

Course number		G-LAS12 80006 LE10					
Course title (and course title in English)	Introduction to Algorithms and Informatics			Instructor's name, job title, and department of affiliation	Graduate School of Informatics Program-Specific Associate Professor, Jesper Jansson		
	Introduction to Algorithms and Informatics						
Group	Interdisciplinary Graduate Courses			Field(Classification)	Statistics, Informatics and Data Science		
Language of instruction	English			Old group			Number of credits 2
Number of weekly time blocks	1	Class style	Lecture (Face-to-face course)		Year/semesters	2025 • First semester	
Days and periods	Tue.1		Target year	Graduate students		Eligible students	For science students
(Students of Graduate School of Informatics cannot take this course as liberal arts and general education course. Please register the course with your department.)							
[Overview and purpose of the course]							
<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. 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>							
[Course objectives]							
<p>After completing this course, the student should be able to:</p> <ul style="list-style-type: none"> - 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. 							
[Course schedule and contents)]							
<p>The course will cover the following topics:</p> <ol style="list-style-type: none"> 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 							
<div style="text-align: right;">Continue to Introduction to Algorithms and Informatics(2)</div>							

Introduction to Algorithms and Informatics(2)

[Course requirements]

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

[Evaluation methods and policy]

A written examination at the end of the course.

[Textbooks]

Not used

[References, etc.]

(References, etc.)

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

[Study outside of class (preparation and review)]

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

[Other information (office hours, etc.)]