Course Numbering	
Year	Second semester 2025
Subject (J)	Basic Computer Science
Subject	
Credit(s)	2Credits
Instructor	TAKEHIRO ITO,YUICHI KAWAMOTO,WAIDYASOORIYA HASITHA MUTHUMALA
Media Class Subjects	
Essential Subjects	
Language of Instruction	English
Course Objectives and Summary/ Learning Goals (J)	
Course Objectives and Summary/ Learning Goals	This course provides an overview of some research fields of computer science to bridge fundamental theories of computer science with the cutting-edge research in our department. The course consists of algorithm theory, communication network, and parallel computing. Students will come to understand the association between the fundamental knowledge about computer science and the research activities. The emphasis will be on giving a broad overview of the research areas in computer science.
Relevance to Other Subjects/Considerations for Taking the Class (J)	
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Course Description (J)	
Course Description	Please see Google Classroom. Class code: 4tjd3lj (The order of the parts is subject to change.) 01. Introduction of this course [Algorithm Theory] Algorithms now play a very important role for the reliability and efficiency in several social systems. In this part, we focus on design and analysis of algorithms from the viewpoint of theoretical computer science. The main topics are as follows: 02. What is algorithm? Power of "efficient" algorithms 03. How to evaluate algorithms 04. Basic techniques for algorithms (1) 05. Basic techniques for algorithms (2) 06. Algorithms for computationally hard problems 07. Online algorithms [Communication Network] Communication network infrastructure needs to be resilient to natural disasters. In this part, we focus on the information and communication technology for disaster response and recovery. The main topics are as follows: 08. Basic technologies for communication networks 09. UAV network 10. Wireless mesh network 11. Device to Device (D2D) network [Parallel Computing] Parallel computing is extremely important in many fields such as numerical simulations, artificial intelligence, machine learning, optimizations, etc. In this part, we focus on leaning different parallel computation techniques, their bottlenecks and how to simply run a program in parallel. The main topics are as follows: 12. Basics of parallel computing 13. CPU-based multicore computing 14. GPU parallel computing 15. Introduction to multi-processor parallel computing
Preparation and Review(J)	
Preparation and Review	Students are required to make a thorough review. They are also expected to learn topics related to the class by themselves. Such related topics and keywords will be provided during the lectures.

Evaluation methods and criteria (J)	
Evaluation methods and criteria	Evaluation is performed comprehensively based on reports, exercises and activities during the lecture time, etc. Details will be announced in the lectures.

Textbooks and references

Title	Author	Publisher	Year	ISBN/ISSN	Classification

URL	Please see Google Classroom. Class code: 4tjd3lj
Attached File	
Office Hours(J)	
Office Hours	
Contact： Please insert '@' in the email address.	
Notes	
Practical Skill/Hands-on Class	
Other Comments/Instructions	
Last Update	

One-credit courses require 45 hours of study. In lecture and exercise-based classes, one credit consists of 15-30 hours of class time and 30-15 hours of preparation and review outside of class. In laboratory, practical skill classes, one credit consists of 30-45 hours of class time and 15-0 hours of preparation and review outside of class.