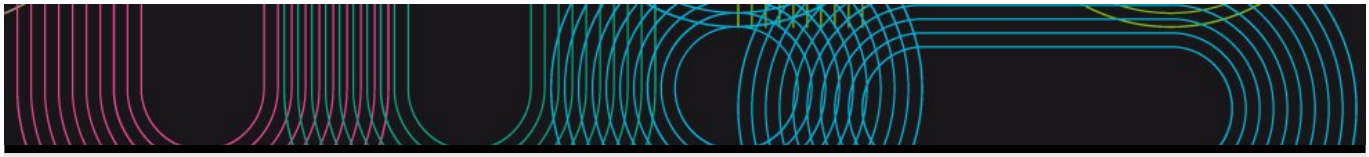

IDENTIFYING DATA				
Application development and integration				
Subject	Application development and integration			
Code	O06G151V01406			
Study programme	Grado en Ingeniería Informática			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	García Pérez-Schofield, Baltasar			
Lecturers	García Pérez-Schofield, Baltasar			
E-mail	jbgarcia@uvigo.es			
Web	http://webs.uvigo.es/jbgarcia			
General description	The objective of this subject is to show the particularities of the development of applications by teams of several members. English Friendly subject: International students may request from the teachers: a) resources and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.			

Training and Learning Results	
Code	
A2	Students will be able to apply their knowledge and skills in their professional practice or vocation and they will show they have the required expertise through the construction and discussion of arguments and the resolution of problems within the relevant area of study.
A5	Students will acquire the learning skills that are required to pursue further studies with a high degree of independence.
B1	Ability to conceive, write, organize, plan, develop and sign projects in the field of computing engineering whose aim is, according to the acquired knowledge and training, the design, development and exploitation of computing systems, services and applications.
B2	Ability to manage the project□s activities from the computing field in accordance with the acquired knowledge and training.
B4	Ability to define, assess and select hardware and software platforms for the development and execution of computing systems, services and applications, according to the acquired knowledge and training.
B5	Ability to conceive, develop and maintain computing systems, services and applications through use of software engineering methods as tools to ensure quality, according to the knowledge and training acquired.
B6	Ability to conceive and develop centralized or distributed computing systems and architectures, integrating hardware, software and networks, according to the knowledge and training acquired.
B9	Ability to solve problems by taking the initiative, making decisions and acting independently and creatively. Ability to communicate the knowledge contents, skills and abilities of the Computer Science Engineer profession.
C11	Knowledge, administration and maintenance of computer systems, services and applications.
C18	Knowledge and application of the characteristics, functions and structure of data bases, allowing their appropriate use, and design, analysis and implementation of applications based on them.
C19	Knowledge and application of the necessary tools for storing, processing and accessing information Systems, including web-based ones.
C22	Knowledge and application of the principles, methodologies and life cycles of software engineering.
C25	Ability to develop, maintain and assess software systems and services that satisfy all the demands of users and work reliably and efficiently, are easy to develop and maintain, and meet the quality standards, applying the theories, principles, methods and practices of Software Engineering.
C27	Ability to solve problems of integration according to available strategies, standards and technologies.
C28	Ability to identify and analyze problems and design, develop, implement, verify and document software solutions on the basis of sound knowledge of the theories, models and techniques available nowadays.

C29	Ability to identify, assess and deal with associated risks that could potentially arise.
D4	Analysis, synthesis and evaluation capacity
D5	Organizational and planning skills
D6	Ability to abstract: ability to create and use models that reflect real situations
D7	Ability to search, relate and structure information from various sources and to integrate ideas and knowledge.
D8	Ability to work in situations of lack of information and / or under pressure
D9	Ability to quickly integrate and work efficiently in unidisciplinary teams and to collaborate in a multidisciplinary environment
D10	Interpersonal relationship skills.
D11	Critical thinking
D12	Leadership

Expected results from this subject

Expected results from this subject	Training and Learning Results			
RA1. Develop all type of software through all the phases.	A2 A5	B1 B2 B4 B5 B6 B9	C11 C18 C19 C22 C25 C27 C28 C29	D4 D5 D6 D7 D8 D9 D11
RA3. Learn practical methods for the specification of all components during the development of a software package.	A2 A5	B1 B5	C11 C18 C19 C22 C25 C27 C29	D4 D5 D6 D7 D8 D9 D11
RA4. Learn the available technics for software integration.	A2 A5	B1 B4 B5 B6 B9	C27 C29	D4 D5 D6 D7 D8 D9 D10 D11 D12
RA5. Learn methods and standards for the development, verification and maintenance of an integrated application.	A2	B1 B2 B4 B5 B6 B9	C11 C18 C19 C22 C25 C27 C28 C29	D4 D5 D6 D7 D8 D9 D10 D11 D12
RA6. Be able to apply software engineering techniques to obtain applications of big quality with the requested functionalities, considering the system as a group of applications.	A2 A5	B1 B2 B4 B5 B6 B9	C11 C18 C19 C22 C25 C27 C28 C29	D4 D5 D6 D7 D8 D10 D11
RA7. Work like part of a team that develops software projects composed by several phases and control milestones.	A2	B1 B2 B4 B5 B6 B9	C11 C18 C19 C22 C25 C27 C28 C29	D4 D5 D6 D7 D8 D9 D10 D11 D12

RA8. Present an adapted form of project's documentation to each one of the people involved in its development: analysts, designers, programmers and customers.	A2 A5	B1 B2 B9	C28 C29	D4 D5 D7 D8 D9 D10 D11 D12

Contents	
Topic	
Introduction	Bases of object orientation.
Techniques	Codification guidelines Design and code generation. Programming by contract. Test-driven development.
Persistence	Orthogonal persistence. Persistence tools.

