






Teacher(s)	Dupont Pierre ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	This course assumes that the student already masters the basics of programming covered by the course LINFO1101.
Main themes	<ul style="list-style-type: none"> • Design and implementation of iterative or recursive algorithms: path, counting, sorting, searching in collections • Computational complexity • Basic data structures: arrays, stacks, queues, linked lists • Recursive data structures: tree structures, binary search trees • Invariants
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>Given the learning outcomes of the "Bachelor in Computer science" program, this course contributes to the development, acquisition and evaluation of the following learning outcomes:</p> <ul style="list-style-type: none"> • S1.I2, S1.I3 • S2.2-4 • S6.2 <p>Students who have successfully completed this course will be able to:</p> <ul style="list-style-type: none"> • justify a choice between several algorithmic solutions to solve a given problem, • analyze algorithms, iterative or recursive, to represent and manipulate collections and to propose variants thereof, 1 • choose, design and use data structures, including recursive, • give a reasoned estimate of the time complexity of iterative algorithms and the spatial complexity of data structures; • reasoning about properties of algorithms or data structures in terms of invariants. <p>Students will have developed methodological and operational skills. In particular, they have developed their ability to:</p> <ul style="list-style-type: none"> • to take a critical look and make a reasoned analysis of a solution or set of solutions that could be made to a given problem by setting quality criteria, • realize small programs using conventional algorithms and data structures.
Evaluation methods	<p>A note of PARTICIPATION reflects the involvement of the student during the year for solving the practice problems on Inginious and when implementing the final project.</p> <p>In the first session, the participation grade is worth 20% of the final grade + 80% for the final exam. The participation mark can not be reassessed.</p> <p>In the second session, participation grade and the final exam are worth respectively 10 % and 90% of the overall score.</p> <p>The (closed book) final exam is a written exam on a computer or, when appropriate, on paper.</p>
Teaching methods	<ul style="list-style-type: none"> • Lectures • Practical sessions on the Inginious server • One project at the end of the semester
Content	<p>Algorithmics is concerned with solving problems by implementing sequences of elementary operations according to a predefined process or procedure leading to a solution.</p> <p>This discipline is both abstract and put into practice through programs (e.g. implemented in Python) and run on a computer.</p> <ul style="list-style-type: none"> • Time and space complexity • Search algorithms through arrays • Abstract data types, data structures: stacks, queues, dynamic arrays, linked lists • Sorting algorithms • Recursion • Recursive data types

	<ul style="list-style-type: none">• Computational complexity of recursive algorithms, recurrence equations• Binary trees and dictionaries• Invariants
Inline resources	moodle.uclouvain.be/course/view.php?id=1916
Bibliography	Il n'y a pas d'ouvrage de référence obligatoire mais, à titre complémentaire, des ouvrages sont recommandés sur le site Moodle.
Faculty or entity in charge	INFO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Linguistics	LING2M	5		
Additional module in Geography	APPGEOG	5		
Minor in Computer Sciences	MINSINF	5		
Minor in numerical technologies and society	MINSTIC	5		
Bachelor in Computer Science	SINF1BA	5		
Bachelor in Mathematics	MATH1BA	5		