



COMPUTER ENGINEERING

34025 - COMPUTER ENGINEERING (2024-25)

General

Code: 34025

Lecturer responsible:

MARTINEZ ALVAREZ, ANTONIO

Credits ECTS:

6,00

Theoretical credits:

1,20

Practical credits:

1,20

Distance-base hours:

3,60

Departments involved

- **Dept:** INFORMATION TECHNOLOGY AND COMPUTING

Area: COMPUTER ARCHITECTURE

Theoretical credits: 1,2

Practical credits: 1,2

This Dept. is responsible for the course.

This Dept. is responsible for the final mark record.

Study programmes where this course is taught

- [DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION](#)
Course type: COMPULSORY (Year: 4)
- [DEGREE IN COMPUTER ENGINEERING](#)
Course type: COMPULSORY (Year: 3)

Competencies and objectives

Course context for academic year 2024-25

The subject "*Computer Engineering*" (CE) is part of the group of subjects focused on Computer Architecture, among which are "*Computer Fundamentals*", "*Computer Structure*" and "*Computer Architecture*", from previous courses and whose contents are an essential basis for CE. From a historical perspective, a technological evolution is followed that begins with the subject "*Computer Architecture*" where complex architectures that incorporate different degrees of parallelism (in their majority at the level of instruction) and that form the base of the high performance architectures that are studied in CE. In the present subject, different high performance architectures are analyzed in depth, and also their main characteristics, programming, and their evaluation mechanisms.

Course content (verified by ANECA in official undergraduate and Master's degrees) for academic year {0}

Specific Competences (CE)

- **CE1** : Capacitat per a dissenyar, desenvolupar, seleccionar i avaluar aplicacions i sistemes informàtics, assegurant la seua fiabilitat, seguretat i qualitat, d'acord amb principis ètics i amb la legislació i normativa vigent.
- **CE14** : Coneixement i aplicació dels principis fonamentals i tècniques bàsiques de la programació paral·lela, concurrent, distribuïda i de temps real.

Exclusive skill taught in this course

No data

Learning outcomes (Training objectives)

No data

Specific objectives stated by the academic staff for academic year 2024-25

The general objective is to make the student understand the importance of high performance architectures, understood as architectures that incorporate high levels of parallelism. To achieve this general objective, the following specific sub-objectives are proposed:

- To know the basic characteristics of the parallel computing according to the different architectures.
- To get knowledge about techniques to evaluate the high performance architectures.
- To develop a critical spirit about architectures evaluation and the use of parallelism to improve the performance.
- To select the best parallel architecture according to the problem we want to solve.
- To know the main elements in the design of a multicomputer and a multiprocessor.
- To understand the differences in the design of different parallel architectures and how these differences determine the performance.
- To develop the capacity of belonging to a group of design and developing of software to parallel architectures.
- To get the capacity of analysing a problem from a parallel point of view.

Theoretical contents:

Unit 1. Introduction to parallelism

- 1.1 Introduction and motivation.
- 1.2 Parallelism.
- 1.3 Vectorial architectures.

Unit 2. Superscalar architectures

- 2.1 Introduction and motivation.
- 2.2 Superscalar channel.
- 2.3 Risk management.

Unit 3. Parallel Computing

- 3.1 Concepts and motivation.
- 3.2 Techniques and procedures.
- 3.3 High performance architectures.
- 3.4 Performance evaluation.

Unit 4. Interconnection networks

- 4.1 Introduction, concepts and classification.
- 4.2 Performance.
- 4.3 Topologies.
- 4.4 Switching techniques.
- 4.5 Routing techniques.

Unit 5. Memory in parallel architectures

- 5.1 Introduction and motivation.
- 5.2 Multiprocessor memory.
- 5.3 Consistency protocols.

Practical contents:

- Study of problems with high computational needs.
- Programming and performance evaluation in centralised memory systems: multithreading/multicore programming.
- Programming and performance evaluation in distributed memory systems: multiprocess programming.

Related links

<http://www.acm.org>

Association for Computing Machinery

<http://www.open-mpi.org>

Enlace a web sobre OpenMPI

<http://www.computer.org>

IEEE Computer Society

<http://www.openmp.org>

WEb de las librerías OpenMP

<http://www.top500.org>

Lista TOP500 de supercomputadores

Bibliography

Arquitectura de computadores

Author(s): Ortega Lopera, Julio ; Anguita López, Mancia

Issue: Madrid : Thomson , 2005;

ISBN: 84-9732-274-6

Category: Básico

Computer architecture : a quantitative approach

Author(s): Hennessy, John L.

