

2020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

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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 concise 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 interpret the processed data

【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, all in English) for the lectures will be provided as needed using the Hétude 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. Introduction to Protein and Nucleotide BLAST.

9	Analyzing a protein sequence. Part 2	Introduction to ExPASy (portal of the Swiss Institute of Bioinformatics).
10	Nucleotide sequences. Part 1	Chemistry of DNA and RNA molecules.
11	Nucleotide sequences. Part 2	Analyzing DNA and RNA composition.
12	Comparing sequences. Multiple sequence alignment	The many flavors of BLAST and Clustal. How to use these tools.
13	Evolution and phylogenetic trees (1)	Biological basis of evolution at molecular level.
14	Evolution and phylogenetic tree (2)	Cladistic trees. Interpretation of phylogenetic trees.

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

【Preparatory study and review time for this class are 4 hours each.】 During classes, preferably a personal computer, will be required to check database sites and retrieve specific information. Also, you will be asked to work specific software on relevant data concerning molecular representation of molecules. If time permits, instructions on how to operate programs for protein data modeling will be 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.

Information is widely available on the internet.

【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 classes.

【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 strongly encouraged.

Some of the reports require you to link to a server to retrieve data and perform the appropriate analysis.

【Changes following student comments】

Due to the manageable number of students in each session, a one-on-one interaction during classes has been always possible. This provides a real-time feedback to adjust, in a bespoke manner, the content and emphasis of each lecture, to circumvent the wide diversity of backgrounds of the students. In a such a way, this course, although introductory, can be offered to any student holding any background, and personal interest stands as the only requirement.

【Equipment student needs to prepare】

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

【Others】

None.

COS500D1

Coding and Information Theory

周 金佳 Jinjia Zhou

Subtitle：符号化と情報理論

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Outline and objectives】

In today's information society, coding plays an essential role in the storage and delivery of information. This course will introduce information and coding theory, 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 coding and information theory. 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	How Huffman code and arithmetic coding are used in 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.)】

【Preparatory study and review time for this class are 4 hours each.】 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.

【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.

COS500D1

Digital Image and Video Processing

周 金佳 Jinjia Zhou

Subtitle：デジタル画像と映像処理

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【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 and videos, and how to apply them in solving practical problems.

【Goal】

The students will get to understand the key concepts and techniques in the digital image and video 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 be 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 digital image and video 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	Transforms (1)	What is frequency domain? How transform works and why it is useful.
7	Transforms (2)	Fourier transform. Discrete cosine transform. KL transform.
8	Transforms (3)	Walsh-Hadamard transform. Haar transform.
9	Enhancement (1)	What is image enhancement and why it is important?

10	Enhancement (2)	Enhancement methods in image processing: Histogram processing, linear and non-linear noise smoothing, sharpening.
11	Image/video coding	Introduction of image and video coding.
12	Motion detection and estimation	Motion detection and estimation. Motion compensated filtering
13	Machine learning in image/video processing	Neural network, convolutional neural network
14	Confirmation of understanding	Confirmation of understanding

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

【Preparatory study and review time for this class are 4 hours each.】 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.

【Grading criteria】

Homework 50% + Final Presentation 50%

【Changes following student comments】

None in particular.

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 on the 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 for 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 for 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.)】

【Preparatory study and review time for this class are 4 hours each.】 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.

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.)】

【Preparatory study and review time for this class are 4 hours each.】 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.)】

【Preparatory study and review time for this class are 4 hours each.】 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：

【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 lecture will begin on April 27th.]

[本授業の開始日は4月27日とする.]

It will be given in the Learning Management System.

Please confirm the announcement from the Learning Management System.

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 submit their written papers and their comments to other papers.

【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.)】

【Preparatory study and review time for this class are 4 hours each.】 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.

【Grading criteria】

Homework 60% + in-class discussion 40%

【Changes following student comments】

None in particular.

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：

【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)】

[The lecture will begin on April 27th.]

[本授業の開始日は4月27日とする.]

It will be given in the Learning Management System.

Please confirm the announcement from the Learning Management System.

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.)】

【Preparatory study and review time for this class are 4 hours each.】 Preparation of presentations.

【Textbooks】

Handouts and prints will be distributed.

【References】

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

【Grading criteria】

Homework 20% + presentations 80%

【Changes following student comments】

None in particular.

CAR500D1

IIST Seminar

周 金佳 Jinjia Zhou、宮越 龍義、常重 アントニオ
Antonio TSUNESHIGE、彌富 仁、佐野 俊夫、森
隆昌、内田 薫、中村 壮亮、チャピ ゲンツイ、八名
和夫、伊藤 一之

Subtitle：IIST セミナー

Term： | Term： | Credit(s)：2

Day/Period： | Campus：小金井 / Koganei

Grade：

Notes：

【Grading criteria】

Report 50% + In-class discussion 50%

【Changes following student comments】

None in particular.

【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 invited speaker introduces his/her research.
3	Invited talk	The invited speaker introduces his/her research.
4	Invited talk	The invited speaker introduces his/her research.
5	Invited talk	The invited speaker introduces his/her research.
6	Invited talk	The invited speaker introduces his/her research.
7	Invited talk	The invited speaker introduces his/her research.
8	Invited talk	The invited speaker introduces his/her research.
9	Invited talk	The invited speaker introduces his/her research.
10	Invited talk	The invited speaker introduces his/her research.
11	Invited talk	The invited speaker introduces his/her research.
12	Invited talk	The invited speaker introduces his/her research.
13	Invited talk – Research	The invited speaker introduces his/her research.
14	Summary of course	Summary and discussion.

