UCLouvain

lsinf1121

2019

Algorithmics and data structures

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Schaus Pierre ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	*The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.*
Aims	1 - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** **Examen on computer using Inginious https://inginious.info.ucl.ac.be.** **A mi-term quizz could be organized during the smart-week but will effectively count in the final grade only if it is favorable.** Students who have successfully completed this course will be able to - make an informed choice on the use of the main data structures used to represent collections, - make good use of existing algorithms to manipulate these data structures and analyze their performance, - apply the principles of object-oriented programming such as genericity, abstraction, composition and reuse, - design and implement variants of the algorithms studied in high quality Java programs. Students will have developed methodological and operational skills. In particular, they will have developed their ability to: - critically analyze an algorithmic problem - learn autonomously in a reference book and in the complementary technical documentation - produce a satisfactory solution to algorithmic problems within the prescribed deadlines.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The active pedagogy method followed in this course is inspired by flipped classrooms. There are six two-week modules. Each module includes an introductory course on the subject, theoretical exercises to prepare, chapters of the reference book to read, a session to correct exercises in the middle of the model with the TA, work on inginious to realize (Java programs) and finally a restructuring course at the end of the module. One of the essential components of this pedagogy is **self-learning**. The success of the learning process thus presupposes a significant involvement of each student. The actual learning remains the responsibility of each student. To pass the exam it is highly recommended that **the student programs regularly**.
Content	• Computational complexity, • Trees, binary search trees, • Balanced trees, • Dictionaries and hash tables, • Priority queues and heaps • Graphs, • Text processing (pattern matching, compression algorithms)
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=7682 https://lsinf1121.readthedocs.io
Bibliography	Required Textbook: Algorithms, 4th Edition by Robert Sedgewick and Kevin Wayne, Addison-Wesley Professional. ISBN-13: 978-0321573513 ISBN-10: 032157351X Exercices and documents https://lsinf1121.readthedocs.io Communication with students using moodle http://moodleucl.uclouvain.be/course/view.php?id=7682

Other infos	Background: LEPL1401 et LEPL1402 ou cours équivalents
Faculty or entity in charge	INFO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Approfondissement en statistique et sciences des données	LSTAT100P	5		🔍
Minor in Statistics, Actuarial Sciences and Data Sciences	LSTAT100I	5		🔍
Minor in Engineering Sciences: Computer Sciences (only available for reenrolment)	LSINF100I	5		🔍
Master [120] in Mathematical Engineering	MAP2M	5		🔍
Master [120] in Computer Science	SINF2M	5		🔍
Bachelor in Mathematics	MATH1BA	5	LINFO1225	🔍
Master [60] in Computer Science	SINF2M1	5		🔍