Issue: Cambridge Estados Unidos : Morgan Kaufmann , 2019;

ISBN: 978-0-12-811905-1

Category: Básico

Computer organization and design : the hardware-software interface

Author(s): Patterson, David A.

Issue: Waltham, MA : : Morgan Kaufmann, 2021;

ISBN: 978-0-12-820109-1

Category: Complementario

Assessment

Assessment procedures and criteria 2024-25

Ordinary call C2:

The final grade in this call is given by the weighted sum, according to the weights indicated in this course guide, of the "Final Exam" and "Computer Practicals" blocks. A minimum score of 4 out of 10 must be obtained in each block to pass the course. If the student does not achieve the minimum score of 4 out of 10 in any of the blocks, the final grade of the course will be the minimum between 3.5 and the previously mentioned weighted grade.

Extraordinary call C4:

Activities not passed in the previous call (those with a score lower than 5 out of 10) will be evaluated according to the evaluation criteria of each activity. The final grade in this call follows the same weighted sum as in the C2 call.

Other aspects of the evaluation:

- According to the Learning Evaluation Regulations (BOUA 9/12/2015) regarding attendance to Practicals: "it will be considered that the student has met the requirement as long as they do not miss more than 20% of the hours of this teaching activity. These absences, in any case, must be properly justified."
- The theoretical/practical work carried out must be original. The detection of copy or plagiarism will result in a mark of "0" in the corresponding test. The department and EPS management will be informed of this incident. Repeated conduct in this or any other subject will entail notification of the corresponding vice-rectorate of the misconduct committed so that they may study the case and sanction it in accordance with the legislation (Regulations on academic discipline in official Centres for Higher Education and Technical Education dependent on the Ministry of National Education BOE 12/10/1954).

Description	Criteria	Type	Weighting system
Computer practices	<p>Continuous evaluation of the theoretical-practical contents of the course. Two individual theoretical-practical tests will be conducted around the middle and at the end of the 4-month term. In the grade for this block, the submission and defense of practice reports are weighted at 20%, and the individual tests at 80%. A minimum score of 4 out of 10 must be obtained in this block to pass the course.</p> <p>This block can be retaken in the second evaluation period through a theoretical-practical exam in the laboratory. For proper planning, the student must notify the course coordinator of their intention to retake this block at least 10 days in advance.</p>	ACTIVITIES OF EVALUATION DURING THE SEMESTER	50
Final exam	Final exam to evaluate the theoretical and practical knowledge acquired in the subject. Individual mark. A minimum score of 4 out of 10 must be obtained to pass the course. This activity is recoverable in the second evaluation period.	FINAL TEST	50

Official exam dates for academic year 2024-25

Exam session	Date	Time	Group - Classroom(s) allocated	Comments
(C2) Periodo ordinario para asignaturas de primer semestre	20/01/2025			Teoría
(C4) Pruebas extraordinarias para asignaturas de grado y máster	02/07/2025			Teoría

Academic staff



MARTINEZ ALVAREZ, ANTONIO

Lecturer responsible

THEORY CLASS: Groups: 1 , 2 , 3 , 40

COMPUTER PRACTICALS: Groups: 01 , 02 , 03 , 04 , 05 , 06 , 40



AZORIN LOPEZ, JORGE

THEORY CLASS: Groups: 1



CLIMENT PEREZ, PAU

THEORY CLASS: Groups: 1 , 2 , 3

COMPUTER PRACTICALS: Groups: 03 , 06



FERNANDEZ DE MERA LOPEZ, FRANCISCO

COMPUTER PRACTICALS: Groups: 05



GARCIA CHAMIZO, JUAN MANUEL

THEORY CLASS: Groups: 40

COMPUTER PRACTICALS: Groups: 40



NIETO HIDALGO, MARIO

COMPUTER PRACTICALS: Groups: 01 , 02



SERRANO CASES, ALEJANDRO

COMPUTER PRACTICALS: Groups: 03

Groups

THEORY CLASS



















Group	Semester	Morning or afternoon session	Language	No. of enrolled students	
Gr. 1 (THEORY CLASS) : 1	1S	Morning	Spanish	103	
Gr. 2 (THEORY CLASS) : 2 (ARA)	1S	Morning	English	20	<ul style="list-style-type: none"> ▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 3 (THEORY CLASS) : 3	1S	Afternoon	Spanish	68	
Gr. 40 (THEORY CLASS) : 40 I2ADE	1S	Morning	Spanish	31	<ul style="list-style-type: none"> ▪ Allowed VISITING STUDENT NO EEES ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION ▪ Allowed VISITING STUDENT EEES






