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

【Preparatory study and review time for this class are 4 hours each.】 Report

【Textbooks】

Handouts and prints will be distributed.

【References】

N/A

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(Introductory level)

【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	nominal sentence	～は～です。 hiragana
③	Pronouns and Noun Modifiers	こそあど hiragana
④	Verb	Verb ～ます (non-past tense) hiragana
⑤	expression of inviting someone to do something	expression of inviting someone to do something (some basic te-forms) hiragana
⑥	review	review and culture Review lesson1-3,talking about custom
⑦	Existence of things and people	Existence of things and people(います・あります) katakana
⑧	verb	verb ～ました (past tense) katakana
⑨	Expression of giving and receiving	あげます・もらいます Expression of giving and receiving. katakana
⑩	adjective	adjective(i-adj na-adj) katakana
⑪	counting	counting
⑫	review	review culture Studying
⑬	te-form	te-form(1) (to know rules and master)
⑭	expressions with te-form	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. Standard study time outside of class for preparation and review: 4 hours.

【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.

【Others】

All students are required that they can read Hiragana to register this class.

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(Early-Basic)

【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	Presnt progressive and Habitual actions	Presnt progressive and Habitual actions ～ています
②	te-form	te-form(Adjective)
③	short form	short form (Verb)
④	Expression of quotation and opinion	Expression of quotation and opinion(with using short form)
⑤	review	Review and others Japanese custom
⑥	short form	short form(past tense)
⑦	Qualifying Nouns	Qualifying Nouns with verbs and adjectives
⑧	comparison	between 2 items among 3 or more items
⑨	lesson8	Expression of planning Indicating a change
⑩	review	Review Japanese culture
⑪	ta-form	ta-form
⑫	Expression of experience	Expression of experience with ta-form
⑬	the mode of explaining things	Review short form ～んです。
⑭	Expression of guess or prediction	Expression of guess or prediction with short form

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

All students are required to review for quiz. And home works. Standard study time outside of class for preparation and review: 4 hours.

【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.

【Others】

Students are required that they can read Hiragana to register this class.

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(Early basic)

【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)】

【The lecture is going to start on zoom on 8th May.】

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	Existence	Existence of things and people(います・あります)
③	giving and receiving	あげます・もらいます Expression of giving and receiving.
④	te-form(1)	te-form (know rules and master)
⑤	te-form(2)	te-form(2) expression of asking someone to do
⑥	Presnt progressive and Habitual actions	Presnt progressive and Habitual actions with te-form.
⑦	Expression of permission	Expression of permission with te-form
⑧	te-form(3)	te-form(Adjective)
⑨	Expression of quotation and opinion	Short form Expression of quotation and opinion
⑩	Review	Review and others Japanese custom
⑪	Qualifying Nouns	Qualifying Nouns with verbs and adjectives
⑫	Comparison(1)	Comparison between 2 items
⑬	Comparison(2)	Comparison among 3 or more items.
⑭	Expression of planning Indicating a change	Review shor forms Expression of planning Indicating a change(adjective)

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

All students are required to review. And home works.

Standard study time outside of class for preparation and review: 4 hours.

【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.

【Others】

Students are required that they can read Hiragana to register this class.

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(Basic)

【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)】

【The lecture is going to start on zoom on 8th May.】

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	ta-form	ta-form Know rules and get used to
②	Expression of experience	Expression of experience wit ta-form
③	The mode of explaining things	～んです。
④	Expression of guess or prediction	Short form Expression of guess or prediction
⑤	review	Review all Japanese custom
⑥	nai-form	nai-form know rules and get used to
⑦	giving advise	ta-form,nai-form review giving advise
⑧	necessary	necessary with nai-form
⑨	potential verbs	potential verbs know and get used to the conjugation rules
⑩	review	Review all Japanese custom
⑪	possibility	short form possibility
⑫	volitional form	volitional form know and get used to the conjugation rules
⑬	giving and receiving action	giving and receiving things(review) giving and receiving action
⑭	hypothetical condition	Review ta-form hypothetical condition

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

All students are required to review. And home works.

Standard study time outside of class for preparation and review: 4 hours.

【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.

【Others】

Students are required that they can read Hiragana to register this class.

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 regression, classification, meta learning, reinforcement learning, network compression and so on.

【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 lecture will begin on April 27th.】[本授業の開始日は4月27日とする.]

It will be given in the Learning Management System. Please confirm the announcement from the Learning Management System.

The students will be asked to submit projects on the basic machine learning problems and consider their own solutions. The students will be encouraged not only to learn the knowledge but also to think about how it can be used to solve 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	Meta learning	Introduction and case study of meta learning
10	Reinforcement learning	Introduction of reinforcement learning
11	Anomaly detection	Introduction and case study of anomaly detection

12	Network compression	Introduction and examples of network compression
13	More examples and summary	Introduce more examples and summarize the lecture
14	Project presentation	Students report their project.

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

【Preparatory study and review time for this class are 4 hours each.】 Homework and final presentation.

【Textbooks】

Handouts and prints will be distributed.

【References】

Ian Goodfellow, "Deep learning".

【Grading criteria】

Homeworks 30% + Final report 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 lecture will begin on April 27th.【本授業の開始日は4月27日とする.】

It will be given in the Learning Management System. Please confirm the announcement from the Learning Management System.

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.)】

【Preparatory study and review time for this class are 4 hours each.】 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.

