exercise/examination

Assessment Policy:

On-site exercise, homework, and mid-term and final examinations

Criteria:

Fundamentals and theories (50%)

Practices (50%)

Visual Media Design

Day of Class Monday #3

Credit 2

Lecturer Professor Masakatsu KANEKO

E-mail kaneko@hc.uec.ac.jp

Prerequisites Elementary knowledge and skills of video making and web programming

Course Description

The purpose of the lectures is to understand how and of what elements visual media contents are constructed. As representative examples of visual media, we consider movie (video) and manga (comic). Movie is composed not only of what you see (picturesque images), but also of what limits those images (frames) and what "is" between the images (montage). The montage, one of the key concepts of visual media, is "temporal" for movie, and "spacial" for manga. At the first half of lectures, we give theoretical explanations, and at the second half, we lean in practice by making a "movie-comic" content.

(references: http://oz.hc.uec.ac.jp/lectures/kyozai/index.html username and password required)

Outline of Class and Contents:

1. Introduction
2. Historical Overview of visual media
3. Elements of visual media: frame and montage
4. Frame 1: size, angle
5. Frame 2: composition
6. Temporal montage: video
7. Spatial montage: manga
8. (Extra)
9. Content making practice 1: Guidance
10. Content making practice 2: Planning

11. Content making practice 3: Shooting and editing
12. Content making practice 4: Editing and programming
13. Content making practice 5: Editing and programming
14. Review and discussion
15. Conclusion

Assessment policy:

The second half of lectures is a kind of workshop. Assessment in this class will take account of (1) achievement of the workshop 60% and (2) attendance 40%.

Introduction to Micro Mechatronics

Day of Class Monday #4

Credit 2

Lecturer Professor Hisayuki Aoyama

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.

Optical Communication Engineering

Day of Class Monday #5

Credit 2

Lecturer Professor KISHI, Naoto

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.

講義概要

科目基礎情報			
授業科目名	(G)UEC Academic Skills III A (Research and Presentation)		
英文授業科目名	(G)UEC Academic Skills III A (Research and Presentation)		
開講年度	2013年度	開講年次	1/2/3/4
開講学期	前学期	開講コース・課程	情報理工学部
授業の方法	講義	単位数	2
科目区分	総合文化科目		
開講学期・専攻	情報理工学部		
担当教員名	樋山　みやび　Miyabi HIYAMA		
居室	E2-302 (every Tuesday)		
公開E-Mail	hiyama@fedu.uec.ac.jp		
授業関連Webページ	http://www.fedu.uec.ac.jp/uec-as3/		
更新日	2013/03/28 12:21:18	更新状況	公開中

講義情報	
主題および 達成目標	この授業は，本学の海外協定校(姉妹校)から来ている交換留学生を対象とした英語で開講されている授業です。 　理工系の専門英語で勉強する機会として、正規生にも開講されており，海外で留学したときの授業を受講する雰囲気を電通大で体験できる授業です. This course designed to provide you research skills and presentation skills for graduate research in the areas of sciences and engineering. You have to proceed a research project yourself. The end of semester, you have to participate in a Mini-International Conference either in a Poster Session or in an Oral Session with International Students and Japanese Students at UEC. This course will be helpful for your presentation.
前もって履修 しておくべき科目	Not Applicable.
前もって履修しておく ことが望ましい科目	You must have experience to write a report before. Any level of Research Project at a high school or university.
教科書等	N/A
授業内容と その進め方	This course consists of lectures and hands-on practice, according to your actual research topic: ---------- Week #1: Introduction to the course Week #2: Linux: permission, Week #3: Linux: processes Week #4: Latex: basic Week #5: Latex: math Week #6: Latex: table Week #7: Structure of abstract Week #8: Writing abstract Week #9: Presentation of Poster presentation Writing 1 Week #10: Presentation of Poster presentation Writing 2 Week #11: Presentation of Poster presentation 3 Week #12: Practice of Oral presentation 1 Week #13: Practice of Oral presentation 2 Week #14: Practice of Poster presentation Week #15: Final exam Week #16: Final exam

