Last update: 12-04-2019

340380 - PROP-I4O23 - Programming Project

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering

Teaching unit: 723 - CS - Department of Computer Science

Academic year: 2019

Degree: BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2018). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)

ECTS credits: 6 Teaching languages: Catalan

Teaching staff

Coordinator: MARIO MARTÍN MUÑOZ

Others: MARIO MARTÍN MUÑOZ

Prior skills

Knowledge of programming and data structures:

- Ability to solve algorithmic problems of medium difficulty from a clear specification, and implement solutions in an imperative programming language.

- Knowledge of basic mechanisms for structuring programs (modularization, encapsulation, abstract data types, classes) and ability to apply them to problems small-sized (a few modules)

- Knowledge of the elements of object oriented programming (classes, objects, mechanisms for implementation).

- Familiarity with object-oriented imperative language.

- Ability to use data structures and programming in this language.

- Ability to use language in this book.

- Mastery of basic strategies for finding and correcting errors in simple modules.

Degree competences to which the subject contributes

Specific:

1. CEC01. Ability to have a thorough understanding of the fundamental principles and models of computation, ability to apply the principles to interpret, select, evaluate, model, and create new concepts, theories, applications and advance the technological development related to computing.
2. CECO2. Ability to understand theoretical basics of programming languages and techniques of lexical, syntactic and semantic associates processing, and apply them to create, design and process languages.
3. CEC03. Ability to assess the computational complexity of a problem, to know algorithmic strategies that may lead to its resolution and to recommend, develop and implement the one which guarantees the best performance according to established requirements.
4. CECO4. Ability to learn basics, paradigms and techniques of intelligent systems and analyze, design and build systems, services and computing applications that use these techniques in any scope.

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Teaching methodology

In the course we work is algorithmic programming techniques through lectures and laboratory classes. In the laboratory classes we look at object oriented programming in a practice, developing programming activities to establish these techniques and finally developing a project of average size for which students must develop the techniques learned in lectures and combine them with object-oriented programming techniques that have been in the laboratory classes.

Learning objectives of the subject

Learning techniques to identify the complexity of a problem and apply the appropriate resolution strategy.
Estrucutra learning of graph to represent combinatorial problems.
Learning the different algorithmic strategies for solving computational problems.
Learn advanced concepts of OOP.

Study load

Total learning time: 150h	Hours large group:	30h	20.00%
	Hours medium group:	0h	0.00%
	Hours small group:	30h	20.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

Graphs

Degree competences to which the content contributes:

Specific objectives:

Algorithmic costs

Degree competences to which the content contributes:

Specific objectives:

Combinatorial Algorithms

Degree competences to which the content contributes:

Greedy algorithms

Degree competences to which the content contributes:

Specific objectives:

Dynamic Programming

Degree competences to which the content contributes:

Agregations and divide and conquer

Degree competences to which the content contributes:

Specific objectives:

Advanced Object Oriented Programming

Degree competences to which the content contributes:

Object Oriented Language: Java

Degree competences to which the content contributes:

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Planning of activities

Activity 1	Hours: 3h Self study: 1h Practical classes: 2h
Activity 2	Hours: 6h Practical classes: 2h Self study: 4h
Project	Hours: 9h Self study: 1h Guided activities: 8h

Qualification system

Theory Grade = max(0,5 Exam1 + 0,5 Exam2; FinalExam)
Small projects grade = 0,5 Small project 1 + 0,5 small project 2

IF Theory Grade>= 3 then Final Grade = 0,5 Theory + 0,3 Big project + 0,2 Small projects
Else Final Grade = 0,7 Theory + 0,2 Big project + 0,1 Small projects

Bibliography

Basic:

Cormen, Thomas H. ; Leiserson, Charles E.; Rivest, Ronald L.; Stein, Clifford. Introduction to algorithms. 3rd. Cambridge: MIT Press, 2009. ISBN 9780262033848.

Levitin, Anany. Introduction to the design and analysis of algorithms. 3rd. Boston, MA: Addison-Wesley, 2011. ISBN 9780132316811.

Edmonds, Jeff. How to think about algorithms. New York: Cambridge University Press, 2008. ISBN 0521849314.

Skiena, Steven S. The Algorithm design manual. 2nd ed. London: Springer, 2008. ISBN 9781848000698.

Savitch, Walter. Java : an introduction to problem solving & programming [on line]. 6th ed. Essex: Pearson, 2012Available on: <http://javahann.files.wordpress.com/2012/01/ebooksclub-org__java__an_introduction_to_problem_solving_and_programming__6th_edition_.pdf>. ISBN 9780273751427.

Wu, C. Thomas. An Introduction to object-oriented programming with JAVA. 5th. Boston [etc.]: McGraw-Hill, 2009. ISBN 9780073523309.

Others resources: