IDENTIFYING DATA

Computer Architecture II

Subject	Computer Architecture II			
Code	O06G150V01303			
Study programme	(*)Grao en Enxeñaría Informática			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	García Rivera, Matías			
Lecturers	García Rivera, Matías Trillo Rodríguez, José Luís			
E-mail	mgrivera@uvigo.es			
Web	http://moovi.uvigo.gal			
General description	This subject concerns in the basic concepts about the components of the architecture of a computer given in Computer Architecture I, in order to understand the operation of a current computer. Technical documentation will be used in English. English Friendly subject: International students may request from the teachers: a) materials and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.			

Competencies

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.
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.
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.
B8	Knowledge of the essential subjects and technologies that will allow students to learn and develop new methods and technologies, as well as those that will endow them with versatility to adapt to new situations.
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.
C7	Ability to design, develop, choose and assess computer applications and systems to guarantee their reliability, safety and quality, according to ethical principles and existing legislation and regulations.
C19	Knowledge and application of the necessary tools for storing, processing and accessing information Systems, including web-based ones.
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.
C26	Ability to assess clients needs and determine the software requirements to satisfy these needs, reconciling conflicting goals through attempts to reach acceptable compromises within the limits imposed by costs, available times, existing developed systems and organizations themselves.
C30	Ability to design appropriate solutions in one or more domains of application by using methods of software engineering that include ethical, social, legal and economic issues.
C32	Ability to select, design, implement, integrate, assess, build, manage, exploit and maintain hardware, software and network technologies, within the appropriate costs and quality requirements.
D4	Analysis, synthesis and evaluation capacity
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
D14	Have motivation for quality and continuous improvement

Learning outcomes

Expected results from this subject	Training and Learning Results			
RA01: Advise programmers in the problems that arise with the programming of systems	A2	B4 B6 B8 B9	C7 C19 C25 C26 C30 C32	D4 D6 D7 D8 D9 D10 D11 D14
RA01: Study the current system and analyze and devise the best means to carry out the same or additional objectives				
RA02: Implement testing and quality control procedures in accordance with current legislation and regulations	A2	B4 B6 B8 B9	C7 C19 C25 C26 C30 C32	D4 D6 D7 D8 D9 D10 D11 D14
RA03: Install, configure and manage hardware and communications systems, basic software and user applications.	A2	B4 B6 B8 B9	C7 C19 C25 C26 C30 C32	D4 D6 D7 D8 D9 D10 D11 D14
RA04: Set out the technical specifications for a medium-sized computer installation, considering the needs for power, refrigeration, technical floor, conservation and security, in accordance with regulations	A2	B4 B6 B8 B9	C7 C19 C25 C26 C30 C32	D4 D6 D7 D8 D9 D10 D11 D14
RA05: Analyze projects and needs, and propose solutions on a technical, human and financial level	A2	B4 B6 B8 B9	C7 C19 C25 C26 C30 C32	D4 D6 D7 D8 D9 D10 D11 D14

Contents

Topic	
Introduction to current processors	Processors of the families x86, x64, ARM.
Internal memory	Introduction to systems and the hierarchy of memory in personal computers. Internal memory. Principal memory. Types of DRAM memory. Cache. Memory system of the Intel family.
External memory	External memory. Magnetic and solid state disks (HDD, SSD). Physical and logical discs. File systems in HDDs and SSDs. Optical and tape drives.

Input Output	Input Output Techniques on personal computers. Peripherals and I / O modules. External interfaces: USB, IEEE 1394, PATA, SATA.
Power supply	Power supply: power supply, uninterrupted and emergency power systems, batteries.
Interconnection with buses	Interconnection and hierarchy of buses. PCI, AGP, PCI-Express buses.
Practices I	Low-level programming in a simple computer of the input-output techniques.
Practices II	Identification of components of personal computers. Disassembly and assembly of personal computers.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	18	30	48
Problem solving	17	30	47
Laboratory practical	12	23.5	35.5
Problem and/or exercise solving	1.5	6	7.5
Laboratory practice	4	8	12

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	Exhibition to the students of the contained of the subject.
Problem solving	Formulation, analysis, resolution and debate of problems or exercises related with the thematic of the subject.
Laboratory practical	Formulation, analysis, resolution and debate of computer programming problems in low level related with input output

Personalized assistance

Tests	Description
Problem and/or exercise solving	An individual analysis of the students will be carried out through a continuous control of the partial tests.