授業内容と その進め方	
授業時間外の学習 (予習・復習等)	There are only 6 official classes for instructions during the semester. However, 2 hours progress meeting is required every week with your research members of foreign students for 10 weeks. In this progress meeting, you have to report for what you make progress on your research projects. Essential project hours are estimated for more than 8 hours a week, where this is the same standard of graduate thesis project.
成績評価方法 および評価基準 (最低達成評価基準を含む)	There is no examination at the end of semester. However, the evaluation wiil be given according to the following policies: ---------- Assignments Except for the projects, all other assignments are designed to be done during the class time. At the end of the theoretical explanation, students are given enough time to make the exercises and finish the assignment for the class. If students are not able to finish the class assignments during the class period, they have until 23:59 of the same day to submit the assignment by email. Assignments sum 20% of the final grade. ---------- Evaluation is given as follows; Attendance - 10% Assignments - 10% Writing paper - 20% Preparing poster or oral presentation - 60% Total 100 %
オフィスアワー: 授業相談	Tuesday 13:00-14:00 at Room 302 of UEC East2 Building. Appointment Essential by E-mail in advance. Inquiries by emails are always welcome.
学生へのメッセージ	This is the most useful practice for your research presentation in English at UEC, since more than 20 international students participates in this excercises from more than 10 countries.
その他	N/A
キーワード	Research and Presentation

講義概要

科目基礎情報			
授業科目名	(G)UEC Academic Skills I A (Computer Literacy)		
英文授業科目名	(G)UEC Academic Skills I A (Computer Literacy)		
開講年度	2013年度	開講年次	1/2/3/4
開講学期	前学期	開講コース・課程	情報理工学部
授業の方法	講義	単位数	2
科目区分	総合文化科目		
開講学期・専攻	情報理工学部		
担当教員名	樋山　みやび　　Miyabi HIYAMA		
居室			
公開E-Mail	hiyama@fedu.uec.ac.jp		
授業関連Webページ	http://www.fedu.uec.ac.jp/uec-as1/		
更新日	2013/03/28 12:27:19	更新状況	公開中

講義情報	
主題および 達成目標	この授業は，本学の海外協定校(姉妹校)から来ている交換留学生を対象とした英語で開講されている授業です。 　理工系の専門英語で勉強する機会として、正規生にも開講されており，海外で留学したときの授業を受講する雰囲気を電通大で体験できる授業です. This course gives the students the intermediate-advances knowledge of computer systems and computer networks in a typical academic environment. Learning by examples is the main characteristic of this course. The first part of each class is the theoretical part given by the instructor. The second part is the practical exercise designed for each core topic. The usage of primitive but powerful tolls such as LINUX shell and HTML is promoted.
前もって履修 しておくべき科目	It is good enough if you know how to browse homepages on internet.
前もって履修しておく ことが望ましい科目	Not Applicable.
教科書等	http://www.fedu.uec.ac.jp/uec-as1/
授業内容と その進め方	Lectures & Hands-On Practice are provided in every Class. ---------- Week #1: Introduction to the course Week #2: Linux: file manipulation Week #3: Linux: remote login Week #4: Latex: formatting Week #5: Latex: list & figure Week #6: Latex: cross-references Week #7: HTML: introduction Week #8: HTML: formatting Week #9: HTML: tag Week #10: HTML: list & image Week #11: HTML: link Week #12: HTML: table Week #13: HTML: frame Week #14: HTML: CSS Week #15: HTML: CSS & miscellaneous Week #16: Summary
授業時間外の学習 (予習・復習等)	one hour expected every week for assingments of homepage construction and LaTeX documentation

成績評価方法 および評価基準 (最低達成評価基準を含む)	There is no examination at the end of semester. However, the evaluation wiil be given according to the following policies: ---------- Assignments Except for the projects, all other assignments are designed to be done during the class time. At the end of the theoretical explanation, students are given enough time to make the exercises and finish the assignment for the class. If students are not able to finish the class assignments during the class period, they have until 23:59 of the same day to submit the assignment by email. Assignments sum 20% of the final grade. ---------- Evaluation is given as follows; Attendance - 20% Assignments - 30% Web page - 50% Total 100 %
オフィスアワー： 授業相談	Tuesdays, 13:00-14:00 at Room 302 of UEC East2 Building. Appointment Essential by E-mail in advance. Inquiries by emails are always welcome.
学生へのメッセージ	This is offered to foreign students who are from UEC partner universities over the world. It is the best class to make international friends at the same time as to study HTML. ---------- The class contents are designed for all the students capable the followings; To be an intermediate-advanced UNIX user To use network tools for file transfer, encrypted communications, network diagnosis To create and publish hand-made web pages To understand a compiler environment ----------
その他	N/A
キーワード	Computer Literacy

VLSI Low Power Circuit Design

Day of Class: Tuesday #5

Credit: 2

Lecturer: Professor Koichiro ISHIBASHI

E-mail: ishibashi@ee.uec.ac.jp

Textbook: non

Prerequisites:

Course Description

Thanks of low power LSI, we nowadays enjoy ITC society with electronics appliances such as cell phones, electric cars and so on. The purpose of this lecture is to understand not only fundamentals of VLSI circuits, but low power circuit technologies which have made this ITC society true. Practise of circuit simulation will be done in this course to further understand the operation of VLSI circuits.

