COURSE DATA

Data Subject	
Code	34666
Name	Discrete Mathematics and Logic
Cycle	Grade
ECTS Credits	6.0
Academic year	2020 - 2021

Study (s)

Degree	Center	Acad. year	Period
1400 - Degree in Computer Engineering	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
1400 - Degree in Computer Engineering	9 - Mathematics	Basic Training

Coordination

Name	Department
BARBER MIRALLES, FERNANDO	240 - Computer Science
FERRI RABASA, FRANCESC JOSEP	240 - Computer Science

SUMMARY

The course "Discrete Mathematics and logic" is a subject that is taught in the second semester of the first degree course in Computer Science. Its purpose is to give students the math skills necessary to formally address the problems that subsequently found in different subjects and grade in the exercise of their profession.

Within the set of mathematical topics, focuses on a selection of songs that either have a direct interest in computing or serve as a basis for other branches of Computer Science. The main topics covered include predicate logic, counting and graph theory.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

Have passed Mathematics I

OUTCOMES

1400 - Degree in Computer Engineering

- G8 - Knowledge of basic subject areas and technologies that serve as a basis for learning and developing new methods and technologies, and of those which provide versatility to adapt to new situations.
- G9 - Ability to solve problems with initiative, decision making, autonomy and creativity. Ability to communicate and transmit the knowledge, skills and abilities of a computer engineer.
- B3 - Ability to understand and master the basics of discrete mathematics, logic, algorithms and computational complexity and their application for solving problems in engineering.

LEARNING OUTCOMES

This course allows for the following learning outcomes:

1. Understanding and mastering the basics in mathematics.
2. To solve engineering problems by applying advanced mathematical concepts.
3. To understand mathematical formalisms that may arise in engineering.
4. To structure the engineering problem solving in a mathematical way.
5. To model real entities using mathematical tools.
6. To interpret mathematical results applied to the physical world.

To complement the above results, this subject also to acquire the following skills and social skills:

- Capacity for critical analysis of the information that the student receives through various media: press, relationship with their environment, and so on.
- Teamwork
- Preparation and submission of documents and papers
- Capacity for critical discussion of a topic, using logical and organized arguments

DESCRIPTION OF CONTENTS

1. Logics

Introduction to Logics. Propositional and predicate Logics. Introduction to proofs.

2. Induction principle

Preorder relationship. Weak induction. Strong and Noetherian induction. Application to abstract data types.

3. Graphs and binary relations

Definitions and properties. Trees. Graph colouring and applications. Equivalence binary relationships.

4. Counting

Introduction to count. Bijections. Enumeration theorems.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	25,00	100
Laboratory practices	20,00	100
Classroom practices	15,00	100
Attendance at events and external activities	2,00	0
Development of group work	15,00	0
Development of individual work	5,00	0
Study and independent work	15,00	0
Readings supplementary material	10,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	10,00	0
Resolution of case studies	8,00	0
TOTAL	**150,00**	

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 an hour 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 two seminars, which will address two issues on applications and less formal aspects of the subject.

- The student's personal work consists mainly in three aspects:

o Preparing lessons in advance and recommended reading texts

o Problem resolution proposed by Professor

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

EVALUATION

a) Participation. Takes into account attendance and involvement of students in scheduled classroom activities to be evaluated with attendance control, use of tutorials and presented homework. This evaluation part cannot be recovered. Weight: 10%

b) Problems/Labs. Lab work and submission of answers to related problems. At least 75% of proposed work must be submitted as requested to get the evaluation. Lab work and submissions have a joint weight of 15% and cannot be recovered. There will be written individual exercises about lab work in partial and final tests. These exercises will have a weight of 15% and require a minimum mark of 4 out of 10. Total weight of this part: 30%

c) Partial exams. To be carried out at the end of some themes. These can be incremental and its realization will depend on viability according to the organization of the academic course. Each exam requires a minimum mark of 4,5 out of 10. Total weight: 60% (if the whole course is covered and proportionally If not).

d) Final exam. Is an individual exercise in a unique session that covers all course contents that is organized in several parts (as much as partial exams, in principle). It is about 75%-85% of practical contents and the rest corresponds to theoretical questions. The exam is not compulsory if the student has passed all contents through partial exams. One only needs to do those parts that are not passed or not presented. One needs to obtain a minimum mark of 4,5 out of 10 in each part. The weight of this item complements the one corresponding to partial exams and is then of 60% or less.

In the **second call** there will be an individual exercise about the whole contents (up to 60%) and also about Lab work along the course (15%) if this has not been passed.

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

- Referencia b1: Ferri, F.J. (2020). Matemàtica Discreta i Lògica. Teoria i, sobretot, problemes. Universitat de València. http://roderic.uv.es/handle/10550/73645
  Referencia b2: Matemática Discreta. Biggs. Ed. Vicens Vives, 1994
  Referencia b3: Lógica Simbólica. M. Garrido. Ed Tecnos, 4ª Ed, 2001
  Referencia b4: Matemática Discreta y Lógica: una perspectiva desde la Ciencia de la Computación Grassmann-Tremblay. Prentice-Hall, 1996

Additional

- Referencia c1: Fonaments de Matemática Discreta. Elements de Combinatoria i d'aritmetica
  Referencia c2: Basart-Rifa-Villanueva. Materials 36 , 1999
  Referencia c3: Matemática Discreta Bogart. Prentice Hall, 1996
  Referencia c4: Estructuras de Matemáticas Discretas para la Computación Kolman et alt.. Prentice Hall, 1997
  Referencia c5: Mathematical Structures for Computer Science J. L. Gersting. Freeman. New York, 1987

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

The teaching methodology for this subject will follow the model approved by the Academic Committee of the GII / GIM degrees (https://links.uv.es/catinfmult/modeloDocent). If the facilities are closed because of COVID-19 pandemics, the scheduled lectures will be replaced by synchronous online sessions within the assigned time slots of the course, using the tools provided by the university.

If the facilities need to be closed due to the pandemics causing any of the evaluation exercises to be held at ETSE-UV, these exercises will be substituted by equivalent exercieses held online using the tools provided by the university. The weights for each activity will remain the same as specified in the teaching guide.