



## ALGORITHMS AND DATA STRUCTURES

Enrollment year	2019/2020
Academic year	2021/2022
Regulations	DM270
Academic discipline	ING-INF/06 (ELECTRONIC AND INFORMATION BIOENGINEERING)
Department	DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING
Course	ELECTRONIC AND COMPUTER ENGINEERING
Curriculum	Informatica
Year of study	3°
Period	2nd semester (07/03/2022 - 17/06/2022)
ECTS	6
Lesson hours	45 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	BARILI ANTONIO (titolare) - 6 ECTS
Prerequisites	Knowledge of computer and networks hardware/software architecture. Knowledge of a programming language.
Learning outcomes	Knowledge of classical algorithms and data structures. Ability to analyze and design application-specific algorithms and data structures.
Course contents	Introduction "Data everywhere", an overview on data sources and data processing. Python basics. Major packages for data processing and visualization.  Data Acquisition Information representation and encoding Getting data: tabular (csv, xls), structured (xml) and unstructured (txt). Getting data from database (sqlite).

	<p>Getting data from online sources (html pages, WEB API), the REST/JSON protocol.</p> <p>Getting binary data (pictures, video).</p> <p>Data wrangling and preprocessing</p> <p>Lexical and syntactic analysis of input data</p> <p>Error treatment.</p> <p>Semantical tests.</p> <p>Basic algorithms and data structures</p> <p>List, tables, queues and stacks</p> <p>Searching, sorting and enumeration.</p> <p>Strings, texts and their applications</p> <p>Exact and approximate substring search</p> <p>Elements of text processing with NLTK (natural language toolkit).</p> <p>Topic analysis (Gensim).</p> <p>Trees and their applications</p> <p>Visit and update algorithms.</p> <p>XML and HTML processing applications.</p> <p>Graphs and their applications</p> <p>Classical algorithms.</p> <p>Maps and georeferenced data.</p> <p>Elements of data analysis and visualization</p> <p>Elements of data processing law</p>
Teaching methods	Classroom Lectures
Reccomended or required readings	Lecture notes and online references provided by the instructor.
Assessment methods	Written test (open-answer questions)
Further information	
Sustainable development goals - Agenda 2030	<a href="#">\$lbl_legenda_sviluppo_sostenibile</a>