

| Hokkaido University Syllabus | | | | | |
|---|--|---|--------------|---|--------|
| <div> <div></div> <div>Course Title</div> </div> | | | | | |
| Introduction to Artificial Intelligence, Big Data, and Cybersecurity for Graduate Students | | | | | |
| <div> <div></div> <div>Subtitle</div> </div> | | | | | |
| | | | | | |
| <div> <div></div> <div>Instructor (Institution)</div> </div> | | | | | |
| YOSHIOKA Masaharu (Faculty of Information Science and Technology) | | | | | |
| <div> <div></div> <div>Other Instructors (Institution)</div> </div> | | | | | |
| YOSHIOKA Masaharu (Faculty of Information Science and Technology) OYAMA Satoshi (Faculty of Information Science and Technology) IIZUKA Hiroyuki (Faculty of Information Science and Technology) Thomas Zeugmann (Faculty of Information Science and Technology) ARIMURA Hiroki (Faculty of Information Science and Technology) James Allan | | | | | |
| <div> <div></div> <div>Course Type</div> </div> | | | | <div> <div></div> <div>Open To Other Faculties / Schools</div> </div> | OK |
| <div> <div></div> <div>Year</div> </div> | 2020 | <div> <div></div> <div>Semester</div> </div> | 1st Semester | <div> <div></div> <div>Course Number</div> </div> | 215601 |
| <div> <div></div> <div>Type of Class</div> </div> | Lecture | <div> <div></div> <div>Number of Credits</div> </div> | 1 | <div> <div></div> <div>Year of Eligible Students</div> </div> | ~ |
| <div> <div></div> <div>Eligible Department / Class</div> </div> | | | | <div> <div></div> <div>Other Information</div> </div> | |
| <div> <div></div> <div>Numbering Code</div> </div> | | | | | |
| <div> <div></div> <div>Major Category Code</div> </div> | <div> <div></div> <div>Major Category Title</div> </div> | | | | |
| | | | | | |
| <div> <div></div> <div>Level Code</div> </div> | <div> <div></div> <div>Level</div> </div> | | | | |
| 5 | Specialized Subjects (basics) in graduate level (Master's Course and Professional Course), Inter-Graduate School Classes | | | | |
| <div> <div></div> <div>Middle Category Code</div> </div> | <div> <div></div> <div>Middle Category Title</div> </div> | | | | |
| | | | | | |
| <div> <div></div> <div>Small Category Code</div> </div> | <div> <div></div> <div>Small Category Title</div> </div> | | | | |
| | | | | | |
| <div> <div></div> <div>Language Type</div> </div> | | | | | |
| Classes are in English. | | | | | |
| <div> <div></div> <div>Course list by the instructor with practical experiences</div> </div> | | | | | |
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Key Words

artificial intelligence, big data, cryptography, information retrieval, machine learning

Course Objectives

Students will learn basic concepts and ideas of big data science and cybersecurity technology including artificial intelligence, machine learning, information retrieval, and cryptography

■ ■ Course Goals

By the end of the course, you will be able to acquire the following key concepts:

- * Artificial Intelligence: Machine learning - Introduction, Basic concepts, Modern machine learning techniques, Cognitive modeling with deep neural network
- * Big data: Information retrieval - Text mining from the Web, Data mining from massive data. Collective intelligence - Crowdsourcing for data analytics, Future direction.
- * Cybersecurity: Cryptography - Classical cryptography, Public key cryptography, Advanced Encryption Standard.

■ ■ Course Schedule

- * Artificial Intelligence - 2 lectures
- * Information retrieval and data mining- 2 lectures
- * Collective intelligence - 1 lectures
- * Foundations of cryptography - 3 lectures

■ ■ Homework

No preparation is needed. You will be asked to write a page (A4) of essay on one or more topics discussed in the lectures at the end of each lecture.

