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|------------------|---------------------------|---------------|----------------|-----------------------|------|
| Course Unit      | Computer Science          |               | Field of study | Computer Science      |      |
| Bachelor in      | Environmental Engineering |               | School         | School of Agriculture |      |
| Academic Year    | 2022/2023                 | Year of study | 1              | Level                 | 1-1  |
| Type             | Semestral                 | Semester      | 1              | ECTS credits          | 5.5  |
| Code             | 9099-309-1102-00-22       |               |                |                       |      |
| Workload (hours) | 148,5                     | Contact hours | T -            | TP 45                 | PL - |
|                  |                           |               | TC -           | S -                   | E -  |
|                  |                           |               | OT 20          | O -                   |      |

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Sérgio Alípio Domingues Deusdado

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Explore the full potential of computer processing by providing it with knowledge and practice in some tools.
2. Integrate in the current context of information technology, Internet, multimedia, intranet, extranet, e-learning, remote databases, and so on.
3. Must be able to develop applications for computational algorithms development that automate the results using iterative and direct numerical methods.
4. Develop practical applications of mathematical knowledge, using the numerical methods, using current technology to solve problems in engineering; Numerical modeling; Simulation; Optimization.
5. Use some reference tools for apply basic concepts of statistics in concrete situations.
6. Formalize and implement correctly problems involving the result of random experiences.

### Prerequisites

Before the course unit the learner is expected to be able to:  
Not applicable

### Course contents

Computers basic learning; Operating systems, Internet, Computer software; Algorithms; Computational approach to numerical methods and statistics.

### Course contents (extended version)

1. Computers basic learning
  - Basic concepts; Definition of computer systems, computer architecture and working.
  - Binary encoding.
2. Operating systems
  - OS constituents, Types, the OS functions.
  - File system maintenance, utilities and communications.
3. Internet
  - Historical notes; TCP/IP and DNS; Services (e-mail, www, ftp, chat and other services);
  - Search of Information; Security, E-learning.
4. Computer software
  - Microsoft Frontpage; On-line documents, Internet publications: Links; A website structure.
  - Microsoft Excel; Formulas and functions; Databases; Drafting and editing graphics; Macros; Forms.
5. Algorithms
  - Basic concepts and terminology; algorithms and programs.
  - Flow charts; algorithmic structures; data structures; modularization.
6. Computational approach to numerical methods and statistics.
  - SPSS Statistics tool. Interface and operation.
  - Numerical algorithms relevant in Engineering.
  - Notions of numerical methods for troubleshooting the engineering and applied mathematics;
  - Advantages and disadvantages of using alternative numerical methods.
  - Recognize the importance of a estimated error and learn to use it.

### Recommended reading

1. Marty Matthews, Windows 7, Verlag Dashofer, ISBN 9789896420741
2. Heitor Pina, Métodos Numéricos, McGraw-Hill de Portugal. ISBN 9728298048
3. Francis Scheid, Análise Numérica, McGraw-Hill de Portugal ISBN: 9729241198
4. Chapra, Steven C. ; Numerical methods for engineers. ISBN: 0-07-112180-3
5. Exercícios Resolvidos com Excel XP e 2000, F C A-Editora Informática.

### Teaching and learning methods

Classes with provision of content and tutorial examples of implementation, use of some tools; labor applied for solidification of knowledge, achieved in true some practical works.

### Assessment methods

- Alternative 1 - (Regular, Student Worker) (Final, Supplementary, Special)
  - Final Written Exam - 45% (Minimum required classification of 8.5 values (in the range 0 to 20) in the final written exam)
  - Practical Work - 55% (Approval of the practical component required for admission to the final written exam)

### Language of instruction

Portuguese

### Electronic validation

|                                  |                           |                                |                           |
|----------------------------------|---------------------------|--------------------------------|---------------------------|
| Sérgio Alípio Domingues Deusdado | Pedro Miguel Lopes Bastos | Artur Jorge de Jesus Gonçalves | Paula Sofia Alves do Cabo |
| 07-12-2022                       | 07-12-2022                | 08-12-2022                     | 13-12-2022                |