Assessment

	Description	Qualification	Training and Learning Results			
Laboratory practical	2 laboratory practice tests to evaluate the small group classes. Each of these 2 tests will be 20% of the final grade. In order to pass the subject, it is mandatory that the student presents himself / herself to all the tests and that in each test he / she obtains a grade equal to or higher than 3 out of 10. Results: RA02 y RA05.	40	A2	B4 B6 B8 B9	C7 C19 C25 C26 C30 C32	D4 D6 D7 D8 D9 D10 D11 D14
Problem and/or exercise solving	2 short answer tests to evaluate the large group classes. Each of these 2 tests will be 30% of the final grade. In order to pass the subject, it is mandatory that the student presents himself / herself to all the tests and that in each test he / she obtains a grade equal to or higher than 3 out of 10. Results: RA01, RA03 y RA04.	60	A2	B4 B6 B8 B9	C7 C19 C25 C26 C30 C32	D4 D6 D7 D8 D9 D10 D11 D14

Other comments on the Evaluation

All references to numeric grades in this guide are about 10.

ASSESSMENT CRITERIA FOR ASSISTANTS 1st EDITION OF ACTS

For the students attending the first edition of the acts, 4 mandatory partial tests will be carried out:

- 2 short answer tests to evaluate the large group classes. Each of these 2 tests will be 30% of the final grade.

- 2 laboratory practice tests to evaluate the small group classes. Each of these 2 tests will be 20% of the final grade.

To pass the subject it is mandatory that the student is present to all the tests and that in each test obtain a grade equal to or higher than 3.

In the case of not performing any test or obtain in a test a grade lower than 3, if the overall score is higher than 5, the final grade in the act will be 4.9, fail.

The dates of these 4 tests for the attending students can be consulted in the calendar of activities of the ESEI.

EVALUATION CRITERIA FOR NON-ASSISTANTS 1st EDITION OF ACTS

The evaluation for the non-attending students in the first edition of the acts will be 2 tests:

Methodology / Test 1: short answer test

Description: A mandatory test with short answers on all the contents of the large group classes.

% Grade: This test will be 60% of the final grade.

Evaluated competences: CB2, CG4, CG6, CG8, CG9, CE7, CE19, CE25, CE26, CE30, CE32, CT4, CT6, CT7, CT8, CT9, CT10, CT11, CT14

Evaluated learning outcomes: RA01, RA02 y RA04.

Methodology / Test 2: laboratory practice

Description: A mandatory practical test on the contents of the classes of the small groups. This practice will be developed with a PC and specific hardware. The download of the hardware manuals and software programs used will be available at faitic.uvigo.es.

% Grade: This test will be 40% of the final grade.

Evaluated competences: CB2, CG4, CG6, CG8, CG9, CE7, CE19, CE25, CE26, CE30, CE32, CT4, CT6, CT7, CT8, CT9, CT10, CT11, CT14

Evaluated learning outcomes: RA01 y RA03.

To pass the subject, it is mandatory that the student presents himself / herself to the 2 tests and that in each test he / she obtains a grade equal to or greater than 3.

In the case of not performing any test or obtain in a test a grade lower than 3, if the overall score is higher than 5, the final grade in the minutes will be 4.9, fail.

EVALUATION CRITERIA FOR THE 2nd EDITION AND OTHERS ACTS

The same evaluation system applied for non-assistants will be used.

ACTS QUALIFICATION PROCESS

Regardless of the call, in the case of not performing any test or obtain in a test a grade lower than 3, if the overall score was greater than 5, the final grade in minutes will be 4.9, fail.

EVALUATION DATES.

The calendar of evaluation tests officially approved by the Center Board of the ESEI is published on the web page http://www.esei.uvigo.es/index.php?id=29.

PROHIBITION OF USE OF ANY ELECTRONIC DEVICE

All students are reminded to prohibit the use of any electronic device in exercises and practices.

JUSTIFICATION OF ABSENCE

To be able to justify the absence to a test, a certificate issued by a doctor is necessary. A proof of the doctor's appointment will not be valid.

