DATA SCIENCETECH INSTITUTE

Applied MSc in Data Science & Big Data

Computer Science & IT for Data Science

Information Systems Major - IS2-001)

Volume of classes hours: 50hrs *(± same personal work expected)*

Course summary:

This workshop-based course aims to provide students with enough programming profiency for dealing with software engineering using multiple programming languages. Students are not expected to be highly proficient in algorithmics and data structures, as fundamentals will be covered through the course, even if having done the **edX – Algorithms and Data Structures** course would be beneficial.

Topics to be covered are:

1. **Knowing your raw materials and their influence on software engineering**
   (covered during the BootCamp https://moodle.dsti.institute/course/view.php?id=82)
   a. Computer architectures
   b. Operating systems.

2. **Classical Imperative programming**
   a. Design Paradigms
   b. Common algorithms & data structures using:
      i. The C Programming Language
      ii. Equivalence in Python (students' own work)

3. **Object-Oriented imperative programming**
   a. Design Paradigms
   b. Common algorithms & data structures using:
      i. C++
      ii. Equivalence in Python (students' own work)

Course objectives:

- Acquiring the abilities to focus on algorithms and data sctructure and conmfortably switch beetwen different programming languages.
- Becoming familiar with different design paradigms for implementation
- Understanding how programming relates to hardware and operating systems concerns.

Course mini-projects description:

The class is organised as an on-going workshop. As such **no** *"PowerPoint lecture notes"* will be presented: students will **practice** instead.
Safari Online Books and various online will be placed on Moodle for reference.

Students will be required to submit short assignments for classical and object-oriented imperative programming based on follow-up from elements seen in class.

Theoretical background used:

- Basic mathematical logic, as covered in the DSBD1-001 "Applied Mathematics for Data Science" course

Technologies used:

Please refer to the PDF IS2-001-Software-Dev-Tools-Tutorial on Moodle