

2019年度
Institute of Integrated Science and Technology (IIST)
講義概要 (シラバス)



法政大学

科目一覧

最新版のシラバスは、法政大学 Web シラバス (<https://syllabus.hosei.ac.jp/>) で確認してください。

【TZ811】 Database Design [NGUYEN N BINH]	1
【TZ812】 Networking Technology [NGUYEN N BINH]	2
【YD952】 Introduction to Bioinformatics [常重 アントニオ Antonio TSUNESHIGE]	3
【YD953】 Multimedia Signal Coding Algorithms [周 金佳 Jinjia Zhou]	4
【YD954】 Multimedia Information Processing [周 金佳 Jinjia Zhou]	5
【YD955】 Cryptography and its Applications [岡本 龍明 Tatsuaki OKAMOTO]	6
【YD956】 Technical Writing Workshop 1 [周 金佳 Jinjia Zhou]	7
【YD957】 Technical Presentation Workshop 1 [周 金佳 Jinjia Zhou]	7
【YD958】 Technical Writing Workshop 2 [周 金佳 Jinjia Zhou]	8
【YD959】 Technical Presentation Workshop 2 [周 金佳 Jinjia Zhou]	9
【YD960】 IIST Seminar [周金佳、チャピ ゲンツイ、中村壮亮、伊藤一之、八名和夫、彌富仁、中村洋一、山下明 泰、常重アントニオ、佐野俊夫]	10
【YD961】 Japanese communication 1 [村松 葉子 Yoko MURAMATSU]	10
【YD962】 Japanese communication 2 [村松 葉子 Yoko MURAMATSU]	11
【YD963】 Japanese communication 3 [村松 葉子 Yoko MURAMATSU]	11
【YD964】 Japanese communication 4 [村松 葉子 Yoko MURAMATSU]	12
【YD965】 Machine Learning [周 金佳 Jinjia Zhou]	12
【YD966】 Digital System Design [周 金佳 Jinjia Zhou]	13
【YD967】 Special Lecture on Advanced Integrated Science and Technology 1 (Introduction to Wireless Sensor Network) [Elma Zanj]	13

COS500D1

Database Design

NGUYEN N BINH

Subtitle：データベース設計論

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

This course explores introductory basics of database modeling and design. The course focuses on the techniques for relational database design, starting with the entity-relationship (ER) approach for data requirements specification and conceptual modeling. It also addresses database design techniques for data warehousing and online analytical processing (OLAP). Some CASE tools for database design are also introduced and practiced.

【Goal】

Basic knowledge and skills in database modeling and design will be acquired. The student will understand basics of the Entity-Relationship Model, the Unified Modeling Language (UML), Requirements Analysis and Conceptual Data Modeling, Transforming the Conceptual Data Model to SQL, Normalization, Object-Relational Design, XML and Web Databases, and Business Intelligence. The student should do some works on database modeling and design using the CASE tools.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

The first three lectures are on an overview of the database issues, ERM, and UML. The next lectures are to learn concepts, techniques and practical methods for logical design of databases. Some advanced topics in database design will be also addressed and discussed. Separate themes will be assigned to the students to prepare and make presentations about their assigned themes from the fourth lecture. The instructor will add comments and more information around the topic's related issues.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
1	Introduction	Data and Database Management; The Database Life Cycle; Conceptual Data Modeling
2	The Entity-Relationship Model	Fundamental ER Constructs; Advanced ER Constructs
3	The Unified Modeling Language (UML)	Class Diagrams; Activity Diagrams; Rules of Thumb for UML Usage
4	Requirements Analysis and Conceptual Data Modeling	Requirements Analysis; Conceptual Data Modeling; View Integration; Entity Clustering for ER Models
5	Transforming the Conceptual Data Model to SQL	Transformation Rules and SQL Constructs; Transformation Steps;
6	Normalization	Fundamentals of Normalization; The Design of Normalized Tables; Normalization of Candidate Tables; Normal Forms
7	An Example of Logical Database Design	Requirements Specification; Logical Design
8	Object-Relational Design	Object Orientation; Object-Oriented Databases; Object-Relational Databases
9	XML and Web Databases	XML; XML Design; Web-Based Applications
10	Business Intelligence	Data Warehousing; Online Analytical Processing (OLAP); Data Mining
11	CASE Tools for Logical Database Design	Introduction to the CASE Tools: Key Capabilities; Semi-Structured Data, XML
12	Case studies	Students' sub-theme presentations and discussions
13	Advanced topics	Hot topics in database design
14	Summary	Reviews of lectures

【Work to be done outside of class (preparation, etc.)】

For each topic, the assigned student must do a survey and prepare a presentation on the topic, then has the presentation at the assigned lecture's time. The student should collect related materials; make a summary report and presentation (PPT, demos, etc.) to show his/her understanding and skills on the topic. In addition, other students also investigate related technologies and materials to have active discussions on the topic.

【Textbooks】

- "Database Modeling and Design: Logical Design," 5th Ed., Toby J. Teorey, Sam Lightstone, Tom Nadeau, and H.V. Jagadish, Morgan Kaufmann, 2011. ISBN: 978-0123820204

- Lecture/presentation printouts / handouts and related materials will be provided to the students.

- Online materials.

【References】

- "Database Systems," 4th Ed., Thomas Connolly and Carolyn Begg, Pearson Education Limited, 2005. ISBN: 9780321210258

- "Database System Concepts," 6th Ed., Abraham Silberschatz, Henry F. Korth, and Henry F. Korth, McGraw-Hill, 2011. ISBN: 978-0-07-352332-3

- "Physical Database Design: The database professional's guide to exploiting indexes, views, storage, and more," 1st Ed., Sam Lightstone, Toby Teorey, and Tom Nadeau, Morgan Kaufmann, 2007. ISBN: 9780123693891

- "データベースの設計." T.J. ティオリー著; 原田勝訳 | データベースノセツケイ, 東京: 勤草書房, 2000.10. ISBN: 4326000252

Some other references will be introduced.

【Grading criteria】

Practical exercises and/or assignments to the students, and sub-themes as mini-projects will be also given to the students. The total evaluation will be based on

1. Discussion in the class and report(s): 40%
2. Sub-theme report(s) and presentation(s): 60%

【Changes following student comments】

Some case studies on several database designs were added.

