

科目ナンバリング		G-LAS12 80006 LE10							
授業科目名 <英訳>	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			
	Introduction to Algorithms and Informatics								
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】									
<p>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.</p> <p>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.</p>									
【到達目標】									
<p>After completing this course, the student should be able to:</p> <ul style="list-style-type: none"> <li>- Apply various algorithm design techniques for solving computational problems.</li> <li>- Prove the correctness of an algorithm and measure its efficiency.</li> <li>- Explain how famous algorithms such as Prim's algorithm, Quicksort, the Karp-Rabin algorithm, and Graham's scan work.</li> </ul>									
【授業計画と内容】									
<p>The course will cover the following topics:</p> <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Divide-and-Conquer</li> <li>3. Greedy Algorithms</li> <li>4. Dynamic Programming</li> <li>5. Randomized Algorithms</li> <li>6. Advanced Sorting Algorithms</li> <li>7. Hash Tables</li> <li>8. Amortized Analysis</li> <li>9. String Matching</li> <li>10. Efficient Data Structures</li> <li>11. Computational Geometry</li> <li>12. NP-Completeness</li> <li>13. Approximation Algorithms</li> <li>14. Course summary and Q &amp; A session</li> <li>&lt;&lt;Final examination&gt;&gt;</li> <li>15. Feedback</li> </ol>									
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)】