

**COURSE DATA****Data Subject**

Code	36876
Name	Lógica y Matemática Discreta
Cycle	Grade
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
1935 - Doble Grado en Matemáticas-Ingeniería Telemática	Faculty of Mathematics	1	Second term
1936 - Doble Grado en Matemáticas-Ingeniería Informática	Faculty of Mathematics	1	Second term

Subject-matter

Degree	Subject-matter	Character
1935 - Doble Grado en Matemáticas-Ingeniería Telemática	1 - Primer curso	Basic Training
1936 - Doble Grado en Matemáticas-Ingeniería Informática	1 - Primer curso	Basic Training

Coordination

Name	Department
FERRI RABASA, FRANCESC JOSEP	240 - Computer Science

SUMMARY

The subject "Logic and Discrete Mathematics (LMD)" is a subject taught in the second semester of the first year of the Double Degrees in Mathematics and Computer Science and Mathematics and Telematics Engineering. Its purpose is to delve into some fundamental or transversal mathematical concepts, and their relationship with computer and communication sciences. The common thread is the modeling and resolution of a wide spectrum of problems.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

- Master mathematical language, reasoning and the relationship between different concepts.
- Encourage critical thinking when formalising problems and finding solutions.
- Relate mathematical formulation with algorithmic problem solving.
- Understand different ways of reasoning, as well as the possible mechanization of some deductions.
- Be able to enumerate, count and/or represent discrete structures such as sets, permutations, applications, relationships, graphs or trees.
- Understand and know how to apply the concepts of induction and recursion, as well as the fundamentals of mathematical logic.
- Be able to work in a team and prepare documents for the presentation of results.

DESCRIPTION OF CONTENTS

1. Counting and cardinality

Sets, relationships, applications, variations, permutations, combinations and related mathematical tools.

2. Logic

Predicate logic, propositional logic, deduction and rules of inference. Introduction to logical programming.

3. Recursion and induction

Recurrence relations and recursive predicates. Types of induction proofs. Types of recursion and recurrence manipulation. Recursive logic programs.

4. Graphs and trees

Definitions and properties of different types of graphs. Tree structures. Paths, cycles, trees and graphs. Representation, enumeration and some algorithms on trees and graphs.



WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Laboratory practices	20,00	100
Classroom practices	10,00	100
TOTAL	60,00	

TEACHING METHODOLOGY

Teaching will consist of a combination of lectures, problem sessions and practical activities to be performed by the student. This teaching will be supplemented by the personal work of students, focusing on the study, problem solving, and preparation of papers to deliver. In addition, there will be sessions on lab work with your computer.

- The theoretical activities consist of conducting classes in which the themes will be developed to provide a global and inclusive vision, analyzing in detail the key issues and more complex, encouraging at all times, the share of students.
- Practical activities will include conducting meetings of problems and issues in the classroom as well as conducting seminars, which will address issues on applications and less formal aspects of the subject.
- The student's personal work consists mainly in three aspects:
 - Preparing lessons in advance and recommended reading texts
 - Problem resolution proposed by Professor

Laboratory sessions consist of solving problems related to the theoretical contents through software.

EVALUATION

The continuous evaluation of the knowledge and skills acquired within the following sections will be encouraged:

- Attendance and participation: 10% (non-recoverable)
- Participation in laboratory sessions: 15% (non-recoverable)
- Written tests throughout the course: 0-15% (not recoverable). Written tests may be carried out on any part of the theory and laboratory syllabus. The minimum grade to average is 4.
- Final exam of theoretical-practical content: 60-75% (depending on the previous section, both in first and second call). The minimum grade to average is 4.

Grades will be according to "Grading Qualifications of Universitat de València." At the time of writing this teaching guide, the current legislation is that approved in the Consell de Govern session of 30th of may, 2017. (ACGUV 108/2017)., adjusted as provided for that purpose by the Royal Decrees 1044/2003 and 1125 / 2003. It states basically that the grades will be numbered from 0 to 10 with a decimal expression and must be added the qualitative rating scale for the following:



De 0 a 4,9: “Suspenso”

De 5 a 6,9: “Aprobado”

De 7 a 8,9: “Notable”

De 9 a 10: “Sobresaliente” o “Sobresaliente con Matrícula de Honor”

Plagiarism

If a student incurs in plagiarism in any of the assessment activities or if she fails to follow the related rules can be assessed as “Failed” for the whole evaluation. Moreover, the corresponding legal and punitive measures will be carried out whenever it is considered appropriate.

REFERENCES

Basic

- Ferri, F.J. (2023). Matemàtica Discreta i Lògica. Teoria i, sobretot, problemes. Universitat de València. Versió 2.4. <https://roderic.uv.es/handle/10550/86345>
- Matemática Discreta. Biggs. Ed. Vicens Vives, 1994
- Lógica Simbólica. M. Garrido. Ed Tecnos, 4ª Ed, 2001
- Matemática Discreta y Lógica: una perspectiva desde la Ciencia de la Computación. Grassmann-Tremblay. Ed. Prentice-Hall, 1996
- Concrete Mathematics: A Foundation for Computer Science. Ronald L. Graham, Donald E. Knuth, Oren Patashnik. Ed. Addison-Wesley, 2nd edition, 1994.

Additional

- Fonaments de Matemàtica Discreta. Elements de Combinatoria i d'aritmètica. Basart-Rifa-Villanueva. Materials 36 , 1999
- Matemática Discreta Bogart. Prentice Hall, 1996
- Estructuras de Matemáticas Discretas para la Computación Kolman et alt.. Prentice Hall, 1997
- Mathematical Structures for Computer Science J. L. Gersting. Freeman. New York, 1987
- Lógica Simbólica. M. Garrido. Ed Tecnos, 4ª Ed, 2001