【Equipment student needs to prepare】

Some database design tools (free software) can be downloaded and installed on private PC for logical database design.

COS500D1

Networking Technology

NGUYEN N BINH

Subtitle：ネットワーク技術

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

This course explores introductory basics and fundamentals of networking technology. The course focuses on the techniques for networking technology, starting with an introduction to computer networks. The course then explains the contents of application layer, transport layer, the network layer, and the link layer. It also addresses wireless and mobile networks, then multimedia networking, network security, and the network management issues.

【Goal】

Basic knowledge and skills in networking technology will be acquired. The student will understand basics and essentials of networking technology to use, manipulate and manage computer networks effectively. The student should do some works on networking technology.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

The first three lectures are on an overview of network technologies and application layer. The next lectures are to learn concepts, methods, techniques and practical issues of other layers, etc. Some advanced topics in networking technologies will be also addressed and discussed. Separate themes will be assigned to the students to prepare and make presentations about their assigned themes from the fourth lecture. The instructor will add comments and more information around the topic's related techniques and technologies

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
1	Introduction to Computer Networks and the Internet	Network edges; core; delay, loss, throughput; protocol layers, service models; security
2	Application Layer	Principles of network applications; Web and HTTP; FTP
3	Application Layer (Cont.)	Electronic mail: SMTP, POP3, IMAP; DNS; P2P applications; socket programming
4	Transport Layer	Transport-layer services; multiplexing; UDP; principles of reliable data transfer
5	Transport Layer (Cont.)	TCP; principles of congestion control; TCP congestion control
6	The Network Layer	Introduction: virtual circuit and datagram networks; IP: datagram format; IPv4; ICMP; IPv6
7	The Network Layer (Cont.)	Routing algorithms in the Internet; broadcast and multicast routing.
8	The Link Layer: Links, Access Networks, and LANs	Introduction, services; error detection, correction; multiple access protocols
9	The Link Layer: Links, Access Networks, and LANs (Cont.)	LANs: addressing and ARP, Ethernet, switches, VLANs; link virtualization: MPLS
10	Wireless and Mobile Networks	Wireless links, characteristics; CDMA; IEEE 802.11; wireless LANs ("Wi-Fi"); Cellular Internet Access; Mobile issues.
11	Multimedia Networking	Multimedia networking applications; streaming stored video; voice-over-IP; protocols for real-time conversational applications; multimedia
12	Security in Computer Networks	Principles of cryptography; Message integrity, authentication: Securing e-mail; SSL; IPsec; Securing wireless LANs; IDS

13	Network Management	Internet standard management framework: SMI, MIB, SNMP, SNMP protocol operations and transport mappings, security and administration; ASN.1
14	Hot topics Summary	Presentations and discussions. Reviews of lectures

【Work to be done outside of class (preparation, etc.)】

For each topic, the assigned student must do a survey and prepare a presentation on the topic, then has the presentation at the assigned lecture's time. The student should collect related materials; make a summary report and presentation (PPT, demos, etc.) to show his/her understanding and skills on the topic. In addition, other students also investigate related technologies and materials to have active discussions on the topic.

【Textbooks】

- "Computer networking: a top-down approach," 6th Ed., James F. Kurose and Keith W. Ross, Boston: Pearson, 2013. ISBN: 9780132856201

- Lecture/presentation printouts / handouts and related materials will be provided to the students.

- Online materials.

【References】

- "Computer networking: a top-down approach featuring the Internet," 2nd(int'l) Ed., James F. Kurose, Keith W. Ross, Boston, Addison-Wesley, 2003. ISBN: 0321176448

- "Data and computer communications," 8th Ed., William Stallings, Upper Saddle River, N.J. : Pearson/Prentice Hall, 2007. ISBN: 0132433109

- "インターネット技術のすべて：トップダウンアプローチによる実践ネットワーク技法." ジェームズ・F. クロセ, キース・W. ロス著, 秋月治 [ほか] 訳, 東京, ビアソン・エデュケーション, 2004.1. ISBN: 4894714949

Some other references will be introduced.

【Grading criteria】

Practical exercises and/or assignments to the students, and sub-themes as mini-projects will be also given to the students. The total evaluation will be based on

1. Discussion in the class and report(s): 40%
2. Sub-theme report(s) and presentation(s): 60%

【Changes following student comments】

Some case studies on networking were added.

【Equipment student needs to prepare】

Some networking tools (free software) can be downloaded and installed on private PC for networking technology.

GNM500D1

Introduction to Bioinformatics

常重 アントニオ Antonio TSUNESHIGE

Subtitle：バイオインフォマティクス入門

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

This introductory course is offered *to students in general*. Previous knowledge of molecular biology, chemistry, or physics, although recommended, is not a requirement, as most basic topics will be presented in a concisely manner. Processes covering from gathering scientific information, to sequencing of genomic material, sequencing and modeling of proteins will be presented.

【Goal】

You should be able:

- (1) to understand the basic concepts and principles of bioinformatics, and how they are applied routinely;
- (2) to acquire basic and relevant information in the literature by cross-referencing;
- (3) to retrieve and analyze genomic and protein sequences from their respective databases; and
- (4) to understand basic information released thorough the media.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

This course consists of fourteen lectures. Relevant material (scientific articles) for the lectures will be provided as needed using the H'etude system. Part of the classes will emphasize on problem-solving situations.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
1	What is bioinformatics? -Part 1	Why is bioinformatics so relevant nowadays? Brief introduction to the scope of this new field. Introduction to NCBI
2	What is bioinformatics? -Part 2	What bioinformatics cannot do for you. Understanding the limitations of bioinformatics.
3	What is Life? Living organisms.	Introduction to basic biological concepts. Chemistry of Life. living organisms.
4	Rules of the Game. Part 1	Variety of life forms. Basic concepts.
5	Rules of the Game. Part 2	Basic concepts (continued). Terminology and processes.
6	Rules of the Game, Part 3	Basic concepts (continued). Terminology and processes.
7	Recapitulation of previous classes	Summary of basic concepts and processes learned in previous classes.
8	Analyzing a protein sequence. Part 1	Introduction to the Protein Data Bank. Retrieval of a protein sequence. FASTA format.
9	Analyzing a protein sequence. Part 2	Introduction to Swiss Viewer. Introduction to ExPASy (portal of the Swiss Institute of Bioinformatics).
10	Analyzing a DNA sequence. Part 1	Nucleotide sequence database
11	Analyzing a DNA sequence. Part 2	Analyzing DNA composition.
12	Comparing sequences. Multiple sequence alignment	Finding coding regions Introduction to BLAST and Clustal
13	Evolution and phylogenetic trees (1)	Biological basis of evolution at molecular level.
14	Evolution and phylogenetic tree (2)	Cladistic trees.