COMPUTER PRACTICALS






Group	Semester	Morning or afternoon session	Language	No. of enrolled students	
Gr. 01 (COMPUTER PRACTICALS) : 1	1S	Morning	Spanish	30	
Gr. 02 (COMPUTER PRACTICALS) : 2	1S	Morning	Spanish	34	
Gr. 03 (COMPUTER PRACTICALS) : 3	1S	Morning	Spanish	39	
Gr. 04 (COMPUTER PRACTICALS) : 4 (ARA)	1S	Morning	English	20	<ul style="list-style-type: none"> ▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 05 (COMPUTER PRACTICALS) : 5	1S	Afternoon	Spanish	32	
Gr. 06 (COMPUTER PRACTICALS) : 6	1S	Afternoon	Spanish	36	
Gr. 40 (COMPUTER PRACTICALS) : 40 I2ADE	1S	Morning	Spanish	31	<ul style="list-style-type: none"> ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION ▪ Allowed VISITING STUDENT EEES ▪ Allowed VISITING STUDENT NO EEES

Timetables

THEORY CLASS







Group	Start date	End date	Day	Start time	End time	Lecture room
1	09/09/2024	09/09/2024	LUN	13:00	15:00	A3/0008 
1	16/09/2024	16/09/2024	LUN	13:00	15:00	A3/0008 
1	23/09/2024	23/09/2024	LUN	13:00	15:00	A3/0008 
1	30/09/2024	30/09/2024	LUN	13:00	15:00	A3/0008 
1	07/10/2024	07/10/2024	LUN	13:00	15:00	A3/0008 
1	14/10/2024	14/10/2024	LUN	13:00	15:00	A3/0008 
1	21/10/2024	21/10/2024	LUN	13:00	15:00	A3/0008 
1	28/10/2024	28/10/2024	LUN	13:00	15:00	A3/0008 
1	04/11/2024	04/11/2024	LUN	13:00	15:00	A3/0008 
1	11/11/2024	11/11/2024	LUN	13:00	15:00	A3/0008 
1	18/11/2024	18/11/2024	LUN	13:00	15:00	A3/0008 
1	25/11/2024	25/11/2024	LUN	13:00	15:00	A3/0008 
1	02/12/2024	02/12/2024	LUN	13:00	15:00	A3/0008 
1	09/12/2024	09/12/2024	LUN	13:00	15:00	A3/0008 
1	16/12/2024	16/12/2024	LUN	13:00	15:00	A3/0008 
2	11/09/2024	11/09/2024	MIE	09:00	11:00	A3/0007 
2	18/09/2024	18/09/2024	MIE	09:00	11:00	A3/0007 
2	25/09/2024	25/09/2024	MIE	09:00	11:00	A3/0007 
2	02/10/2024	02/10/2024	MIE	09:00	11:00	A3/0007 
2	09/10/2024	09/10/2024	MIE	09:00	11:00	A3/0007 






















Group	Start date	End date	Day	Start time	End time	Lecture room
2	16/10/2024	16/10/2024	MIE	09:00	11:00	A3/0007 
2	23/10/2024	23/10/2024	MIE	09:00	11:00	A3/0007 
2	30/10/2024	30/10/2024	MIE	09:00	11:00	A3/0007 
2	06/11/2024	06/11/2024	MIE	09:00	11:00	A3/0007 
2	13/11/2024	13/11/2024	MIE	09:00	11:00	A3/0007 
2	20/11/2024	20/11/2024	MIE	09:00	11:00	A3/0007 
2	27/11/2024	27/11/2024	MIE	09:00	11:00	A3/0007 
2	04/12/2024	04/12/2024	MIE	09:00	11:00	A3/0007 
2	11/12/2024	11/12/2024	MIE	09:00	11:00	A3/0007 
2	18/12/2024	18/12/2024	MIE	09:00	11:00	A3/0007 
3	09/09/2024	09/09/2024	LUN	19:00	21:00	A3/0008 
3	16/09/2024	16/09/2024	LUN	19:00	21:00	A3/0008 
3	23/09/2024	23/09/2024	LUN	19:00	21:00	A3/0008 
3	30/09/2024	30/09/2024	LUN	19:00	21:00	A3/0008 
3	07/10/2024	07/10/2024	LUN	19:00	21:00	A3/0008 
3	14/10/2024	14/10/2024	LUN	19:00	21:00	A3/0008 
3	21/10/2024	21/10/2024	LUN	19:00	21:00	A3/0008 
3	28/10/2024	28/10/2024	LUN	19:00	21:00	A3/0008 
3	04/11/2024	04/11/2024	LUN	19:00	21:00	A3/0008 
3	11/11/2024	11/11/2024	LUN	19:00	21:00	A3/0008 
3	18/11/2024	18/11/2024	LUN	19:00	21:00	A3/0008 






















