



1. General information

Course: PROGRAMMING FUNDAMENTALS I

Type: BASIC

Degree: 406 - UNDERGRADUATE DEGREE IN COMPUTER SCIENCE AND ENGINEERING (AB)

Center: 604 - SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (AB)

Year: 1

Main language: Spanish

Use of additional languages:

Web site:

Code: 42302

ECTS credits: 6

Academic year: 2022-23

Group(s): 10 11 12 13

Duration: First semester

Second language: English

English Friendly: N

Bilingual: Y

Lecturer: FERNANDO CUARTERO GOMEZ - Group(s): 12

Building/Office	Department	Phone number	Email	Office hours
1.A.10	SISTEMAS INFORMÁTICOS	2478	fernando.cuartero@uclm.es	The office hours will be announced on the first day of class and will be available online at: https://www.esiiaab.uclm.es/pers.php?codpers=fernando&curso=2022-23

Lecturer: MIGUEL ANGEL GALDON ROMERO - Group(s): 10

Building/Office	Department	Phone number	Email	Office hours
ESII / 1.A.2	SISTEMAS INFORMÁTICOS	2442	miguel.galdon@uclm.es	The office hours will be announced on the first day of class and will be available online at: https://www.esiiaab.uclm.es/pers.php?codpers=mgaldon&curso=2022-23

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

Building/Office	Department	Phone number	Email	Office hours
ESII / 0.A.4	SISTEMAS INFORMÁTICOS	97144	arturosimon.garcia@uclm.es	The office hours will be announced on the first day of class and will be available online at: https://www.esiiaab.uclm.es/pers.php?codpers=ArturoSimon.Garcia&curso=2022-23

Lecturer: JUAN JOSE PARDO MATEO - Group(s): 10 11

Building/Office	Department	Phone number	Email	Office hours
ESII / 0.A.10	SISTEMAS INFORMÁTICOS	2044	juanjose.pardo@uclm.es	The office hours will be announced on the first day of class and will be available online at: https://www.esiiaab.uclm.es/pers.php?codpers=jpardo&curso=2022-23

Lecturer: FRANCISCO JOSE VIGO BUSTOS - Group(s): 11 12

Building/Office	Department	Phone number	Email	Office hours
ESII / 1.C.12	SISTEMAS INFORMÁTICOS		fco.vigo@uclm.es	The office hours will be announced on the first day of class and will be available online at: https://www.esiiaab.uclm.es/pers.php?codpers=fvigo&curso=2022-23

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 establish 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 paradigms and programming languages.
INS01	Analysis, synthesis, and assessment skills.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Resolution of problems throughout basic techniques of algorithm design.

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

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

Final test [ON-SITE]	Assessment tests	BA04 BA05 CO07 CO08 INS01	0.16	4	Y	N	laboratory practical sessions [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. The number of tests to be taken, as well as the weighting of these tests, will be indicated on the first day of class [ESC].
Laboratory sessions	30.00%	30.00%	There will be several tests throughout the course in which students will demonstrate their programming skills with the support of a computer. The number of tests to be taken, as well as the weighting of these tests, will be indicated on the first day of class. Students who do not follow continuous evaluation will take a single test on the date established in the teaching organisation [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 [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.esiiaab.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.esiiaab.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
Mid-term test [PRESENCIAL][Assessment tests]	6
Final test [PRESENCIAL][Assessment tests]	4
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]	2.5
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]	2.5
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
Class Attendance (theory) [PRESENCIAL][Combination of methods]	15.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	16.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	57
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
Total horas: 115	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Gottfried B.	Programación en C	McGraw- Hill			2005	
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