

Academic Year: (2023 / 2024)

Review date: 28-04-2023

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: ALVAREZ RODRIGUEZ, JOSE MARIA

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 2

Branch of knowledge: Engineering and Architecture

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

-Experience in the use of computers will be valuable.

DESCRIPTION OF CONTENTS: PROGRAMME**1 Basic Concepts.**

- 1.1 Structure of a computer system: hardware and software. Information encoding.
- 1.2 Bool algebra.
- 1.3 The notion of programming language. Programming paradigms: structured programming.
- 1.4 Basic definitions: algorithm, program, process, etc.
- 1.5 Compilation, debugging and execution processes.
- 1.6 Pseudocode.

2 Basic elements of programming.

- 2.1 Identifiers.
- 2.2 Variables and constants.
- 2.3 Simple datatypes.
- 2.4 Operators, expressions and statements.

3 Control flow.

- 3.1 Conditional statements.
- 3.2 Loop statements.
- 3.3 Other control flow statements.

4 Data structures and user-defined datatypes.

- 4.1 Definition and design principles.
- 4.2 Strings: concept, management and application.
- 4.3 Arrays, tuples and sets: concept, management and application.
- 4.4 Dictionaries: concept, management and application.

5 Subprograms: procedures and functions

- 5.1 Definition and design principles.
- 5.2 Function signature, parameters and invocation.
- 5.3 Introduction to recursive functions.
- 5.4 Other paradigms: Object-Oriented programming introduction.

6 Basic algorithms.

- 6.1 Searching and sorting.

7 Resource management.

- 7.1 Static vs dynamic memory
- 7.2 Memory basic operations: allocation and free.

8 Input/Output system.

- 8.1 File definition, use and types: text and binary.
- 8.2 File management: create, write, read and delete operations.

LEARNING ACTIVITIES AND METHODOLOGY

Theoretical Lectures: 1 ECTS

Practical Lectures: 1 ECTS

- Exercise resolution
- Best coding practices
- General tutoring

Team Work: 3 ECTS

- Project design and development
- Application of best coding practices

Individual Work: 1 ECTS

- Contribution to team project
- Study and preparation of exams

ASSESSMENT SYSTEM

CONTINUOUS EVALUATION (70%)

- Mid-term exam: 20%
- Questionnaires of continuous evaluation: 10%
- Final project: 40% (with a partial delivery to follow up the status)

FINAL EVALUATION (30%)

- Final exam: 30%

A minimum grade of 5.0 both in the final project and in the final examination is required to pass the course.

% end-of-term-examination:	30
% of continuous assessment (assignments, laboratory, practicals...):	70

BASIC BIBLIOGRAPHY

- Allen B. Downey Think Python: How to Think Like a Computer Scientist, 2nd edition, O'Reilly, 2015
- Andrew Koenig C Traps and Pitfalls, Addison-Wesley Professional, 1989
- Anthony Scopatz, Kathryn D. Huff Effective Computation in Physics: Field Guide to Research with Python, O'Reilly, 2015
- Brian W. Kernighan / Dennis Ritchie The C Programming Language, Pearson, 2015
- David M. Beazley Python Cookbook: Recipes for Mastering Python 3, O'Reilly, 2011
- Jose María Álvarez Rodríguez Hands on Programming with Python: Theory and Practice, Amazon KDP Publishing, 2020
- K. N. King C Programming: A Modern Approach, 2nd Edition, W. W. Norton & Company, 2008
- Luciano Ramalho Fluent Python, O'Reilly, 2015
- Mark Lutz Learning Python, O'Reilly, 2013
- Paul Barry Head-First Python, 2nd edition, O'Reilly, 2016
- Robert C. Martin Clean Code: A Handbook of Agile Software Craftsmanship , Prentice Hall, 2008
- Samuel P. Harbison, Guy L. Steele Jr. C: A Reference Manual, 5th Edition, Pearson, 2002
- Zed A. Shaw Learn Python 3 the Hard Way, Addison-Wesley, 2016

ADDITIONAL BIBLIOGRAPHY

- Peter Prinz, Tony Crawford C in a Nutshell, O'Reilly Media, 2015
- Richard M. Reese Understanding and Using C Pointers, O'Reilly Media, 2013

BASIC ELECTRONIC RESOURCES

- Jose María Álvarez Rodríguez . Hands on Programming with Python: <https://chemaar.github.io/python-programming-course/>
- Python Community . Real Python Tutorials: <https://realpython.com/>
- Python Software Foundation . Python documentation and official resources: <https://www.python.org/doc/>

- Qingkai Kong, Timmy Siau, Alexandre Bayen . Python Programming And Numerical Methods: A Guide For Engineers And Scientists: <https://pythonnumericalmethods.berkeley.edu/notebooks/Index.html>

- The Python Software Foundation . The Python Tutorial: <https://docs.python.org/3/tutorial/>