科目ナンバリング	G-LAS12 80006 LE10						
授業科目名<英訳>	Introduction to Algorithms and Informatics Introduction to Algorithms and Informatics			担当者所属職名・氏名	情報学研究科 特定准教授 Jesper Jansson		
群	大学院横断教育科目群	分野(分類)	統計・情報・データ科学系	使用言語	英語		
旧群		単位数	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2026・前期	曜時限	火1	配当学年	修士課程	対象学生	理系向

（情報学研究科の学生は，全学共通科目として履修登録できません。所属部局で履修登録してください。）

[授業の概要・目的]

An algorithm is a well-defined procedure for solving a computational problem.
Reliable algorithms have become crucial components of people's daily lives; for example, the Internet or our smartphones would not work without them.
The purpose of this course is to provide a basic introduction to algorithms for graduate students.
General techniques for designing algorithms and analyzing their efficiency, as well as examples of widely used algorithms with important real-life applications, will be presented.

[到達目標]

After completing this course, the student should be able to:
- Apply various algorithm design techniques for solving computational problems.
- Prove the correctness of an algorithm and measure its efficiency.
- Explain how famous algorithms such as Prim's algorithm, Quicksort, the Karp-Rabin algorithm, and Graham's scan work.

[授業計画と内容]

The course will cover the following topics:
1. Introduction
2. Divide-and-Conquer
3. Greedy Algorithms
4. Dynamic Programming
5. Randomized Algorithms
6. Advanced Sorting Algorithms
7. Hash Tables
8. Amortized Analysis
9. String Matching
10. Efficient Data Structures
11. Computational Geometry
12. NP-Completeness
13. Approximation Algorithms
14. Course summary and Q & A session
<<Final examination>>
15. Feedback

Introduction to Algorithms and Informatics(2)へ続く↓↓↓

Introduction to Algorithms and Informatics(2)

[履修要件]

An ability to think abstractly and to solve problems of a mathematical nature will be required for this course. No programming skills are needed.

[成績評価の方法・観点]

A written examination at the end of the course.

[教科書]

使用しない

[参考書等]

（参考書）

T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein 『Introduction to Algorithms, Third Edition』（The MIT Press, 2009）ISBN:978-0262033848

P. Louridas 『Real-World Algorithms - A Beginner's Guide』（The MIT Press, 2017）ISBN:978-0262035705

[授業外学修（予習・復習）等]

Students will be expected to spend about 5 hours per week to prepare for and review the lessons.

[その他（オフィスアワー等）]

[主要授業科目（学部・学科名）]