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	15	22	37
Project based learning	17.5	42.5	60
Problem solving	15	19	34
Project	2	4	6
Problem and/or exercise solving	3	10	13
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Lecturing	Lectures will be centered in the presentation of the necessary concepts in the simplest way possible. They will be accompanied by audiovisual means and small exercises aimed at strengthening understanding.
Project based learning	Exercise classes, from the second half of the semester on, will consist in the development of a group project, specially enforcing the interaction among members.
Problem solving	Exercise classes in the first half of the semester will consist of the resolution of guided simple exercises, strengthening the understanding of topics presented in the theoretical lectures. Continuous evaluation: mandatory (80% assistance is required). Global evaluation: not mandatory.

Personalized assistance	
Methodologies	**Description**
Project based learning	Several virtual tools (email, videoconference, forums...), will be available for tutorial sessions. These sessions will be previoulsy agreed.

Assessment					
	Description	Qualification	Training and Learning Results		
Project	The student will develop a group project, supported by small exercises in the sessions of exercise classes, along all the subject. Results: RA1, RA2, RA3, RA4, RA5, RA6, RA7, RA8.	60	A5	B1 B5 B6 B9	C29	D4 D5 D6 D7 D8 D9 D10 D11 D12

Problem and/or exercise solving	They will make two written exams during the course of the subject, one in the half and another at the end. Said proofs will be eliminatory, so that students passing them will not have to make them again at the theoretical part in first option. Results: RA2, RA3, RA4, RA5, RA8.	40	A2	B1 B2 B4 B5 B6 B9	C11 C18 C19 C22 C25 C27 C28 C29	D4 D5 D6 D7 D8 D9 D10

Other comments on the Evaluation

Continuous evaluation system

TEST 1: Partial 1.

Description: Eliminatory test, that is, in terms of the theoretical part, those students who pass these tests (Partial 1 & Partial 2), will not need to do the first option test.

Methodology(s) applied(s): Resolution of problems and/or exercises.

% Qualification: 30%

Minimum % A student must obtain a mark equal to or greater than 4 points (out of 10) in order to pass this test.

Evaluated training and learning results: A5, B5, B9, C29, C30, D4, D5, D6, D7, D8, D11.

Expected results in the subject evaluated: RA3, RA8.

TEST 2: Partial 2.

Description: Eliminatory test, that is, in terms of the theoretical part, those students who pass these tests (Partial 1 & Partial 2), will not need to do the first option test.

Methodology(s) applied(s): Resolution of problems and/or exercises.

% Qualification: 30%

Minimum % A student must obtain a mark equal to or greater than 4 points (out of 10) in order to pass this test.

Evaluated training and learning results: A5, B5, B9, C29, C30, D4, D5, D6, D7, D8, D11.

Expected results in the subject evaluated: RA3, RA8.

TEST 3: Project.

Description: Students will carry out a project as the subject progresses, taking advantage of and applying the theoretical knowledge assimilated in the theoretical session. The student will need to deliver in this project at the end of the course.

Methodology(s) applied: Project.

% Qualification: 40%

Minimum % A student must obtain a grade equal to or greater than 4 points (out of 10)) in order to pass this test.

Evaluated training and learning results: A2, B2, B4, B5, B9, B12, C18, C19, C25, C27, C28, C29, C30, C36, D4, D5, D6, D7, D8.

Expected results in the subject evaluated: RA3, RA6, RA8.

 All students who take any of the tests are understood to accept the continuous assessment procedure described above.

 If a student does not take any of the tests, they will be assigned, at most, a mark of 4 in it, according to the rest of the marks.

Global evaluation system

Procedure for choosing the global evaluation modality: during a period of one month from the beginning of the semester, the enrolled students can formally state their intention to take advantage of the continuous evaluation system.

TEST 1: First opportunity.

Description: Resolution of exercises.

Methodology(s) applied(s): Resolution of problems and/or exercises.

% Rating: 100%.

Minimum %: A student must obtain a grade equal to or greater than 5 points (out of 10)) in order to pass this test.

Evaluated training and learning results: A2, A5, B2, B4, B5, B9, B12, C18, C19, C25, C27, C28, C29, C30, C26, D4, D5, D6, D7, D8, D11.

Expected results in the subject evaluated: RA3, RA6, RA8.

Evaluation criteria for second opportunity and end of degree

The continuous and global evaluation systems described above will be used.

Record qualification process

Regardless of the evaluation system and the option, if any part of the evaluation is not passed, but the overall score is greater than 4 (out of 10), the final qualification will be 4.

Evaluation dates

The dates of the tests corresponding to the continuous assessment system will be published in the calendar of activities, available on the ESEI website https://esei.uvigo.es/docencia/horarios/.

The official exam dates of the different opportunity, officially approved by the Xunta de Centro of the ESEI, are published on the ESEI website https://esei.uvigo.es/docencia/horarios/.

Use of mobile devices

All students are reminded of the prohibition of the use of mobile devices in exercises and practices, in compliance with article 13.2.d) of the University Student Statute, regarding the duties of the university student, which establishes the duty to "Refrain from using or cooperation in fraudulent procedures in the evaluation tests, in the works that are carried out or in official documents of the university."

Inquiry/request for tutorials

Tutorial schedules can be consulted through the personal page of the teaching staff, accessible through https://esei.uvigo.es/docencia/profesorado/

Sources of information

Basic Bibliography

McConnell, Steve, **Code Complete: A Practical Handbook of Software Construction**, 978-0735619678, 2, Microsoft Press, 2004

Albahari, Joseph, **C# 10 IN A NUTSHELL**, 978-1098121952, 1, O'Reilly, 2022

Whitaker, R.B., **The C# Player's Guide**, 978-0985580155, 5, StarBound Software, 2022

Complementary Bibliography

Recommendations