Group	Start date	End date	Day	Start time	End time	Lecture room
3	25/11/2024	25/11/2024	LUN	19:00	21:00	A3/0008 
3	02/12/2024	02/12/2024	LUN	19:00	21:00	A3/0008 
3	09/12/2024	09/12/2024	LUN	19:00	21:00	A3/0008 
3	16/12/2024	16/12/2024	LUN	19:00	21:00	A3/0008 
40	09/09/2024	20/12/2024	LUN	09:00	11:00	A2/E12 






















COMPUTER PRACTICALS







Group	Start date	End date	Day	Start time	End time	Lecture room
01	11/09/2024	11/09/2024	MIE	09:00	11:00	0039PB056 
01	18/09/2024	18/09/2024	MIE	09:00	11:00	0039PB056 
01	25/09/2024	25/09/2024	MIE	09:00	11:00	0039PB056 
01	02/10/2024	02/10/2024	MIE	09:00	11:00	0039PB056 
01	09/10/2024	09/10/2024	MIE	09:00	11:00	0039PB056 
01	16/10/2024	16/10/2024	MIE	09:00	11:00	0039PB056 
01	23/10/2024	23/10/2024	MIE	09:00	11:00	0039PB056 
01	30/10/2024	30/10/2024	MIE	09:00	11:00	0039PB056 
01	06/11/2024	06/11/2024	MIE	09:00	11:00	0039PB056 
01	13/11/2024	13/11/2024	MIE	09:00	11:00	0039PB056 
01	20/11/2024	20/11/2024	MIE	09:00	11:00	0039PB056 
01	27/11/2024	27/11/2024	MIE	09:00	11:00	0039PB056 
01	04/12/2024	04/12/2024	MIE	09:00	11:00	0039PB056 
01	11/12/2024	11/12/2024	MIE	09:00	11:00	0039PB056 

Group	Start date	End date	Day	Start time	End time	Lecture room
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02	18/09/2024	18/09/2024	MIE	11:00	13:00	0039PB056 
02	25/09/2024	25/09/2024	MIE	11:00	13:00	0039PB056 
02	02/10/2024	02/10/2024	MIE	11:00	13:00	0039PB056 
02	09/10/2024	09/10/2024	MIE	11:00	13:00	0039PB056 
02	16/10/2024	16/10/2024	MIE	11:00	13:00	0039PB056 
02	23/10/2024	23/10/2024	MIE	11:00	13:00	0039PB056 
02	30/10/2024	30/10/2024	MIE	11:00	13:00	0039PB056 
02	06/11/2024	06/11/2024	MIE	11:00	13:00	0039PB056 
02	13/11/2024	13/11/2024	MIE	11:00	13:00	0039PB056 
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02	27/11/2024	27/11/2024	MIE	11:00	13:00	0039PB056 
02	04/12/2024	04/12/2024	MIE	11:00	13:00	0039PB056 
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02	18/12/2024	18/12/2024	MIE	11:00	13:00	0039PB056 
03	10/09/2024	10/09/2024	MAR	13:00	15:00	0039PS051 
03	17/09/2024	17/09/2024	MAR	13:00	15:00	0039PS051 
03	24/09/2024	24/09/2024	MAR	13:00	15:00	0039PS051 
03	01/10/2024	01/10/2024	MAR	13:00	15:00	0039PS051 
03	08/10/2024	08/10/2024	MAR	13:00	15:00	0039PS051 

Group	Start date	End date	Day	Start time	End time	Lecture room
03	15/10/2024	15/10/2024	MAR	13:00	15:00	0039PS051 
03	22/10/2024	22/10/2024	MAR	13:00	15:00	0039PS051 
03	29/10/2024	29/10/2024	MAR	13:00	15:00	0039PS051 
03	05/11/2024	05/11/2024	MAR	13:00	15:00	0039PS051 
03	12/11/2024	12/11/2024	MAR	13:00	15:00	0039PS051 
03	19/11/2024	19/11/2024	MAR	13:00	15:00	0039PS051 
03	26/11/2024	26/11/2024	MAR	13:00	15:00	0039PS051 
03	03/12/2024	03/12/2024	MAR	13:00	15:00	0039PS051 
03	10/12/2024	10/12/2024	MAR	13:00	15:00	0039PS051 
03	17/12/2024	17/12/2024	MAR	13:00	15:00	0039PS051 
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04	25/09/2024	25/09/2024	MIE	11:00	13:00	0039PB055 
04	02/10/2024	02/10/2024	MIE	11:00	13:00	0039PB055 
04	09/10/2024	09/10/2024	MIE	11:00	13:00	0039PB055 
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04	30/10/2024	30/10/2024	MIE	11:00	13:00	0039PB055 
04	06/11/2024	06/11/2024	MIE	11:00	13:00	0039PB055 
04	13/11/2024	13/11/2024	MIE	11:00	13:00	0039PB055 
04	20/11/2024	20/11/2024	MIE	11:00	13:00	0039PB055 