【Work to be done outside of class (preparation, etc.)】

You will be ask to check database sites and retrieve specific information. Also, you will be asked to work specific software on relevant data. If time permits, instructions on how to operate programs for protein data modeling will provided.

【Textbooks】

"Bioinformatics for Dummies", J.-M. Claverie, C. Notredame, Wiley Publishing Inc., 2007.

Purchase of this book is not necessary. Lectures are based on a collection of books and articles. Material will be provided.

【References】

"Understanding Bioinformatics", M. Zvelebil & Baum, J. O., Garland Science, 2007.

This is a textbook for advanced students, and exceeds the scope of this course. Nevertheless, this is considered the standard book for bioinformatics.

Relevant scientific articles will be provided prior classe

【Grading criteria】

Reports (40%) are to be submitted as requested within deadline limit. Final exam (40%) at the end of course.

Active participation in class (20%) is encouraged.

Some of the reports require you to link to a server, or the use of certain programs (provided in class) on personal computers. You

【Changes following student comments】

None.

【Equipment student needs to prepare】

Personal computer for data retrieval, computation, or access to mainframe servers. Connectivity to the Internet is required.

【Others】

None.

【】

This introductory course is offered *to students in general*. Previous knowledge of molecular biology, chemistry, or physics, although recommended, is not a requirement, as most basic topics will be presented in a concisely manner. Processes covering from gathering scientific information, to sequencing of genomic material, sequencing and modeling of proteins will be presented.

COS500D1

Multimedia Signal Coding Algorithms

周 金佳 Jinjia Zhou

Subtitle : マルチメディア信号符号化論

Term : | Term : | Credit(s) : 2

Day/Period : | Campus : 小金井 / Koganei

Grade :

Notes :

【Textbooks】

Handouts and prints will be distributed.

【References】

An introduction to information theory: symbol, signals and noise, John

R. Pierce

Elements of information theory, 2nd edition, Thomas M. Cover and Joy

A.

【Grading criteria】

Homework 50% + Final Examination 50%

【Changes following student comments】

None in particular.

【Outline and objectives】

In today's information society, coding plays an essential role in the storage and delivery of information, especially the multimedia information that involves a huge volume of data. This course will introduce the key coding theories, including source coding for data compression and channel coding for data transmission over a noisy channel, all based on the substantial concept of entropy.

【Goal】

The students will get to understand the key concepts and techniques in information and coding theories, such as entropy, Huffman coding, arithmetic coding and channel capacity. As a result, they will acquire background knowledge necessary to undertake advanced courses on image processing, video processing, wireless communication and information security, etc.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

The concept of entropy will be explained followed by an introduction and a review of probability theory. Source coding theory and channel coding theory will then be introduced along with their applications to multimedia information. The lectures will be given in a highly interactive manner. The students will be asked to join the discussions on the basic coding problems and consider their own solutions. Most homework assignments will on open problems without standard answers. The students will be encouraged not only to learn the knowledge but also think how it can be used.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

あり / Yes

【Schedule】

No.	Theme	Contents
1	Introduction	Background of multimedia signal coding. Introduction to the lecturer. Course overview.
2	Probability theory review	Probability theory review
3	Information and entropy	How information is quantified. What entropy is and why it is useful.
4	Conditional entropy and mutual information	Conditional entropy. Chain rule. Mutual information.
5	Source coding basics	Codes and trees. Kraft inequality. Shannon-type codes.
6	Source coding schemes	Fano code. Huffman code.
7	Arithmetic coding	Shannon-Fano-Elias code. Binary arithmetic coding.
8	Adaptive arithmetic coding	Improve compression efficiency with adaptive probability models.
9	Source coding for multimedia information	How Huffman code and arithmetic coding are used in real multimedia data compression.
10	Channel coding basics	Binary symmetric channel. Repetition code. Hamming distance.
11	Hamming codes	How Hamming codes are built and why they are efficient.
12	Channel capacity	Channel capacity. Binary erasure channel. Noisy typewriter channel.
13	Channel coding theorem	Asymptotic equipartition property. Transmission rate and channel capacity.
14	Confirmation of understanding	Confirmation of understanding

【Work to be done outside of class (preparation, etc.)】

Before the first lecture, please check: https://en.wikipedia.org/wiki/Information_theory

More preparations will be announced during the lectures, if necessary. Homework assignments will be given every other lectures.

COS500D1

Multimedia Information Processing

周 金佳 Jinjia Zhou

Subtitle：マルチメディア情報処理技術

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Grading criteria】

Homework 50% + Final Presentation 50%

【Changes following student comments】

None in particular.

【Outline and objectives】

Recently, multimedia information (video, image, audio, etc.) covers from everyone's experiences to everything happening in the world. This course will introduce the basic principles and tools used to process digital images, videos and audios, and how to apply them in solving practical problems.

