

科目ナンバリング		U-LAS30 20041 LE10									
授業科目名 <英訳>		Mathematics for Informatics I-E2 Mathematics for Informatics I-E2				担当者所属 職名・氏名		情報学研究科 特定講師 EVEN , Jani Juhani luc			
群	情報学科目群			分野(分類)		(各論)			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	2024・前期		曜時限	火5		配当学年	全回生		対象学生	全学向	

[授業の概要・目的]

This course is an introduction to graph theory. Graph theory is a field of mathematics that studies graphs. A graph is a way to represent relationships. For example, graphs can be used to represent a train map or a social network. Graphs and graph theory play an important role in computer science.

The purpose of this course is as follows:

- Learn the mathematical definitions of graphs,
- Understand the important theorems of graph theory,
- Discover some practical applications of graphs,
- Get familiar with graph-based algorithms.

[到達目標]

The students should be able to use graph theory to proposed efficient models for real-world problems and efficiently solve them using graphs-based algorithms.

「授業計画と内容」

The course starts by the definition of graph and some basic concepts.

- Graph definition, matrix representation and common families of graphs
- Distance in graph, walk, trail and path
- Degree, subgraphs, and graph isomorphism

Then, the following topics are discussed with a focus on applications and algorithms:

- Eulerian graphs, Fleury ' s algorithm, and Hamiltonian graph
- Graph traversals, depth-first search, and depth-first search.
- Trees and directed trees.
- Spanning trees, minimum spanning trees, and algorithms (Kruskal and Prim)
- Network flow, cut and maximum flow
- Bipartite graphs: maximum bipartite matching,
- Planar graphs: Plane graph, Planarity testing
- Graph coloring: vertex coloring, edge coloring

One to two sessions for each item.

The schedule and contents are subject to change based on class progress.

Total : 14 classes, 1 Feedback session.

Mathematics for Informatics I-E2(2)

【履修要件】

This course does not require special knowledge. However, many of the algorithms and examples are from the field of computer science. Some basic programming skill is an advantage. But no specific programming language knowledge is necessary as the algorithms will be presented using pseudo-code written in plain English.

【成績評価の方法・観点】

The evaluation will be based on assignments given after some of the classes (50%) and a final examination during the last class (50%).

For each task, the evaluation criteria will be presented and a raw score grade [0-100] will be used.

【教科書】

No textbook, handouts.

【参考書等】

（参考書）

Jonathan L. Gross, Jay Yellen, “ Graph theory and its applications, second edition ” (Chapman and Hall)
ISBN:978-1584885054

【授業外学修（予習・復習）等】

The students are expected to review the new material before the next class in order to smoothly follow the course.

【その他（オフィスアワー等）】

There is no specific office hour. Students can use e-mails for important communications, assignments, and questions.