■ ■ Grading System

Your grade will be determined by how well you demonstrate your achievement of the course goals through:

- 1) Participation (attendance) 60%
- 2) Writing of reports 40%

■ ■ Practical experience and utilization for classes

■ ■ Condition of tasking the subject

■ ■ Textbooks

No textbook required. Handouts will be distributed

■ ■ Reading List

■ ■ Websites

[This course will be provided as part of the Hokkaido Summer Institute.](https://hokkaidosummerinstitute.oia.hokudai.ac.jp/courses/CourseDetail=G089)
[For more information \(invited lecturers, course details, etc.\), please visit the website below:](https://hokkaidosummerinstitute.oia.hokudai.ac.jp/courses/CourseDetail=G089)
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■ ■ Website of Laboratory

■ ■ Additional Information

■ ■ Update

2020/01/30 09:18:44

北海道大学シラバス

科目名

Introduction to Artificial Intelligence, Big Data, and Cybersecurity for Graduate Students

講義題目

責任教員（所属）

吉岡 真治（大学院情報科学研究院）

担当教員（所属）

吉岡 真治（大学院情報科学研究院）
 小山 聡（大学院情報科学研究院）
 飯塚 博幸（大学院情報科学研究院）
 T h o m a s Z e u g m a n n（大学院情報科学研究院）
 有村 博紀（大学院情報科学研究院）
 James Allan（マサチューセッツ大学アマースト校）

科目種別

情報科学院専門科目

他学部履修等の可否

可

開講年度

2020

期間

1 学期

時間割番号

215601

授業形態

講義

単位数

1

対象年次

～

対象学科・クラス

補足事項

ナンバリングコード

大分類コード

大分類名称

レベルコード

レベル

5

大学院（修士・専門職）専門科目（基礎的な内容の科目）、大学院共通授業科目

中分類コード

中分類名称

小分類コード

小分類名称

言語

英語で行う授業

実務経験のある教員等による授業科目

キーワード

artificial intelligence, big data, cryptography, information retrieval, machine learning

■ ■ 授業の目標

Students will learn basic concepts and ideas of big data science and cybersecurity technology including artificial intelligence, machine learning, information retrieval, and cryptography

■ ■ 到達目標

By the end of the course, you will be able to acquire the following key concepts:

* Artificial Intelligence: Machine learning - Introduction, Basic concepts, Modern machine learning techniques, Cognitive modeling with deep neural network

* Big data: Information retrieval - Text mining from the Web, Data mining from massive data. Collective intelligence - Crowdsourcing for data analytics, Future direction.

* Cybersecurity: Cryptography - Classical cryptography, Public key cryptography, Advanced Encryption Standard.

■ ■ 授業計画

* Artificial Intelligence - 2 lectures

* Information retrieval and data mining- 2 lectures

* Collective intelligence - 1 lectures

* Foundations of cryptography - 3 lectures

■ ■ 準備学習(予習・復習)等の内容と分量

No preparation is needed. You will be asked to write a page (A4) of essay on one or more topics discussed in the lectures at the end of each lecture.

■ ■ 成績評価の基準と方法

Your grade will be determined by how well you demonstrate your achievement of the course goals through:

1) Participation (attendance) 60%

2) Writing of reports 40%

■ ■ 有する実務経験と授業への活用

■ ■ 他学部履修の条件

■ ■ テキスト・教科書

No textbook required. Handouts will be distributed

■ ■ 講義指定図書

■ ■ 参照ホームページ

[This course will be provided as part of the Hokkaido Summer Institute.](https://hokkaidosummerinstitute.oia.hokudai.ac.jp/courses/CourseDetail=G089)

[For more information \(invited lecturers, course details, etc.\), please visit the website below:](https://hokkaidosummerinstitute.oia.hokudai.ac.jp/courses/CourseDetail=G089)

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■ ■ 研究室のホームページ

■ ■ 備考

■ ■ 更新日時

2020/01/30 09:18:44