【Goal】

The students will get to understand the key concepts and techniques in multimedia information processing such as transform, enhancement, segmentation, etc.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

The lectures will be given in a highly interactive manner. The students will be asked to join the discussions on the basic multimedia processing problems and consider their own solutions. Most homework assignments will on open problems without standard answers. The students will be encouraged not only to learn the knowledge but also think how it can be used.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

あり / Yes

【Schedule】

No.	Theme	Contents
1	Introduction	Background of multimedia information processing. Introduction to the lecturer. Course overview.
2	Human visual system	What is human visual system model?
3	Quality measurement	Subjective and objective image/video quality measures
4	Color space, image sampling	How to store a color image? The structure and properties of color spaces.
5	Quantization	Basic properties of quantization. Rate - distortion optimization. Quantizers
6	Image transforms (1)	What is frequency domain? How transform works and why it is useful.
7	Image transforms (2)	Fourier transform. Discrete cosine transform. KL transform.
8	Image transforms (3)	Walsh-Hadamard transform. Haar transform.
9	Image enhancement (1)	What is image enhancement and why it is important?
10	Image enhancement (2)	Enhancement methods in image processing: Histogram processing, linear and non-linear noise smoothing, sharpening.
11	Video processing	History of video coding. Video processing techniques overview.
12	Motion detection and estimation	Motion detection and estimation. Motion compensated filtering
13	Machine learning	Neural network, convolutional neural network
14	Confirmation of understanding	Confirmation of understanding

【Work to be done outside of class (preparation, etc.)】

Homework and final presentation

【Textbooks】

Handouts and prints will be distributed.

【References】

Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Pearson Education/PHI.

Digital Video Processing, A. Murat Tekalp, Prentice Hall.

FRI500D1

Cryptography and its Applications

岡本 龍明 Tatsuaki OKAMOTO

Subtitle：暗号とその応用

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

Nowadays, modern cryptography is widely used in Internet and many IT applications. Cryptocurrencies and block-chains are one of the applications of cryptography. This course will introduce the basic concept and techniques of modern cryptography as well as cryptocurrencies. It will also provide some advanced topics of modern cryptography such as post-quantum cryptography, homomorphic encryption and functional encryption.

【Goal】

The students will get to understand the key concepts and techniques in modern cryptography and its applications to cryptocurrencies, such as symmetric-key encryption, public-key encryption, digital signatures, Bitcoin, block-chains and some advanced concepts of cryptography.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

Following the lectures, the students will learn the concepts and understand the basis of modern cryptography and cryptocurrencies. This course provides opportunities to students to learn the basic knowledge, methods and techniques.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
1st class	Introduction	Background of modern cryptography. Introduction to the lecturer. Course overview.
2nd class	Symmetric-key cryptosystems	Block ciphers and authentication code
3rd class	Concept of Public-key cryptosystems	Public-key encryption, Key exchange
4th class	Security and construction of public-key cryptosystems	CCA security, DH key exchange, RSA encryption, ElGamal encryption
5th class	Concept and security of digital signatures and hash functions	Requirements for electronic signatures, EU-CMA security
6th class	Construction of digital signatures and hash functions	RSA signatures, (EC-)DSA signatures, SHA family of hash functions
7th class	Public-key infrastructures (PKI)	Certificate authorities (CA), Digital signature laws
8th class	Post-quantum cryptography	Quantum computer, Lattice-based cryptography
9th class	Electronic money	Traditional electronic money systems, Ecash systems
10th class	Bitcoin	Proof of work (POW), Mining, Transactions, Block-chain.
11th class	Drawbacks of Bitcoin and other cryptocurrencies	Proof of Stake (POS), Smart contract, Ethereum, DAG
12th class	Block-chains	Open Ledger, Centralized/decentralized system, Public/private systems
13th class	Advances of public-key cryptosystems (1)	Fully homomorphic encryption, Applications, Lattice based construction
14th class	Advances of public-key cryptosystems (2)	Functional encryption, Applications, Bilinear based construction

【Work to be done outside of class (preparation, etc.)】

Before the first lecture, please check: <https://en.wikipedia.org/wiki/Cryptography>

【Textbooks】

I will introduce some books and articles in my lectures.

【References】

I will introduce some books and articles in my lectures.

【Grading criteria】

1. Class participation: 40%
2. Final report: 60%

【Changes following student comments】

n/a The class has just started last year.

【】

Nowadays, modern cryptography is widely used in Internet and many IT applications. Cryptocurrencies and block-chains are one of the applications of cryptography. This course will introduce the basic concept and techniques of modern cryptography as well as cryptocurrencies. It will also provide some advanced topics of modern cryptography such as post-quantum cryptography, homomorphic encryption and functional encryption.

BSP500D1

Technical Writing Workshop 1

周 金佳 Jinjia Zhou

Subtitle：テクニカルライティングワークショップ 1

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

Getting your work published in top conferences and journals requires not only great science, but also a well-written document. This course helps students develop effective writing skills for publication in English.

【Goal】

This course aims to cultivate the ability of writing technical papers.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

The students will apply what they have learned in their own writing, slowly constructing a full-research paper by the end of the course. The lectures will be given in a highly interactive manner. The students will be asked to join the discussions on their written paper.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

あり / Yes

【Schedule】

No.	Theme	Contents
1	Introduction	Technical writing overview. Introduction to the lecturer. Course overview.
2	Writing tools (1)	Introduction to Latex, Microsoft Word, and Microsoft Visio.
3	Writing tools (2)	Introduction to Latex, Microsoft Word, and Microsoft Visio.
4	Preparing to write. Reference survey	Principles of audience analysis and structure of research papers. Learning how to survey the reference papers.
5	Reference survey (1)	The students will choose a topic and report their survey results.
6	Reference survey (2)	The students will report their survey results.
7	Abstract and introduction sections	Learning how to write the abstract and introduction sections.
8	Proposal section	Learning how to write the proposal section.
9	Results and comparison sections	Learning how to write the results and conclusion sections.
10	Conclusion, acknowledgement, and reference	Learning how to write the conclusion, acknowledgement, and reference sections.
11	Figures, tables, and pseudo code	Learning how to draw figures, tables, and pseudo code.
12	Revising and reviewing	Revising and reviewing manuscripts written by the other students. The students will present their written paper.
13	Paper submission	Learning the process of submitting a conference paper.
14	Case study	Writing a full paper. The students will present their paper.

【Work to be done outside of class (preparation, etc.)】

Homework (reports and presentation).

【Textbooks】

Handouts and prints will be distributed.

【References】

English for Writing Research Papers, A. Wallwork, Springer.
Science Research Writing: A Guide for Non-Native Speakers of English, H.G. Deal, Imperial College Press.

【Grading criteria】

Homework 80% + Final Presentation 20%

【Changes following student comments】

None in particular.