Outline of Class and Contents

1) Introduction to rolls of VLSI on ITC society
2) Structure of MOSFET and its characteristics
3) Moore's law and Scaling law
4) Fundamentals of CMOS LSI circuits
5) Power on CMOS LSI
6) Low power digital circuit design techniques
7) Low power CPU design techniques
8) Practice of Circuit Simulation

Assessment policy:

Interim and final exams will be done for evaluation.

Students who get the score more than 50% will pass the class.

UEC Academic Skills II A

(Cross-Cultural Communication)

Lecturer:

Gary J. Wolff

Homepage: http://www.garyjwolff.com

Course summary and objectives:

In this day and age, it is becoming increasingly more important to be able to communicate with and understand different cultures. We live in an era of rapid globalization in which being able to communicate across cultures is imperative to our ability to function in a diverse workplace, city, and world.

This course will focus on the importance of culture in our everyday lives, and the ways in which culture interrelates with and affects our communication processes. This course is designed for students interested in enhancing their cross-cultural communication skills required in international settings. It will also cover various everyday topics dealing with international culture, enabling students to broaden their global horizons and enhance their understanding of the world.

Textbook:

"World Interviews" by Miles Craven

Published by Seibido, 2006, ¥2100

Class Contents:

1) Our textbook, "World Interviews," is based on exciting interviews with young people from around the world. The course will utilize Lessons 1-12 of this textbook and a CD, plus supplementary learning materials furnished by the instructor. Every class will include pair and/or group discussions of a wide variety of thought provoking topics, ranging from dating and marriage to politics, that will enable students to express their own ideas and opinions while making cultural comparisons. Also included will be listening comprehension practice, vocabulary development, and other exercises to enhance cross-cultural English communication skills.

2) Students will be given the opportunity each week to share their overseas experiences and opinions of other countries by posting their stories in an online forum provided by the teacher.

Students will also be expected to comment on stories posted by the other students.

3) At the beginning of each class, at least 1 student will be asked to share a culturally significant current event news story from their home country in the form of a 2-3 minute oral presentation.

4) Students will work together in groups of 3-4 students to study & conduct an in depth cultural comparison of at least 2 countries on various topics such as youth culture, dating and marriage, food and drink, fashion, education, corporate culture & business manners, student life, friendships, family, etc.

At the end of the semester, all study groups will be required to give a 10-15 minute presentation, using software like PowerPoint, Keynote, etc., to report on the results of their research. Ideally, time will be given at the end of most every class for these groups to work together, but it is likely that they will also have to meet on occasion outside of classroom hours, particularly toward the end of the semester in preparation for the final presentation.

Grading method:

Grade will be determined by attendance & in-class performance (30%), homework & assignments (35%), online stories (10%), final group presentation (15%), and short mid-term & final vocabulary quizzes (10%). Because homework and in-class exercises are to be submitted on B5 paper, students are required to bring a B5-size notepad to every class.

Miscellaneous:

This class will be highly interactive, requiring students to engage in lively pair work and group discussions every week. Only students with a sincere desire to expand their global horizons & improve their cross-cultural English communication skills should join this class.

Please bring your positive attitude and be prepared to be an active participant in a very fun learning environment.

Visual Communications

Day of Class	Wednesday #5
Credit	2
Lecturer	Professor Masahide KANEKO
E-mail	kaneko@ee.uec.ac.jp
Textbook	Original 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. Nowadays digital cameras and digital videos are widely used by many people. Furthermore we enjoy the digital broadcasting at home every day. So the technologies of visual communications are very popular for us. 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, JPEG XR, 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 in this class.

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.

Mathematics for Information

Day of class: Thursday #1

Credit: 2

Lecurer: Professor Kazuo Ohta, Associate Professor Mitsugu Iwamoto,

Email: math_info@oslab.inf.uec.ac.jp

Textbook: Winning Ways vol.1, by E.Berlekamp, J.H.Conway, R.K.Guy, ISBN: 978-1568811307

Objectives:

This course aims to learn how to use of descrete mathematics by discussing the theory of impertial games. The elementary knowledge of discrete mathematics such as logic, sets, map, and relations, etc., are required.

