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< >	Mathematics for Informatics I-E2 Mathematics for Informatics I-E2		EVEN Jani Juhani luc
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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.

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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.

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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.

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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.

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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.

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No textbook, handouts.

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

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

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