BSP500D1

Technical Presentation Workshop 1

周 金佳 Jinjia Zhou

Subtitle：テクニカルプレゼンテーションワークショップ 1

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

In this course, students will develop the oral presentation skills which are helpful to present their research results.

【Goal】

This course aims to cultivate the ability to give technical presentations.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

This course includes group discussion, learning talks on TED, learning American English pronunciation, and 2 times oral presentations. The lectures will be given in a highly interactive manner. The students will be encouraged to join the in-class discussions on their presentations.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

あり / Yes

【Schedule】

No.	Theme	Contents
1	Introduction	Technical presentation overview. Introduction to the lecturer. Course overview.
2	Oral presentation skills	Introduction to basic oral presentation skills.
3	Talks on TED (1)	Learning from talks on TED. The students are divided to several groups. Every group chooses a presentation topic.
4	Talks on TED (2)	Learning from talks on TED. The students start to prepare their presentation.
5	Talks on TED (3)	Learning from talks on TED. The students start to prepare their presentation.
6	Group presentation (1)	Every group give 30-minus presentation and 10-minus Q/A. In-class discussion.
7	Group presentation (2)	Every group give 30-minus presentation and 10-minus Q/A. In-class discussion.
8	Pronunciation and intonation	Learning pronunciation and intonation
9	Handling your nerves	Learning how to handle your nerves
10	Writing and Editing the text of the slides	Learning the skills for writing and editing the text of the slides.
11	Getting and keeping the audience's attention	Learning how to get and keep the audience's attention.
12	Questions and answers	Learning the skills of answering questions.
13	Practice presentation (1)	Every student gives 15-minus presentation and 5-minus Q/A. In-class discussion.
14	Practice presentation (2)	Every student gives 15-minus presentation and 5-minus Q/A. In-class discussion.

【Work to be done outside of class (preparation, etc.)】

Preparation of presentations.

【Textbooks】

Handouts and prints will be distributed.

【References】

English for Presentations at International Conferences, A.Wallwork, Springer.

【Grading criteria】

Group presentation 40% + Personal presentation 60%

【Changes following student comments】

None in particular.

BSP500D1

Technical Writing Workshop 2

周 金佳 Jinjia Zhou

Subtitle：テクニカルライティングワークショップ2

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

[Grading criteria]

Homework 60% + in-class discussion 40%

[Changes following student comments]

None in particular.

[]

Getting your work published in top conferences and journals requires not only great science but also a well-written document. This course helps students develop effective writing skills for publication in English. For the whole year, there are Technical Writing Workshop 1 and Technical Writing Workshop 2.

[Outline and objectives]

Getting your work published in top conferences and journals requires not only great science but also a well-written document. This course helps students develop effective writing skills for publication in English. For the whole year, there are Technical Writing Workshop 1 and Technical Writing Workshop 2.

[Goal]

For this semester, the Technical Writing Workshop 2 aims to cultivate the ability to write journal papers.

[Which item of the diploma policy will be obtained by taking this class?]

[Method(s)]

The students will apply what they have learned in their own writing, slowly constructing a full research paper by the end of the course. The basic skills from Technical Writing Workshop 1 will be used. The lectures will be given in a highly interactive manner. The students will be asked to join the discussions on their written paper.

[Active learning in class (Group discussion, Debate.etc.)]

あり / Yes

[Fieldwork in class]

あり / Yes

[Schedule]

No.	Theme	Contents
1	Introduction	Technical writing overview. Introduction to the lecturer. Course overview.
2	Reference survey	Learning how to survey the reference papers. Study the high ranked journals in the related research area.
3	Introduction to journal papers	Learning the difference between conference and journal papers. Learning how to expand a conference paper to a journal paper.
4	Introduction section	Learning how to write the introduction section of a journal paper.
5	Proposal section	Learning how to write the proposal section of a journal paper.
6	Result section	Learning how to write the result section of a journal paper.
7	Comparison section	Learning how to write the comparison section of a journal paper.
8	Conclusion, acknowledgement, and reference	Learning how to write the conclusion, acknowledgement, and reference sections.
9	Paper submission	Learning the process of submitting a journal paper.
10	Case study	Writing a full paper. The students will present their paper.
11	Case study 2	Based on the presented paper, we will have a group discussion.
12	Review	Learning the review process of a journal paper. Learning how to evaluate a journal paper.
13	Reply letter	Learning how to write a reply letter for a conditional accepted journal paper.
14	Summary of course	Summary. Question and answers.

[Work to be done outside of class (preparation, etc.)]

Homework (reports, paper writing and presentation).

[Textbooks]

Handouts and prints will be distributed.

[References]

Science Research Writing: A Guide for Non-Native Speakers of English, H.G. Deal, Imperial College Press.

BSP500D1

Technical Presentation Workshop 2

周 金佳 Jinjia Zhou

Subtitle：テクニカルプレゼンテーションワークショップ2

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Grading criteria】

Homework 20% + presentations 80%

【Changes following student comments】

None in particular.

【Outline and objectives】

In this course, students will develop the oral presentation skills which are helpful to present their research results.

【Goal】

This course aims to cultivate the ability to give technical presentations.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

This course includes group discussion, learning talks on TED, and 2 times oral presentations. The lectures will be given in a highly interactive manner. The students will be encouraged to join the in-class discussions on their presentations.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

あり / Yes

【Schedule】

No.	Theme	Contents
1	Introduction	Technical presentation overview. Introduction to the lecturer. Course overview.
2	Oral presentation skills	Introduction to basic oral presentation skills.
3	Presentation tools	Introduction to Microsoft Powerpoint.
4	Talks on TED (1)	Learning from talks on TED. The students are divided to several groups. Every group chooses a presentation topic.
5	Talks on TED (2)	Learning from talks on TED. The students are divided to several groups. Every group chooses a presentation topic.
6	Talks on TED (3)	Learning from talks on TED. The students are divided to several groups. Every group chooses a presentation topic.
7	Presentation and discussion for the first topic (1)	Students will give 10-minus presentation and 5-minus Q/A. In-class discussion.
8	Presentation and discussion for the first topic (2)	Students will give 10-minus presentation and 5-minus Q/A. In-class discussion.
9	Presentation and discussion for the first topic (3)	Students will give 10-minus presentation and 5-minus Q/A. In-class discussion.
10	Summary of the presentations	The presentation techniques will be summarized. The students will choose their second presentation topic.
11	Presentation and discussion for the second topic (1)	Students will give 15-minus presentation and 5-minus Q/A. In-class discussion.
12	Presentation and discussion for the second topic (2)	Students will give 15-minus presentation and 5-minus Q/A. In-class discussion.
13	Presentation and discussion for the second topic (3)	Students will give 15-minus presentation and 5-minus Q/A. In-class discussion.
14	Summary of the presentations	The presentation techniques will be summarised.

