# UNIVERSIDAD DE CASTILLA - LA MANCHA

# GUÍA DOCENTE

## 1. General information

**Course:** PROGRAMMING FUNDAMENTALS I
**Code:** 42302
**Type:** BASIC
**ECTS credits:** 6
**Degree:** 406 - UNDERGRADUATE DEGREE IN COMPUTER SCIENCE AND ENGINEERING (AB)
**Academic year:** 2023-24
**Center:** 604 - SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (AB)
**Group(s):** 10 11 12 13 14
**Year:** 1
**Duration:** First semester
**Main language:** Spanish
**Second language:** English
**Use of additional languages:**
**English Friendly:** N
**Web site:**
**Bilingual:** Y

Lecturer: **FERNANDO CUARTERO GOMEZ** - Group(s): **10**

| Building/Office | Department | Phone number | Email | Office hours |
|---|---|---|---|---|
| 1.A.10 | SISTEMAS INFORMÁTICOS | 2478 | fernando.cuartero@uclm.es | |

Lecturer: **MIGUEL ANGEL GALDON ROMERO** - Group(s): **12**

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| ESII / 1.A.2 | SISTEMAS INFORMÁTICOS | 2442 | miguel.galdon@uclm.es | |

Lecturer: **ARTURO SIMON GARCIA JIMENEZ** - Group(s): **13**

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| ESII / 0.A.4 | SISTEMAS INFORMÁTICOS | 97144 | arturosimon.garcia@uclm.es | The tutoring hours will be provided to students on the first day of class, and will be available at https://www.esiiab.uclm.es/pers.php?codpers=724&curso=2023-24 |

Lecturer: **JUAN JOSE PARDO MATEO** - Group(s): **11 12**

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Lecturer: **FRANCISCO JOSE VIGO BUSTOS** - Group(s): **10 11**

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## 2. Pre-Requisites

This subject is taught in the first four-month period of the first year of the Computer Science degree. Because of this, it will be new to most students and it will most likely be their first contact with programming. Therefore, it does not seem logical to stablish prerequisites in this case.

In spite of this, and with the main purpose of guaranteeing the assimilation of the contents and the acquisition of skills of this subject, the student is advised to take advantage of certain personal skills and abilities that they acquired during their primary and secondary studies. Among them, we highlight the critical reading of the texts of the bibliography, the use of the electronic material of this subject available on the virtual campus platform and the active search for complementary material on the Internet. It is also very important that the student has initiative and perseverance in the daily work of the subject.

## 3. Justification in the curriculum, relation to other subjects and to the profession

Programming Fundamentals I is not an isolated subject, but a part of the curriculum with a close relationship to the rest of the subjects. Thus, this subject has been included in the groups of subjects dedicated to Programming together with Programming Fundamentals II, Data Structures, Programming Methodology and Concurrent and Real Time Programming. Since Programming Fundamentals I is the first subject of the group, it will be one of the fundamental pillars in which the basic concepts of programming will be established, which will subsequently be used by the other subjects of the group.

In addition, the knowledge and skills acquired with this subject will be important for the proper development of other subjects, such as Software Engineering.

Going beyond the university environment and thinking about the future employment of our students, this subject (and all those of that make up the group) will provide them with the necessary skills and abilities to make a good project planning and an evaluation the different alternatives proposed. All this considering that a graduate in computer science is not called to be a mere programmer but to be responsible for large projects.

## 4. Degree competences achieved in this course

**Course competences**

| Code | Description |
|---|---|
| BA04 | Basic knowledge about the uses and programming of computers, operating systems, data bases, and digital programmes with applications in engineering. |
| BA05 | Knowledge about the structure, organization, functioning, and inter connexions of digital programmes, with their application in engineering problems. |
| CO07 | Knowledge, design, and efficient use of types of data and structures which arise as most appropriate in problem solving. |
| CO08 | Ability to analyse, design, build and maintain applications in a strong, safe, and efficient manner by selecting the most appropriate |

| | |
|---|---|
| INS01 | paradigms and programming languages.<br>Analysis, synthesis, and assessment skills. |

## 5. Objectives or Learning Outcomes

**Course learning outcomes**

Description

Application of basic principles of structured design, led to objects for problem solving.

Resolution of problems throughout basic techniques of algorithm design.

**Additional outcomes**

Acquire information autonomously, explain it to classmates making sure they have assimilated it.

Code, tune and execute simple programs written in the C programming language.

Know how to choose and manipulate the right types of data for a correct representation of the information.

