

Course Syllabi

1. TICS-00057 PROGRAMMING II: DATA STRUCTURES AND ALGORITHM ANALYSIS

2. 192 credits hours.

3. Bibliography

- Data Structures using C: a practical approach for beginners. , Japtap A.M. y Mali A.S., 2022
- Data structures and algorithms: annotated reference with examples., Barnett, Granville, and Luca Del Tongo, 2021

4. Specific Course Information

- a. Programming 2 is a subject that explores data structures as tools for efficient software development. Students will be able to build more complex types of data that will facilitate the design and implementation of applications. In addition, design strategies, non-basic ordering algorithms are studied and the need to produce efficient software is established. Fundamental concepts of computational complexity are discussed throughout the course. C. Finally, the subject guides the student to an ethical exercise of the profession and motivates him to think of practical ways to contribute to society from his field of study.
- b. Prerequisites:
 - TICS-00056 PROGRAMMING I: ALGORITHMS, DATA, AND STRUCTURES

5. Learning Objectives of the Course

- a. Acquire knowledge about data structures, use of computer memory, algorithms of ordering and algorithm analysis; their concept and utility for problem solving. Apply this knowledge in the analysis, design and implementation of software.
 - Analyze, design and implement software using static and dynamic data structures
 - Know and employ efficient data ordering methods
 - Develop skills in software tools for the development of applications
 - Apply design strategies for algorithms.
- b. Learning Outcomes
 - At the end of the course, the student knows the concepts related to the static and dynamic management of memory for the development of efficient software, using pointers.
 - At the end of the course the student knows and applies software design strategies through the implementation of recursive and iterative solutions.
 - At the end of the course, the student knows and employs complex data structures such as graphs and trees for dynamic data management.
 - At the end of the first chapters of the subject, the student uses the concepts related to dynamic data structures by implementing linked lists, queues and stacks to solve a problem through a software.
 - At the end of the course, the student identifies the differences between a dynamic data structure and a static one during the implementation and execution of a program.
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- At the end of the course the student knows and applies software design strategies through the implementation of recursive and iterative solutions.
- At the end of the course, the student uses the c programming language tools for the use of memory through the implementation of static and dynamic structures.
- At the end of the first chapters of the subject, the student uses the concepts related to dynamic data structures by implementing linked lists, queues and stacks to solve a problem through a software.
- At the end of the chapter on ordering, the student uses efficient ordering methods for the manipulation of data in a software.
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6. Course Topics

- Introduction
- Memory and spotlights
- Statistical and dynamic data structures
- Recursivity
- Binary trees
- Graphos
- Efficient organization