

62222 - High Performance Computing

Información del Plan Docente

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| Academic Year | 2016/17 |
| Academic center | 110 - Escuela de Ingeniería y Arquitectura |
| Degree | 534 - Master's in IT Engineering |
| ECTS | 6.0 |
| Course | 1 |
| Period | First semester |
| Subject Type | Compulsory |
| Module | --- |

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process that is designed for this subject is based on the following:

Monitor the learning activities for this course.

5.2.Learning activities

The program that the student is offered to help you achieve the expected results includes the following activities

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Learning and classroom activities are based on:

1. **Class attendance** . Showroom by presentation or explanation by a teacher (possibly including demonstrations).
2. **Laboratory**. Activities in special spaces with specialized equipment (laboratory, computer rooms).
3. **Tutorial**. Period instruction by a tutor to review and discuss the materials and topics presented in classes.
4. **Evaluation**. Set of written, oral tests, practices, projects, jobs, etc. used in the assessment of student progress

Self-guided learning activities are based on:

1. **Practical work**. Preparation of activities to post or deliver practical classes.
2. **Theoretical study**. Study related to lectures content: study includes any activity that has not been computed in the previous section (study examinations, library work, further reading, doing problems and exercises, etc.)

Student Work

The subject consists of 6 ECTS credits corresponding to 150 hours estimated student work (47 in-person hours and 103 self-guided hours) distributed as follows:

- 45 hours, approximately, of classroom activities (lectures including professional seminars, problem solving and cases, and laboratory practice).
- 40 hours of group work.
- 63 effective working hours and individual study.
- 2 hours devoted to various evaluation tests.

5.3.Program

The course program comprises the following blocks and contents thereof:

Block 1: Numerical simulation

- Numerical simulation of continuous phenomena
- Numerical simulation of discrete events
- Approximations and numerical techniques

Block 2: Architecture and Technology Supercomputers

- Shared memory multiprocessor systems. Consistency, consistency.
- Distributed memory multiprocessor systems. Interconnection networks
- Specific architectures for high performance. Multimedia extensions, GPGPUs

Block 3: Parallel Programming Paradigms

- Shared memory.
 - o Vectorization
 - o Automatic parallelization. Help the compiler
 - o Manual parallelization: OpenMP
- Distributed memory
 - o MPI

Block 4: Optimization of parallel programs

- Optimization Techniques
- Metrics and performance analysis tools in supercomputers

The contents of these blocks will be strengthened through the development of case studies in which the acquired knowledge to solve a complex problem apply.

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5.4.Planning and scheduling

Schedule sessions and presentation of works

The schedules of all classes and dates of the practice sessions will be published well in advance through the websites of the center and the subject.

Delivery dates and monitoring of tutored practical work will be announced in class.

5.5.Bibliography and recommended resources