## 6. Units / Contents

**Unit 1: Introduction to Programming**

**Unit 2: Representing simple data in memory**

**Unit 3: Data input/output**

- **Unit 3.1**
- **Unit 3.2**

**Unit 4: Control statements**

- **Unit 4.1** Blocks of execution
- **Unit 4.2** Conditional control statements
- **Unit 4.3** Repetition/looping structures

**Unit 5: Subprograms**

**Unit 6: Arrays and Matrices**

**Unit 7: User defined datatypes**

- **Unit 7.1** Structures
- **Unit 7.2** Definition of new datatypes

## 7. Activities, Units/Modules and Methodology

| Training Activity | Methodology | Related Competences (only degrees before RD 822/2021) | ECTS | Hours | As | Com | Description |
|---|---|---|---|---|---|---|---|
| Class Attendance (theory) [ON-SITE] | Combination of methods | BA04 BA05 CO07 CO08 | 0.72 | 18 | N | - | [MAG] Explanation of the main theoretical concepts of the subject |
| Laboratory practice or sessions [ON-SITE] | Practical or hands-on activities | BA04 BA05 CO07 CO08 INS01 | 0.8 | 20 | Y | N | [LAB] Conducting the proposed laboratory sessions. These sessions will be composed of several exercises to be solved in groups or individually as indicated in each case. The evaluation of these laboratory sessions will be made through the delivery of 2 practical exercises carried out individually, whose date will be announced throughout the course. |
| Problem solving and/or case studies [ON-SITE] | Problem solving and exercises | BA04 BA05 CO07 CO08 INS01 | 0.64 | 16 | N | - | [PRO] Problem solving where students will be able to apply the concepts and techniques explained in class. These activities will be carried out in conjunction with explanations of theoretical concepts. Throughout the course, students may be asked to hand in some of them in order to assess the acquisition of competences. |
| Mid-term test [ON-SITE] | Assessment tests | BA04 BA05 CO07 CO08 INS01 | 0.24 | 6 | Y | N | [EVA] In-class tests that will be conducted throughout the course. These tests may be conducted with or without the aid of a computer. Only students who choose to follow the continuous assessment will take these tests. |
| Study and Exam Preparation [OFF-SITE] | Self-study | BA04 BA05 CO07 CO08 INS01 | 2.44 | 61 | N | - | [EST] Preparation/study of the subject's theoretical concepts and exercises, [LAB] and preparation of laboratory practical sessions |
| Final test [ON-SITE] | Assessment tests | BA04 BA05 CO07 CO08 INS01 | 0.16 | 4 | Y | N | [EVA] Final assessment test. It will not be necessary for students who pass the subject with the continuous assessment. It shall consist of several exercises of similar difficulty to those carried out throughout the course in class. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Writing of reports or projects [OFF-SITE] | Group Work | CO07 CO08 | 1 | 25 | N | - | Students will solve, in groups, a simple practical case study. |
| | | **Total:** | **6** | **150** | | | |
| | | **Total credits of in-class work: 2.56** | | | | | **Total class time hours: 64** |
| | | **Total credits of out of class work: 3.44** | | | | | **Total hours of out of class work: 86** |

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

## 8. Evaluation criteria and Grading System

| Evaluation System | Continuous assessment | Non-continuous evaluation* | Description |
|---|---|---|---|
| Mid-term tests | 45.00% | 0.00% | There will be several evaluation tests throughout the course. These tests will consist of solving small programs without the support of a computer.<br><br>The number of tests to be taken, as well as the weighting of these tests, will be indicated on the first day of class.<br><br>A post-examination interview may be required to explain the student's solution to all or some of the problems, if deemed necessary by the professor [ESC]. |
| Laboratory sessions | 30.00% | 30.00% | There will be several tests throughout the course in which students will demonstrate their programming skills with or without the support of a computer.<br><br>The number of tests to be taken, as well as the weighting of these tests, will be indicated on the first day of class.<br><br>Students who do not follow continuous evaluation will take a single test on the date established in the teaching organisation.<br><br>A post-examination interview may be required to explain the student's solution, if deemed necessary by the professor [LAB]. |
| Assessment of active participation | 10.00% | 0.00% | The participation of the students in class will be valued through the presentation of their solutions to the problems proposed by the lecturers [PRES]. |
| Final test | 0.00% | 55.00% | This final test will consist of solving small programs without the use of a computer. This test will only be taken by students who have not followed the continuous assessment. This test will consist of solving small problems similar to those done in class.<br><br>A post-examination interview may be required to explain the student's solution to all or some of the problems, if deemed necessary by the professor [ESC]. |
| Projects | 15.00% | 15.00% | The work carried out by the students will be assessed by means of an evaluation test, in which individual students will be asked to make modifications to the solution presented by the group to the work proposed [LAB]. |
| **Total:** | **100.00%** | **100.00%** | |

*According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).*

**Evaluation criteria for the final exam:**

**Continuous assessment:**

By default, students will be evaluated through continuous assessment. If a student wishes to change to non-continuous evaluation, he/she must indicate it through the following link https://www.esiiab.uclm.es/alumnos/evaluacion.php before he/she has been assessed 50% of the mark for the course. The teacher will inform in class, and through the virtual campus of the date on which this event occurs, and the deadline for the application of the non-continuous mode.