【Work to be done outside of class (preparation, etc.)】

Preparation of presentations.

【Textbooks】

Handouts and prints will be distributed.

【References】

English for Presentations at International Conferences, A.Wallwork, Springer.

CAR500D1

IIST Seminar

周金佳、チャピ ゲンツィ、中村壮亮、伊藤一之、八名和夫、
彌富仁、中村洋一、山下明泰、常重アントニオ、佐野俊夫

Subtitle：IIST セミナー

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

In this course, several famous researchers will be invited to share their experience of doing research and studying abroad.

【Goal】

The course aims to let students learn from great and famous researchers.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

Several famous researchers will be invited to share their stories. Students can directly communicate with these researchers. A final report is required.

【Active learning in class (Group discussion, Debate.etc.)】

なし / No

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
1	Introduction	Course overview.
2	Invited talk – The Experience of Studying Abroad	The invited researcher shares his/her experience of studying abroad.
3	Invited talk – Research	The invited researcher introduces his/her research.
4	Invited talk – The Experience of Studying Abroad	The invited researcher shares his/her experience of studying abroad.
5	Invited talk – Research	The invited researcher introduces his/her research.
6	Invited talk – The Experience of Studying Abroad	The invited researcher shares his/her experience of studying abroad.
7	Invited talk – Research	The invited researcher introduces his/her research.
8	Invited talk – The Experience of Studying Abroad	The invited researcher shares his/her experience of studying abroad.
9	Invited talk – Research	The invited researcher introduces his/her research.
10	Invited talk – The Experience of Studying Abroad	The invited researcher shares his/her experience of studying abroad.
11	Invited talk – Research	The invited researcher introduces his/her research.
12	Invited talk – The Experience of Studying Abroad	The invited researcher shares his/her experience of studying abroad.
13	Invited talk – Research	The invited researcher introduces his/her research.
14	Summary of course	Summary and discussion.

【Work to be done outside of class (preparation, etc.)】

Report

【Textbooks】

Handouts and prints will be distributed.

【References】

N/A

【Grading criteria】

Report 50% + In-class discussion 50%

【Changes following student comments】

None in particular.

【】

The students can learn interesting research topics from various areas.

LANj500D1

Japanese communication 1

村松 葉子 Yoko MURAMATSU

Subtitle：日本語コミュニケーション 1

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

Basic Japanese and Culture

【Goal】

This class aims to learn Japanese basic structures and expressions in daily life and know Japanese customs to have simple communication with Japanese people.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

This is kind of acting class, so students are required to perform as much as possible. We will learn some new grammar, and then practice speaking and asking each other. Out of class, students will have some writing homework. There will be a few quizzes.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
①	Introduction	Go over syllabus Self-introduction Level check
②	lesson1	～は～です。 hiragana
③	lesson2	Pronouns and Noun Modifiers(こそあど) hiragana
④	lesson3	Verb(non-past tense) hiragana
⑤	lesson4	expression of inviting someone to do something hiragana
⑥	review	review and culture Review lesson1-3,talking about custom
⑦	lesson5	Existence of things and people(います・あります katakana
⑧	lesson6	verb(past tense) katakana
⑨	lesson7	あげます・もらいます Expression of giving and receiving. katakana
⑩	lesson8	adjective katakana
⑪	lesson9	counting review
⑫	review	review culture Studying
⑬	lesson10	te-form(1)
⑭	lesson11	te-form(2) expression of asking someone to do

【Work to be done outside of class (preparation, etc.)】

All students are required to review for quiz. And home works.

【Textbooks】

Teacher will provide handouts to the students.

【References】

Dictionaries(no google translation)

【Grading criteria】

Participation70%,Homework20%,Quiz10%

【Changes following student comments】

Following the results of the students comments, I'll include more grammar explanation and try to take more time.

I always welcome any comments and suggestions to improve this class anytime.

LANj500D1

Japanese communication 2

村松 葉子 Yoko MURAMATSU

Subtitle：日本語コミュニケーション2

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

Basic Japanese and Culture

【Goal】

This class aims to learn Japanese basic structures and expressions in daily life and know Japanese customs to have simple communication with Japanese people.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

This is kind of acting class, so students are required to perform as much as possible. We will learn some new grammar, and then practice speaking and asking each other. Out of class, students will have some writing homework. There will be a few quizzes.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
①	lesson1	Presnt progressive and Habitual actions
②	lesson2	te-form(Adjective)
③	lesson3	short form
④	lesson4	Expression of quotation and opinion
⑤	review	Review and others Japanese custom
⑥	lesson5	short form(past)
⑦	lesson6	Qualifying Nouns with verbs and adjectives
⑧	lesson7	Comparison
⑨	lesson8	Expression of planning
⑩	review	Indicating a change
⑪	lesson9	Review
⑫	lesson10	Japanese culture
⑬	lesson11	ta-form
⑭	lesson12	Expression of experience ～んです。
		Expression of guess or prediction

【Work to be done outside of class (preparation, etc.)】

All students are required to review for quiz. And home works

【Textbooks】

Teacher will provide handouts to the students.

To be announced.

【References】

Dictionaries(no google translation)

【Grading criteria】

Participation70%,Homework20%,Quiz10%

【Changes following student comments】

Following the results of the students comments, I'll include more grammar explanation and try to take more time.

I always welcome any comments and suggestions to improve this class anytime.

