COURSE GUIDE

Fundamentals of Computer Science for Biology (2001113)

Grado (Bachelor's Degree)	Grado en Biología	Branch	Sciences

Module	Materias Básicas Instrumentales para la Biología	Subject	Informática

Year of study	1º	Semester	1º	ECTS Credits	6	Course type	Core course

PREREQUISITES AND RECOMMENDATIONS

High school mathemathics are recommended.

BRIEF DESCRIPTION OF COURSE CONTENT (According to the programme's verification report)

- Tools for work and communication: Operating systems, ofimatics, thematic dictionaries, Image processing, e-learning platforms, and presentations.
- Information search: browsers, databases, university libraries.
- Scientific/technical software: Data processing, Mathematics, Simulation, Cartography.
- Introduction to programming: applications, programming, and statistics with Python.

SKILLS

GENERAL SKILLS

- CG01 - Organisational and planning skills
- CG02 - Teamwork
- CG03 - Applying knowledge to problem solving
- CG04 - Capacity for analysis and synthesis
- CG05 - Knowledge of a foreign language
- CG07 - Informatic knowledge regarding the field scope

SUBJECT-SPECIFIC SKILLS

- CE25 - Design models of biological processes
- CE36 - Implantar y desarrollar sistemas de gestión relacionados con la Biología
- CE41 - Manejar las bases de datos y programas informáticos que pueden emplearse en el ámbito de Ciencias de la Vida

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- CE77 - Knowing computer science applied to Biology

LEARNING OUTCOMES

- Know and handle some work and communication tools: Operating systems, ofimatics, and thematic dictionaries.
- Know and handle software for image processing, e-learning platforms, and presentations.
- Know and perform information searches using browsers, databases, and university libraries.
- Know and handle some scientific/technical software: data processing, Mathematics, Simulations, and Cartography.
- Design and implement simple computer programs and know how to apply them to solve specific problems in biology.
- Solve statistical problems with a programming language such as python.

PLANNED LEARNING ACTIVITIES

THEORY SYLLABUS

1. Introduction to Computer Science
2. Representation of information
3. Databases
4. Programming fundamentals
5. Programming fundamentals in python
6. Basic data types
7. Control structures
8. Advanced data types
9. Introduction to bioinformatics

PRACTICAL SYLLABUS

Seminars / Workshops:
- Ofimatics skills.
- Python applications.

Laboratory practices:

1. Spreadsheets. Charts.
2. Databases.
3. Basic programming in python

RECOMMENDED READING

ESSENTIAL READING

- Fox, R. 2013. Information Technology. Chapman and Hall

- Beekman, G. 2009. Tomorrow's technology and you. Prentice Hall.
- Arias-Silva, N. 2018. Office 365 essentials: get up and running with the fundamentals of Office 365. Packt Publishing
- Thorsten Altenkirch and Isaac Triguero. Complete book on Python Programming: Conceptual Programming with Python. 1st Edition, University of Nottingham. 30th September 2019, Paperback: ISBN 978-0-244-82276-7; http://conceptual-programming.com/
- Ryan, M. 2018. Python Fundamentals. Packt Publishing.

COMPLEMENTARY READING

- Youens-Clark, K. 2021. Mastering Python for bioinformatics: how to write flexible, documented, tested Python code for research computing. O'Reilly Media

RECOMMENDED LEARNING RESOURCES/TOOLS

Python. https://www.python.org/doc/
W3Schools: it provides extensive tutorials and documentation for learning Python, covering a wide range of topics from basic syntax to advanced web development with Python. https://w3schools.com/python/
PRADO 2 platform. https://prado.ugr.es
Microsoft 365 help & learning. https://support.microsoft.com/en-us/microsoft-365
OpenOffice documentation. https://wiki.openoffice.org/wiki/Documentation
Codedex.io: it provides an easy and entertaining approach to learning Python by solving different levels and tasks in a gamification way https://www.codedex.io/python ;
CodeCombat: it offers an interactive platform where users can learn Python by solving coding challenges within a game-like environment. https://codecombat.com/play
Sintonia DASCI. https://www.tiktok.com/@sintonia_dasci
Programming for Lovers. https://programmingforlovers.com/
Studio Code. https://studio.code.org/

TEACHING METHODS

- MD01 - Lección magistral/expositiva
- MD02 - Sesiones de discusión y debate
- MD03 - Resolución de problemas y estudio de casos prácticos
- MD04 - Prácticas de laboratorio y/o clínicas y/o talleres de habilidades
- MD06 - Prácticas en sala de informática
- MD07 - Seminarios
- MD10 - Realización de trabajos en grupo
- MD11 - Realización de trabajos individuales

ASSESSMENT METHODS (Instruments, criteria and percentages)

ORDINARY EXAMINATION DIET

Continuous evaluation:

Formative activities	Weight
Theory	50%
Practice	50%

- **Theory (50%)** [S1]: There will be three tests (20%, 15% and 15% of the evaluation, respectively). The first one will happen after lesson 3, the second in the middle of Python lessons (1st December), and the third one will take place on the date established by the grade for the computer science exam in the ordinary examination. These tests enable a continuous evaluation of the theory part of the course.
- **Practice (50%)** [SE2, SE3, SE4]: Participation and evaluation of laboratory activities, seminars, and supervised works will be comprised of participation and assessment.

The details of this ponderation are as follows:
- SE1: Evaluation of the acquired level through theory classes: 50% (Theory)
- SE2: Evaluation of the acquired level through laboratory activities: 20% (Practice)
- SE3: Evaluation of the acquired level through seminars and guided work: 20% (Practice)
- SE4: Evaluation of assistance, attitude, and participation in activities: 10% (Practice)

To pass the course, it will be necessary to obtain a final mark of 5 (out of 10) or higher. A minimum mark of 4 in both theory and practice is required. If that is not met, the final evaluation for the course will be the minimum between 4.9 and the student's marks.

EXTRAORDINARY EXAMINATION DIET

- The student will take an exam including theory and practice. All the lessons and activities in the syllabus will be included in the exam.
- Students not attending the practical part of the exam will maintain the marking they obtained during the ordinary session in this part.
- The final mark of the course will be the sum of each part with a weight of 50% each.
- To pass the course, it is necessary to obtain a mark of 5 (out of 10) or higher. It is also mandatory to obtain 4 or more in each part (theory and practice), otherwise, the final mark for the course will be the minimum between 4.9 and the student's marks.

SINGLE FINAL ASSESSMENT (evaluación única final)

- The students will take two tests: one to evaluate their knowledge regarding the theory aspects of the course, and another to evaluate acquired competencies related to the practical part.
- The final mark will be the average of both marks. To pass the course, it is necessary to obtain a mark of 5 (out of 10) or higher. It is also mandatory to obtain 4 or more in each part (theory and practice), otherwise, the final mark for the course will be the minimum between 4.9 and the student's marks.

ADDITIONAL INFORMATION

Following the recommendations of CRUE and the Secretariat of Inclusion and Diversity of the UGR, the mechanisms for the acquisition and assessment of competencies included in this syllabus will be applied according to the design principle for all people, facilitating learning and demonstration of knowledge according to the needs and functional diversity of the students.
The platform of support resources for teaching (PRADO2) at https://prado.ugr.es
Información de interés para estudiantado con discapacidad y/o Necesidades Específicas de Apoyo Educativo (NEAE): Gestión de servicios y apoyos (https://ve.ugr.es/servicios/atencion-

social/estudiantes-con-discapacidad).

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