Group	Start date	End date	Day	Start time	End time	Lecture room
04	27/11/2024	27/11/2024	MIE	11:00	13:00	0039PB055 
04	04/12/2024	04/12/2024	MIE	11:00	13:00	0039PB055 
04	11/12/2024	11/12/2024	MIE	11:00	13:00	0039PB055 
04	18/12/2024	18/12/2024	MIE	11:00	13:00	0039PB055 
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05	14/10/2024	14/10/2024	LUN	15:00	17:00	0039PS002 
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05	18/11/2024	18/11/2024	LUN	15:00	17:00	0039PS002 
05	25/11/2024	25/11/2024	LUN	15:00	17:00	0039PS002 
05	02/12/2024	02/12/2024	LUN	15:00	17:00	0039PS002 
05	09/12/2024	09/12/2024	LUN	15:00	17:00	0039PS002 
05	16/12/2024	16/12/2024	LUN	15:00	17:00	0039PS002 
06	09/09/2024	09/09/2024	LUN	17:00	19:00	0039PS002 
06	16/09/2024	16/09/2024	LUN	17:00	19:00	0039PS002 

Group	Start date	End date	Day	Start time	End time	Lecture room
06	23/09/2024	23/09/2024	LUN	17:00	19:00	0039PS002 
06	30/09/2024	30/09/2024	LUN	17:00	19:00	0039PS002 
06	07/10/2024	07/10/2024	LUN	17:00	19:00	0039PS002 
06	14/10/2024	14/10/2024	LUN	17:00	19:00	0039PS002 
06	21/10/2024	21/10/2024	LUN	17:00	19:00	0039PS002 
06	28/10/2024	28/10/2024	LUN	17:00	19:00	0039PS002 
06	04/11/2024	04/11/2024	LUN	17:00	19:00	0039PS002 
06	11/11/2024	11/11/2024	LUN	17:00	19:00	0039PS002 
06	18/11/2024	18/11/2024	LUN	17:00	19:00	0039PS002 
06	25/11/2024	25/11/2024	LUN	17:00	19:00	0039PS002 
06	02/12/2024	02/12/2024	LUN	17:00	19:00	0039PS002 
06	09/12/2024	09/12/2024	LUN	17:00	19:00	0039PS002 
06	16/12/2024	16/12/2024	LUN	17:00	19:00	0039PS002 
40	10/09/2024	10/09/2024	MAR	11:00	13:00	P3/0-INF1 
40	17/09/2024	17/09/2024	MAR	11:00	13:00	P3/0-INF1 
40	24/09/2024	24/09/2024	MAR	11:00	13:00	P3/0-INF1 
40	01/10/2024	01/10/2024	MAR	11:00	13:00	P3/0-INF1 
40	08/10/2024	08/10/2024	MAR	11:00	13:00	P3/0-INF1 
40	15/10/2024	15/10/2024	MAR	11:00	13:00	P3/0-INF1 
40	22/10/2024	22/10/2024	MAR	11:00	13:00	P3/0-INF1 
40	29/10/2024	29/10/2024	MAR	11:00	13:00	P3/0-INF1 

Group	Start date	End date	Day	Start time	End time	Lecture room
40	05/11/2024	05/11/2024	MAR	11:00	13:00	P3/0-INF1 
40	12/11/2024	12/11/2024	MAR	11:00	13:00	P3/0-INF1 
40	19/11/2024	19/11/2024	MAR	11:00	13:00	P3/0-INF1 
40	26/11/2024	26/11/2024	MAR	11:00	13:00	P3/0-INF1 
40	03/12/2024	03/12/2024	MAR	11:00	13:00	P3/0-INF1 
40	10/12/2024	10/12/2024	MAR	11:00	13:00	P3/0-INF1 
40	17/12/2024	17/12/2024	MAR	11:00	13:00	P3/0-INF1 