0-Overview

Advanced Computing Tools for Applied Research
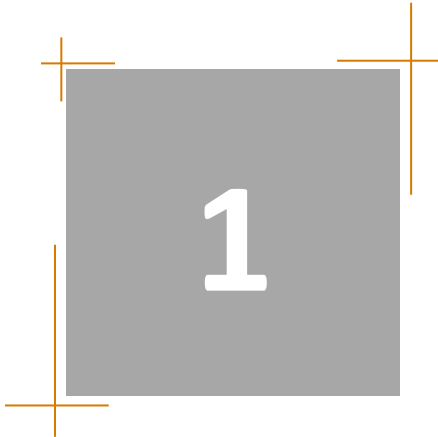(*Herramientas Computacionales Avanzadas para la Investigación Aplicada*)

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MSEE, MII

Advanced Computing Tools for Applied Research
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1

Main Objectives of the course

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General objectives

- Acquire the knowledge and develop the ability to design and implement advanced computational tools.
- With special focus on Applied Research applications and technology integration.

More specifically

- General characteristics of applied research tools
- Software design techniques
- Integrating different technologies
- Complex data structures for high-volume and high-performance analysis
- Ability to select the most suitable tool for each application

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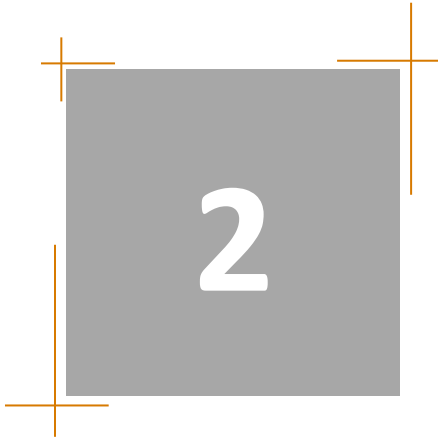
Teaching Methodology

Teaching Methodology

- 3 ECTS credits
- 2h/week
- Feb 2nd – May 25th

February							
2	3	4	5	6	7	8	Presentation, Chapter 1
9	10	11	12	13	14	15	Chapter 2 + Lab
16	17	18	19	20	21	22	Chapter 3 + Lab
23	24	25	26	27	28	1	Chapter 4 + Lab

March							
2	3	4	5	6	7	8	Chapter 5 + Lab
9	10	11	12	13	14	15	Chapter 6
16	17	18	19	20	21	22	Chaoter 7 + Lab
23	24	25	26	27	28	29	Lab
30	31						

April							
		1	2	3	4	5	
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	Chapter 8 + Lab
20	21	22	23	24	25	26	Chapter 9 + Lab
27	28	29	30				Chapter 10 + Lab

May							
				1	2	3	
4	5	6	7	8	9	10	Oral Presentations
11	12	13	14	15	16	17	Oral Presentations
18	19	20	21	22	23	24	Oral Presentations
25	26	27	28	29	30	31	Exam

Teaching Methodology

- Lectures and Practical sessions
  - Lectures for basic concepts
  - Exercises to be solved in small groups

- Final project:
  - Select your own tool at the beginning of the course, which may be related to either a real or an imaginary application
  - Make use of techniques and suggestions from the lectures, to describe it in a reduced set of text+diagrams slides (PowerPoint)
  - Present your work to the class in 15 minutes
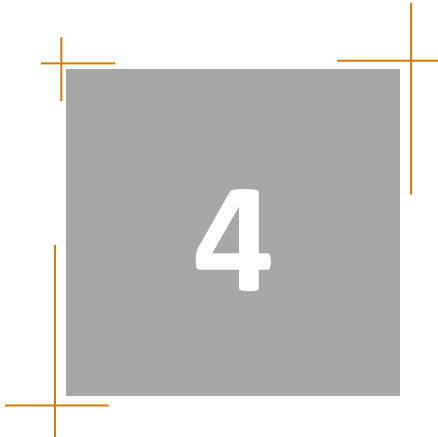
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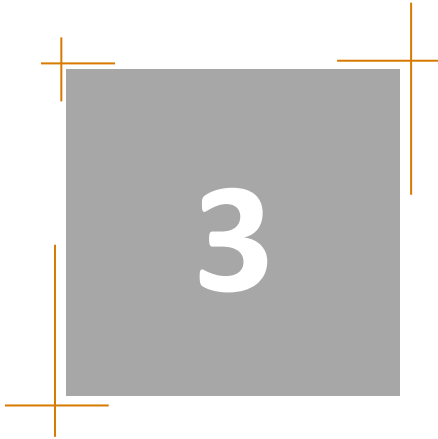
Grading system

Grading system

- 60% based in knowledge acquisition and participation
    - Practical exercises
    - Short tests
    - Active learning attitude
    - Final exam

- 40% final project
    - Quality of the work
    - Quality of the presentation

- Mandatory: 85% attendance to lectures, punctuality

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Subjects overview

Subjects overview.

- Chapter 1 - Introduction to software
- Chapter 2 - Coding conventions
- Chapter 3 - Source code documentation
- Chapter 4 - Version control
- Chapter 5 - Design of User Interfaces
- Chapter 6 - Computers and Programming Languages
- Chapter 7 - Reliability and performance
- Chapter 8 - Management of large data volumes
- Chapter 9 - Inter process communications
- Chapter 10 - High-performance computing

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