Outline of Class and Contents:

The lecture consists of two parts: the first part is the lectures on Sprague-Grundy Theorem, and the latter part concsists of reports by students on several impertial games.

I. Sprague-Grundy Theorem (7 lectures):

(1) Combinatorial game and Nim

(2) Algebra in games

2.1: Adding two games

2.2: Partition of two games

2.3: Algebraic properties of games

(3) Characterizing the winning positions

3.1: Observations on Nimbers

3.2: Sprague–Grundy theorm: formal proof

(4) Winning ways

II. Discussion on several impertial games:

Topics will be selected from the textbook

and they will depend on situations.

Assessment policy:

Reports (resume and talk) in part II,

and contribution (discussion) throughout the class

Modern Optics and Photonics

Day of Class Thursday #1

Credit 2

Lecturer Prof. Yasuo TOMITA

E-mail ytomita@ee.uec.ac.jp

Textbook Instructor's notes will be provided. Material will also be taken from the following optional textbooks:

1. Yariv, Optical Electronics in Modern Communications, Oxford Univ. Press, Oxford, 1997.
2. S.G. Lipson et al., Optical Physics, 3rd ed., Cambridge Univ. Press, Cambridge, 1995.
3. B.E.A. Saleh and M.C. Teich, Fundamentals of Photonics, Wiley, New York, 1991.

Prerequisites

A good understanding of introductory electromagnetics and linear systems theory may be helpful.

Objectives

This is an introductory-level course in the ever-increasing field of modern optics. It includes ray- and wave-descriptions of light propagation and image formation with coherent light. An introduction to holography and optical information processing is also given as an example of parallel and multi-dimensional data handling capabilities of light. Furthermore, it contains discussions of photonic devices (such as lasers, amplifiers, light modulators and detectors) and fiber-optic communications systems.

Outline of Class and Contents

Topics in 90-minute lectures will include:

1. Geometrical (ray) optics
2. Wave optics
3. Fourier optics
4. Electromagnetic and crystal optics
5. Guided-wave and fiber optics
6. Introduction to fiber-optic communications

Introduction to Computational Methods in Science and Engineering using MATLAB

Day of Class Thursday #2

Credit 2

Lecturer Associate Professor Hans-Georg Matuttis

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 !!!

Advanced Theory of Systems Reliability

Day of Class	Thursday #2
Credit	2
Lecturer	Professor Kazuyuki SUZUKI
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 roles. Also, recent development of information technology has been changing the methods of Reliability Engineering. These new aspects are also dealt with.

Outline of Contents

1) TQM (Total Quality Management) and Reliability
2) Prevention of Reliability and Safety Problems by Prediction
3) Reliability Assurance using FMEA and FT
4) Reliability Failure Model and its Theory
5) Reliability Design and Systems Reliability
6) Reliability Testing and Data Analysis
7) Maintainability and Condition Monitoring Maintenance

Assessment policy:

Assessment will be based on the level of understanding

Video and Image Technologies

Lecturer

Prof.Akihiro HORI

Course Description

Video technology is very important for human interface especially in the digital era. In this lecture, we will learn fundamentals for video and image technology from video cameras to displays, how it works.

The goal of this lecture

1) Understanding the fundamentals of the video and image technology.

2) Understanding the latest technology for the video and image technology.

The resume of the lecture

1. Video Camera/Image Capture Device
2. Display Device
3. Image Resolution
4. Video Format
5. Digital Cinema
5. Analog TV
6. Digital Video Compression
7. 3D Video
8. Video Effect
9. Subjective Assessment
10. Digital WaterMark

How to proceed the lecture

This lecture is interactive. Let's study together. The speed of the innovation is so fast in digital technology, video is no exception. We will study the latest video technology from video camera to display including 3D.

Pre-requirement

It is required for the students who take this lecture to have some basic knowledge about semiconductor, digital filter and sampling theory.