In order to pass the subject, students must have a minimum mark of 3 points in the progress tests, the lab tests and the project. In addition, the overall mark for the course must be greater than or equal to 5 points.

The student who does not pass the mandatory activities/assignments required in the subject will have a mark not higher than 4.00 even if the obtained average was another, including more than 5.00.

**Non-continuous evaluation:**

Only those students who have explicitly indicated this through the link https://www.esiiab.uclm.es/alumnos/evaluacion.php before they have been assessed for 50% of the mark for the course will be assessed in this mode. The teacher will inform in class, and through the virtual campus of the date on which this event takes place, and the deadline for the application of the non-continuous mode.

In this case, students will take a final test and a lab test described in the table above, a laboratory assessment test and a project assessment test.

In order to pass the subject in this evaluation, a minimum mark of 3 points in each of the parts and an overall mark of 5 points or more will be required.

The student who does not pass the mandatory activities/assignments required in the subject will have a mark not higher than 4.00 even if the obtained average was another, including more than 5.00.

**Specifications for the resit/retake exam:**

Students who have not passed the course in the regular evaluation session (continuous or non-continuous) will take a written test, a laboratory test and a project test. If the student obtained the minimum mark in any of the parts indicated above, he/she can opt to retain that mark and not take that part of the exam again, maintaining the mark obtained in the regular evaluation session.

For those students who have followed the continuous assessment and take the final written test (because they did not reach the minimum of 3 in this part or because they decide to do so) they will not keep the grade of the assessment of active participation (10%) and therefore the written test will be valued 70%.

In order to pass the subject, students must have a minimum mark of 3 points in each of the parts and a final mark of 5 points or more.

The student who does not pass the mandatory activities/assignments required in the subject will have a mark not higher than 4.00 even if the obtained average was another, including more than 5.00.

**Specifications for the second resit / retake exam:**

The students will take a final test (this test could have a written part and another practical part) whose assessment will be 100%.

## 9. Assignments, course calendar and important dates

**Not related to the syllabus/contents**

| **Hours** | **hours** |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 1.5 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 3.5 |
| Mid-term test [PRESENCIAL][Assessment tests] | 6 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 4 |
| Final test [PRESENCIAL][Assessment tests] | 4 |
| Writing of reports or projects [AUTÓNOMA][Group Work] | 25 |

**General comments about the planning:** This course schedule is APPROXIMATE. It could vary throughout the academic course due to teaching needs, bank holidays, etc. A weekly schedule will be properly detailed and updated on the online platform (Virtual Campus). Note that all the lectures, practice sessions, exams and related activities performed in the bilingual groups will be entirely taught and assessed in English. Classes will be scheduled in 3 sessions of one hour and a half per week. Evaluation activities or catch-up classes may exceptionally be scheduled in the afternoon (morning).

**Unit 1 (de 7): Introduction to Programming**

| **Activities** | **Hours** |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 1.5 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 2 |

**Unit 2 (de 7): Representing simple data in memory**

| **Activities** | **Hours** |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 1.5 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 1.5 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 1 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 2 |

**Unit 3 (de 7): Data input/output**

| **Activities** | **Hours** |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 1.5 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 1.5 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 1 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 2 |

**Unit 4 (de 7): Control statements**

| **Activities** | **Hours** |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 3 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 3 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 3.5 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 18 |

**Unit 5 (de 7): Subprograms**

| **Activities** | **Hours** |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 3 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 3 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 3.5 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 20 |

**Unit 6 (de 7): Arrays and Matrices**

| **Activities** | **Hours** |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 3 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 4.5 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 3 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 5 |

**Unit 7 (de 7): User defined datatypes**

| **Activities** | **Hours** |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 3 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 3 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 4 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 8 |

**Global activity**

| **Activities** | **hours** |
|---|---|
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 20 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 61 |
| Mid-term test [PRESENCIAL][Assessment tests] | 6 |

| | |
|---|---|
| Final test [PRESENCIAL][Assessment tests] | 4 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 16 |
| Writing of reports or projects [AUTÓNOMA][Group Work] | 25 |
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 18 |
| **Total horas:** | 150 |

## 10. Bibliography and Sources


| Author(s) | Title/Link | Publishing house | Citv | ISBN | Year | Description |
|---|---|---|---|---|---|---|
| Martinez Gil, F.A, Martin Quetglás, G | Introducción a la programación Estructura en C | Universitat de Valencia | | | 2003 | |
| Schildt, H. | C: Manual de Referencia. | McGraw- Hill. | | | | |
| Carretero, J., García, F., Fernández, J., Calderón, A. | El Lenguaje de Programación C. Diseño e Implementación de Programas | Prentice Hall | | | 2001 | |
| Byron S. Gottfried | Programming with C | McGraw-Hill | | | 1996 | |
| Herbert Schildt | C: The Complete Reference | McGraw-Hill | | | 2000 | 4th Edition |
| Gottfried B. | Programación en C | McGraw- Hill | | | 2005 | |