LANj500D1

Japanese communication 3

村松 葉子 Yoko MURAMATSU

Subtitle：日本語コミュニケーション3

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

Basic Japanese and Culture

【Goal】

This class aims to learn Japanese basic structures and expressions in daily life and know Japanese customs to have simple communication with Japanese people.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

This is kind of acting class, so students are required to perform as much as possible. We will learn some new grammar, and then practice speaking and asking each other. Out of class, students will have some writing homework. There will be a few quizzes.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
①	review	review last term
②	lesson1	Existence of things and people(います・あります)
③	lesson2	あげます・もらいます
④	lesson3	Expression of giving and receiving.
⑤	lesson4	te-form(1)
⑥	lesson5	te-form(2)
⑦	lesson6	expression of asking someone to do
⑧	lesson7	Presnt progressive and Habitual actions
⑨	lesson8	expression of permission
⑩	review	te-form(Adjective)
⑪	lesson9	Expression of quotation and opinion
⑫	lesson10	Review and others Japanese custom
⑬	lesson11	Qualifying Nouns with verbs and adjectives
⑭	lesson12	Comparison(1)
		Comparison(2)
		Expression of planning
		Indicating a change

【Work to be done outside of class (preparation, etc.)】

All students are required to review. And home works.

【Textbooks】

Teacher will provide handouts to the students.

【References】

Dictionaries(no google translation)

【Grading criteria】

Participation70%,Home work20%,Quiz10%,

【Changes following student comments】

Following the results of the students comments, I'll include more grammar explanation and try to take more time.

I always welcome any comments and suggestions to improve this class anytime.

LANj500D1

Japanese communication 4

村松 葉子 Yoko MURAMATSU

Subtitle：日本語コミュニケーション4

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

Basic Japanese and Culture

【Goal】

This class aims to learn Japanese basic structures and expressions in daily life and know Japanese customs to have simple communication with Japanese people.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

This is kind of acting class, so students are required to perform as much as possible. We will learn some new grammar, and then practice speaking and asking each other. Out of class, students will have some writing homework. There will be a few quizzes.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
①	lesson1	ta-form
②	lesson2	Expression of experience
③	lesson3	～んです。
④	lesson4	Expression of guess or prediction
⑤	review	Review all Japanese custom
⑥	lesson5	nai-form
⑦	lesson6	giving advise
⑧	lesson7	necessary
⑨	lesson8	potential verb
⑩	review	Review all Japanese custom
⑪	lesson11	possibility
⑫	lesson12	volitional form
⑬	lesson13	giving and receiving action
⑭	lesson14	hypothetical condition

【Work to be done outside of class (preparation, etc.)】

All students are required to review. And home works.

【Textbooks】

Teacher will provide handouts to the students.

【References】

Dictionaries(no google translation)

【Grading criteria】

Participation70%,Home work20%,Quiz10%,

【Changes following student comments】

Following the results of the students comments, I'll include more grammar explanation and try to take more time.

I always welcome any comments and suggestions to improve this class anytime.

COS500D1

Machine Learning

周 金佳 Jinjia Zhou

Subtitle：機械学習

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

This course provides a broad introduction to machine learning. Topics include: (i) Supervised learning. (ii) Unsupervised learning. (iii) Best practices in machine learning.

【Goal】

The students will get to understand the key techniques in machine learning and gain practice implementing them and getting them to work for yourself.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

The lectures will be given in a highly interactive manner. The students will be asked to join the discussions on the basic machine learning problems and consider their own solutions. The students will be encouraged not only to learn the knowledge but also think about how it can be used to solve the real problems.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

あり / Yes

【Schedule】

No.	Theme	Contents
1	Introduction	What is machine learning. What is supervised learning. What is unsupervised learning.
2	Linear regression with one variable	Model representation, cost function, gradient descent for linear regression.
3	Linear regression with multiple variables	Multiple features, gradient descent for multiple variables.
4	Logistic regression	classification, hypothesis representation, cost function,
5	Regularization	The problem of overfitting, regularized linear regression.
6	Neural networks	non-linear hypotheses, neurons and the brain, model representation.
7	Back-propagation algorithm.	back-propagation algorithm, gradient checking, random initialization.
8	Machine learning system design	Examples of implementing machine learning system.
9	Unsupervised learning	K-means algorithm.
10	Octave/Matlab Introduction	How to use Octave/Matlab
11	Python Introduction	How to use Python
12	Application Example: Photo OCR	Learn an example.
13	More examples and summary	Introduce more examples and summarize the lecture
14	Project presentation	Students present their project.

【Work to be done outside of class (preparation, etc.)】

Homework and final presentation.

【Textbooks】

Handouts and prints will be distributed.

【References】

Ian Goodfellow, "Deep learning".

【Grading criteria】

Homeworks 30% + Final Presentation 70%

【Changes following student comments】

None in particular.

ELC500D1

Digital System Design

周 金佳 Jinjia Zhou

Subtitle：デジタルシステム設計

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

This course introduces students to the basic concepts of digital systems, including analysis and design. Both combinational and sequential logic will be covered. Students will gain experience with several levels of digital systems, from simple logic circuits to programmable logic devices and hardware description language.

【Goal】

1. To learn how to design digital systems, from specification and simulation to construction and debugging.
2. To learn techniques and tools for programmable logic design
3. To understand the limitations and difficulties in modern digital design, including wiring constraints, high-speed, etc.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

The lectures will be given in a highly interactive manner. The students will be asked to design some projects such as traffic light controller. Most homework assignments will on open problems without standard answers. There will be many discussions to encourage the students to find the best solutions.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

あり / Yes

【Schedule】

No.	Theme	Contents
1	Introduction(1)	Introduction to digital system design.
2	Introduction(2)	Introduction to integrated system (LSI)
3	Moore's Law and Demard Scaling	Introduce Moore's law and demard scaling
4	Digital System	Definition of digital, binary coding. Introduce how to change from decimal to binary numbers
5	Boolean Algebra	Boolean logic gate, boolean algebra, and boolean equation.
6	Karnaugh Mapping	Truth table, karnaugh mapping, K-maps
7	Combinational Logic Function	Differences between combinational and sequential. Design of combinational circuit.
8	Design Examples of Combinational Logic Function	n-bit Adder, 2-to-4 line decoder, 7-segment encoder.
9	Multivibrators	S-R latch, D-latch, Flip-Flops.
10	Sequential Circuits	Basic registers, behavior of sequential circuit.
11	Examples of Sequential circuits	A temperature display, controllers.
12	Datapath Components	shift and rotate registers, barrel shifter, comparator.
13	Register-Transfer Level (RTL) Design	RTL design method, critical path.
14	Hardware Description Language	data type, structural verilog, simple behaviours.