Sources of information

Basic Bibliography

Stallings, William, **Organización y arquitectura de computadores**, 9788489660823, 7ª edición, Prentice Hall, 2006

Eben Upton, Jeff Duntemann, Ralph Roberts, Tim Mamtora, and Ben Everard, **Learning Computer Architecture with Raspberry Pi®**, 9781119183938, John Wiley & Sons, Inc., 2016

Meyers, Mike, **CompTIA A+ Certification All-in-One Exam Guide : Exams 220-801 and 220-802 with CD**, 9780071795128, 8th Edition, McGraw-Hill Osborne, 2012

Quentin Docter; Emmett Dulaney; Toby Skandier, **CompTIA A+ : Exams 220-801 and 220-802 Study Guide 2nd**, 9781118324059, 2nd Edition, John Wiley, 2012

ASUS, **H81M-PLUS User's Manual: http://dlcdnet.asus.com/pub/ASUS/mb/LGA1150/H81M-PLUS/E8448_H81M-PLUS.pdf**, First Edition V1, ASUS, June 2013

Brian Carrier, **File System Forensic Analysis**, 9780321268174, 1st Edition, Addison-Wesley Professional, 2005

Complementary Bibliography

Romero Ternero, Díaz Ruiz, Molina Cantero, **Estructura y Tecnología de Computadores. Teoría y Problemas**, 9788448191757, Mcgraw-Hill, 2009

Bertrán, Guzmán, **Diseño y evaluación de Arquitectura de Computadoras**, 9788483226506, Pearson, Prentice Hall, 2010

Parhami, Behrooz, **Arquitectura de computadoras: de los microprocesadores a las supercomputadoras**, 9789701061466, McGraw-Hill Interamericana, 2007

Patterson, David A, **Estructura y diseño de computadores: interfaz circuitería-programación**, 9788429126204, 4ª ED., Reverté, 2011

Simon Monk, **Raspberry Pi Cookbook**, 9781492043225, O␣Reilly Media, 2016

Recommendations

Subjects that continue the syllabus

Parallel architectures/O06G150V01401

Subjects that are recommended to be taken simultaneously

Algorithms and data structures II/O06G150V01302
Operating systems I/O06G150V01305

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===
Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes an extraordinary planning that will be activated when the administrations and the institution itself determine it, considering safety, health and responsibility criteria both in distance and blended learning. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and teachers through the standardized tool.

SCENARIO 1: MIXED TEACHING
Due to the exceptional situation, given the impossibility of being able to teach completely in person, virtual means will be used to teach non-contact classes.
For the non-presential part, the means provided by the University, currently the https://campusremotouvigo.gal/ and https://faitic.uvigo.es, will be used. It may also be supplemented by other means.

SCENARIO 2: NON-PRESENCE TEACHING
Due to the exceptional situation, given the impossibility of being able to teach completely in person, virtual means will be used to teach non-contact classes.
For the non-presential part, the means provided by the University, currently the https://campusremotouvigo.gal/ and https://faitic.uvigo.es, will be used. It may also be supplemented by other means.

=== ADAPTATION OF THE METHODOLOGIES ===
* Teaching methodologies maintained

All of them

* Teaching methodologies modified
None of them

* Non-attendance mechanisms for student attention (tutoring)
https://campusremotouvigo.gal/ and https://faitic.uvigo.es

* Modifications (if applicable) of the contents
No modifications

* Additional bibliography to facilitate self-learning
No additional bibliography

* Other modifications
For laboratory practices, the practices that require specific equipment will be replaced by another simulated or virtualized one. Eventually, alternative practices that do not require such equipment will be proposed. These practices may be an autonomous format in anticipation of reconciliation and / or connectivity problems.

=== ADAPTATION OF THE TESTS ===
* Tests already carried out
All tests already carried out maintain their weight

* Pending tests that are maintained
All pending tests maintain their weight

* Tests that are modified
No tests are modified

* New tests
No new test

* Additional Information
Due to the exceptional situation, due to the impossibility of being able to do the tests in person, virtual means will be used to carry out the tests.
The means provided by the University, currently https://campusremotouvigo.gal/ and https://faitic.uvigo.es will be used.
They may also be supplemented by other means.