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GNM500D1

Introduction to Bioinformatics

常重　アントニオ

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：

実務教員：

【Outline and objectives】
This introductory course is offered to students in general. No previous knowledge of molecular biology or chemistry, 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 will be presented.

【Goal】
After the conclusion of this course, the student 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 Hoppii 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 and Expasy.
2	What is bioinformatics? -Part 2	Understanding the span and imitations of bioinformatics. Pending issues.
3	What is Life? Living organisms.	Introduction to basic biological concepts. Chemistry of Life.
4	Rules of the Game. Part 1	Variety of life forms. Basic concepts in molecular biology.
5	Rules of the Game. Part 2	Basic concepts in molecular biology (continued).
6	Rules of the Game. Part 3	Basic concepts in molecular biology (continued). Terminology and processes.
7	Analyzing a protein sequence. Part 1	Retrieval of a protein sequence. Introduction to
8	Analyzing a protein sequence. Part 2	Pairwise and Multiple sequence alignment. BLAST and Clustal. PAM and BLOSUM scoring systems.
9	Nucleotide sequences. Part 1	Chemistry of DNA and RNA molecules.
10	Nucleotide sequences. Part 2	Analyzing DNA and RNA composition
11	Evolution and phylogenetic trees. Part 1.	Biological basis of evolution and phylogenetics at molecular level.
12	Evolution and phylogenetic trees. Part 2.	Phylogenetic tree construction methods. Distance-based methods.
13	Evolution and phylogenetic trees. Part 3.	Interpretation of phylogenetic trees.
14	Structural Bioinformatics	Protein Structure. Visualization. Protein secondary and tertiary structure prediction.

【Work to be done outside of class (preparation, etc.)】
Standard study time outside of class for preparation and review: approximately 7 hours.
During classes, a personal computer will be required to access database sites and retrieve specific information. Also, you will be asked to work specific software on relevant data concerning molecular representation of molecules.

【Textbooks】
"Bioinformatics for Dummies", J.-M. Claverie, C. Notredame, Wiley Publishing Inc., 2007.
"Essential Bioinformatics", Jin Xiong, Cambridge University Press, 2006.
Purchase of these books 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】
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 or 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.
Due to the current COVID-19 pandemic, this course has been implemented since the year 2020 for real-time online delivery, that allows attendance of overseas students. Should conditions permit, in addition to the online format, in-person classes can be easily implemented.

【Equipment student needs to prepare】
A personal computer and internet access is highly recommended. All handouts, study material, assignments will be uploaded, and reports will be submitted via the Hoppii system.

FRI500D1

Cryptography and its Applications

岡本　龍明

Subtitle：暗号とその応用
Term： ｜ Term： ｜ Credit(s)：2
Day/Period： ｜ Campus：小金井 / Koganei
Grade：
Notes：
実務教員：

【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/Cryptograph

【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】
All students are enthusiastic and showed a sufficient level of understanding.

IIST Seminar

周　金佳、宮越　龍義、常重　アントニオ、彌冨　仁、佐野　俊夫、森　隆昌、内田　薫、中村　壮亮、チャピ　ゲンツィ、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：

実務教員：

【Outline and objectives】
In this course, Professors from different majors will be invited to introduce their research. Students can acquire comprehensive introductory knowledge and insight on various research fields.

【Goal】
Students can learn the advanced research from various fields including robotics, bioscience, applied chemistry, computer vision, plant science, and so on.

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

【Method(s)】
This class is taught in an omnibus style by professors from different research fields. Topics vary from robotics technologies, AI technology to advanced bioscience, chemistry, plant science and so on. The class contents are shown below. The learning support system will be used to submit reports and get feedback from lecturers.

【Active learning in class (Group discussion, Debate.etc.)】
なし / No

【Fieldwork in class】
なし / No

【Schedule】

No.	Theme	Contents
1	Introduction	Overview of the topics which will be taught in the class.
2	Multimedia processing	Introduce the multimedia processing technologies including the video processing, audio processing, 3D computer graphic.
3	Robotics	Introduce the brain machine interface, evolutionary robotics, and multi robot systems.
4	Biophysics	Introduce protein biophysics.
5	Intelligent information processing & Data analysis	Introduce the intelligent information processing technologies.
6	Management system engineering (1)	Introduce the research in management system engineering.
7	Management system engineering (2)	Introduce the research in management system engineering.
8	Plant science	Introduce the research topics in plant science.
9	Applied chemistry	Introduce the research in applied chemistry.
10	Pattern recognition 1	Fundamentals of pattern recognition and real world application.
11	Pattern recognition 2	Biometrics and business innovation through computer and information sciences.
12	Human harmonic sensing and control	Introduce human augmented technologies.
13	Robotics	Introduce the intelligent systems.
14	Information processing technology and Summary of course	Introduce the information processing technology and summarize the course.

【Work to be done outside of class (preparation, etc.)】
[Preparatory study and review time for this class are 4 hours each.] Assignments will be given at the first class. Submission of the short paper is required at each professor's class.

【Textbooks】
Handouts and prints will be distributed.

【References】
References will be shown in the handouts provided by each professor.

【Grading criteria】
Grading will be made by the letter grades of submitted short papers to each professor. Class participation will be considered as well.

【Changes following student comments】
None in particular.

【Others】
If the class is offered online, the learning support system will provide information about the change in the online lesson method, lesson plan, and grade evaluation method each time. Please regularly check to see if the instructor has contacted you through the learning support system.

LANj500D1

Japanese communication 1

村松　葉子

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：
実務教員：

【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。 hiraganga
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.
in case classes move online,it is possible there will be changes to the syllabus.

LANj500D1

Japanese communication 2

村松　葉子

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：
実務教員：

【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.
in case classes move online,it is possible there will be changes to the syllabus.

LANj500D1

Japanese communication 3

村松　葉子

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：

実務教員：

【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.in case classes move online,it is possible there will be changes to the syllabus.

LANj500D1

Japanese communication 4

村松　葉子

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：

実務教員：

【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	potentilal 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.
in case classes move online,it is possible there will be changes to the syllabus.