【Work to be done outside of class (preparation, etc.)】

Homework and final presentation.

【Textbooks】

Handouts and prints will be distributed.

【References】

John Wiley and Sons Publishers, "Digital Design".
M. Morris Mano Micheal D. Ciletti, "Digital Design".

【Grading criteria】

Homework 50% + Final Presentation 50%

【Changes following student comments】

None in particular.

ELC500D1

Special Lecture on Advanced Integrated Science and Technology 1 (Introduction to Wireless Sensor Network)

Elma Zanaj

Subtitle：先進総合理工学特論 1 (無線センサーネットワーク入門)

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

The course aims to provide knowledge, study of ad hoc networks and sensors networks and their modeling, topological construction of various sensors networks in MATLAB. The main architectures of systems where sensors are used and the distribution of their information. Wireless sensor networks provide the basis for new computing paradigms that challenge many of the classical approaches to developing distributed and networking systems. This course considers the challenges of developing wireless networking protocols, power-management. As part of this course, students will design a wireless sensor network system using Matlab.

【Goal】

The course supports these concepts and basic terms: sensor networks, various algorithms for efficient data processing, data transmission from sensor networks, transmission channel problems.

【Which item of the diploma policy will be obtained by taking this class?】

【Method(s)】

Lectures, Discussions/Pair work/Group work,Project Presentation.

【Active learning in class (Group discussion, Debate.etc.)】

あり / Yes

【Fieldwork in class】

なし / No

【Schedule】

No.	Theme	Contents
1	Introduction in wireless networks	Radio, Wireless Data Networks, Unlicensed Radio Services, Point-to-Point, Benefits of Wireless.
2	Spread spectrum methods	CDMA, Frequency-Hopping Spread Spectrum, Orthogonal Frequency Division Multiplexing.
3	Wireless Data Services	Wi-Fi, Metropolitan Wi-Fi Services, Cellular Mobile Wireless Services, WiMAX, Bluetooth.
4	Ad Hoc and Sensor Networks	<ul style="list-style-type: none"> • The Future of Wireless Communication: Ad hoc networks, Wireless sensor networks • Challenges: Ad hoc networks, Wireless sensor networks.
5	Modeling Ad Hoc Networks	<ul style="list-style-type: none"> • Wireless Channel: The free space propagation model. The two-ray ground model. The log-distance path model. Large-scale and small-scale variations • Communication Graph • Modeling Energy Consumption: Ad hoc networks. Sensor networks • Mobility Models: Random waypoint model. Random direction model. Brownian-like motion. Map-based mobility. Group-based mobility. Asymptotic Notation.
6	Topology Control	<ul style="list-style-type: none"> • Motivations for Topology Control: Topology control and energy conservation. Topology control and network capacity. A Definition of Topology Control. A Taxonomy of Topology Control • Topology Control in the Protocol Stack: Topology control and routing. Topology control and MAC

7	Critical Transmitting Range	<ul style="list-style-type: none"> • The Critical Transmitting Range for Connectivity: Stationary Networks, Dense Networks, Sparse Networks, Different Deployment Region and Node Distribution • The CTR for k-connectivity : The CTR for Connectivity with Bernoulli Nodes .The Critical Coverage Range.
8	Matlab study of sensor network	Building loop programs
9	Wireless sensors and Gossip algorithm	Epidemic algorithms. Gossip algorithm and its optimization
10	Unicast algorithm and its optimization	Efficiency of unicast algorithms on wireless sensor networks
11	Broadcast algorithms	Comparison of Gossip, Unicast and Broadcast. Theoretical analysis and simulation results in nested and problematic nets.
12	UWSN	Depth and Energy Aware Dominating Set Based Algorithm for Cooperative Routing along with Sink Mobility in Underwater WSNs
13	Wireless Mesh Networks	Network architecture. Characteristics. Application scenarios
14	Wireless Mesh Networks	Critical factors influencing network performance.Capacity of WMNs

[Work to be done outside of class (preparation, etc.)]

It is a course prerequisites a project. The students have to run in Matlab an algorithm for routing in WNS. Knowledge of Matlab is assumed. Carrying out a part of self-directed research in Ad hoc and WSN.

[Textbooks]

This class does not require a textbook. All readings will be distributed printed papers.

[References]

P. Santi, Mobility Models for Next Generation Wireless Networks: Ad Hoc, Vehicular and Mesh Networks, 1st Edition, 2012, J. Wiley & Sons, ISBN-13: 978-1119992

J. Ross, The book of wireless, 2008, No starch Press, ISBN-10: 1-59327-169-7.

[Grading criteria]

Your grading will be based on the following components:

Critiques (30%): For each group of assigned readings, the students will have to write a critique. The critique should be about half a page (not necessarily an essay form) that captures your insights regarding the reading material. The critique is not intended to be a summary of the reading material. Instead you should focus on identifying open issues and limitations of the proposed technical solutions.

Project (60%) : The bulk of the grad for the class will be based on your system project. As part of the project you shall develop a simulation, demonstrate a system, and write a final report. During the course there will be four milestones:

Project proposal and presentation: 10%

Project demo I: 5%

Project demo II: 5%

Final report: 40%

Participation (10%): Class participation is strongly encouraged.

[Changes following student comments]

Questionnaires will be considered

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The course aims to provide knowledge, study of ad hoc networks and sensors networks and their modeling, topological construction of various sensors networks in MATLAB. The main architectures of systems where sensors are used and the distribution of their information. Wireless sensor networks provide the basis for new computing paradigms that challenge many of the classical approaches to developing distributed and networking systems. This course considers the challenges of developing wireless networking protocols, power-management. As part of this course, students will design a wireless sensor network system using Matlab.

