

Heuristics and Optimization

Academic Year: (2022 / 2023)

Review date: 20-05-2022

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: LINARES LOPEZ, CARLOS

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Programming (Course: 1 / Semester: 1)
Algorithms and Data Structures (Course: 1 / Semester: 2)
Discrete Mathematics (Course: 2 / Semester: 2)
Artificial Intelligence (Course: 2 / Semester: 2)

DESCRIPTION OF CONTENTS: PROGRAMME

- 1.- Dynamic programming
- 2.- Linear programming
- 3.- Constrained boolean satisfiability
- 4.- Constraints programming
- 5.- Search

LEARNING ACTIVITIES AND METHODOLOGY

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THEORETICAL-PRACTICAL CLASSES. [44 hours with 100% classroom instruction, 1.67 ECTS]
Knowledge and concepts students must acquire. Student receive course notes and will have basic reference texts to facilitate following the classes and carrying out follow up work. Students partake in exercises to resolve practical problems and participate in workshops and evaluation tests, all geared towards acquiring the necessary capabilities.

TUTORING SESSIONS. [4 hours of tutoring with 100% on-site attendance, 0.15 ECTS]
Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher.

STUDENT INDIVIDUAL WORK OR GROUP WORK [98 hours with 0 % on-site, 3.72 ECTS]

WORKSHOPS AND LABORATORY SESSIONS [8 hours with 100% on site, 0.3 ECTS]

FINAL EXAM. [4 hours with 100% on site, 0.15 ECTS]
Global assessment of knowledge, skills and capacities acquired throughout the course.

METHODOLOGIES

THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed, while providing material and bibliography to complement student learning.

PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group.

TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with a teacher as tutor.

LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories under the tutor's supervision.

ASSESSMENT SYSTEM

EVALUATION SYSTEMS

SE1 - FINAL EXAM. [40 %]

Global assessment of knowledge, skills and capacities acquired throughout the course.

SE2 - CONTINUOUS EVALUATION. [60 %]

Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course.

Minimum score in the final exam: 4 (over 10)

Minimum score in the lab assignments: average of 3,5 (over 10) over all lab assignments

% end-of-term-examination:	40
% of continuous assessment (assignments, laboratory, practicals...):	60

BASIC BIBLIOGRAPHY

- Frederick S. Hiller and Gerald J. Lieberman Introduction to operations research, McGraw-Hill, 2005
- Holger Hoos, Thomas Stützle Stochastic Local Search: Foundations and Applications, Morgan Kaufmann, 2005
- Jongen, H. Th. Optimization Theory, Kluwer Academic, 2004
- Rina Dechter Constraint Processing, Morgan Kaufmann, 2003
- Stefan Edelkamp, Stefan Schrödl Heuristic Search: Theory and Applications, Morgan Kaufmann, 2012
- Steven S. Skiena The Algorithm Design Manual, Springer, 2008
- Sundaram, Rangarajan K. A first course in optimization theory, Cambridge University Press, 2006
- Victor W. Marek Introduction to Mathematics of Solvability, CRC Press, 2009