講義概要

科目基礎情報			
授業科目名	Photonics and opto-electronics		
英文授業科目名	Photonics and opto-electronics		
開講年度	2013年度	開講年次	3/4
開講学期	前学期	開講コース・課程	情報理工学部
授業の方法	講義	単位数	2
科目区分			
開講学期・専攻	情報理工学部		
担当教員名	上野　芳康		
居室	Room no. 310, Building no. West-2 (W2-310).		
公開E-Mail	uenoy@ultrafast.ee.uec.ac.jp		
授業関連Webページ	http://www.ultrafast.ee.uec.ac.jp/ueno-classes.html		
更新日	2013/03/22 13:43:15	更新状況	公開中

講義情報	
主題および 達成目標	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.
前もって履修 しておくべき科目	fundamentals of electro-magnetic waves (propagating in speed of light). fundamentals of electronics such as diodes and transistors.
前もって履修しておく ことが望ましい科目	fundamentals of quantum mechanics (particles and waves). fundamentals of crystalline materials and their basic, electronic properties.
教科書等	(1) B.E.A. Saleh and M.C. Teich, Fundamentals of Photonics, second edition, John Wiley and Sons, Inc., 2007. (this is the primary textbook for this course.) (2) Amnon Yariv, Optical Electronics in Modern Communications, 5th edition, Oxford University Press, 1997. (this is the secondary textbook for this course.)
授業内容と その進め方	1st-5th weeks: (1) Areas of science and technology where photonics and opto-electronics play particularly important roles in our world. (2) Representative photonic devices and materials that many of us must use and rely on, in these areas of science and technology. (3) Fundamental properties of silicon and other few important types of semiconductor crystals. Basics of direct transition (for light-emitting diodes and lasers), in contrast to indirect transition (for sensors and solar cells, for example). Then, basics of quantum-particle-based properties such as conservation laws in unit of electron-volts, in contrast to quantum-wave-based properties. (All of these are well understood and designed in all LED's, laser diodes, optical sensors, solar cells, for example.) 6th-10th weeks:

授業内容と その進め方	(em waves) to photons. (5) Device's internal structures (of light-emitting diodes and light-absorbing sensors), and their working principles. (6) Energy conversion law and general limits in energy-conversion efficiency, from electronic energy to photonic energy. That in the opposite direction, that is, from photonic energy to electronic energy. 11th-15th weeks: (7) advanced groups of lasers, consisting of cavities and waveguides, which are deeply and broadly used in advanced systems such as network infrastructures (terabit per second), optical-disk memories (DVD&CD's), compact and accurate laser diodes (from infrared to blue). (8) high-density light energy in time and 3D-space dimensions (total four dimensions), that is rather simply generated by laser oscillators in particular. (Several kinds of experimental research are going on in our UEC campus, as well.)
授業時間外の学習 (予習・復習等)	Both personal and group studies, efficiently before and after each weekly classroom, are encouraged.
成績評価方法 および評価基準 (最低達成評価基準を含む)	Understanding level of each student is evaluated, in the final test in the end of the 15-week course.
オフィスアワー: 授業相談	6th period, Tuesdays. (Notify me Ueno by email, when I was not available in the period of tuesday.)
学生へのメッセージ	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.
その他	Lecturer Ueno's international activities: http://www.ultrafast.ee.uec.ac.jp/ueno-cv.html
キーワード	photonics, opto-electronics, quantum mechanics, electro-magnetic waves, light-emitting diodes (spontaneous emission), lasers (stimulated emission), optical sensors, solar batteries, silicon, galium arsenide, semiconductor.

Advanced Quantum Mechanics

Day of Class The course is offered as a cram course for this academic year. It is tentatively scheduled for the end of August (possibly during the week of August 26th).

Credit 2

Lecturer Professor shinichi watanabe

E-mail shin@pc.uec.ac.jp

Textbook none

Prerequisites Elementary quantum mechanics at an undergraduate level

Course Description

Objectives:

Theme: To understand the basic principles of quantum mechanics that apply to various quantum phenomena serving as foundations of Modern Science and Technology.

Goals: To understand how to treat the evolution of a quantum system under a weak perturbation. To understand the meaning of transition probability. To understand the quantization of the Electro-Magnetic fields and of the matter wave. To understand how light interacts with matter.

Contents (tentative):

(1) Time-independent perturbation theory (review)
(2) Time-dependent perturbation theory
(3) The golden rule and transition probability
(4) Scattering states and box quantization
(5) Quantization of Electric and Magnetic fields
(6) Quantization of the Matter Wave
(7) Photo absorption and emission by an atom

(NB: The contents may change without notice.)

Assessment Policy

(a) The grade will be based on quizzes and the term paper.
(b) It is required that the student understands the class room materials to such an extent that they can explain the basic concepts by heart.

Keywords: Quantum mechanics, perturbation theory, density of states, the golden rule, number representation, creation and annihilation operators, scattering states, S-matrix, photo absorption and emission, etc.