

Academic Year/course: 2022/23

## 30208 - Discrete mathematics

### Syllabus Information

**Academic Year:** 2022/23

**Subject:** 30208 - Discrete mathematics

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura  
326 - Escuela Universitaria Politécnica de Teruel

**Degree:** 439 - Bachelor's Degree in Informatics Engineering  
443 - Bachelor's Degree in Informatics Engineering

**ECTS:** 6.0

**Year:** 1

**Semester:** Second semester

**Subject Type:** Basic Education

**Module:**

### 1. General information

### 2. Learning goals

### 3. Assessment (1st and 2nd call)

### 4. Methodology, learning tasks, syllabus and resources

#### 4.1. Methodological overview

The learning process designed for this course is based on the following items:

1. An active engagement of the student during the lectures.
2. An effective scheduling on the part of the student, studying the subject on a regular basis and trying to solve the proposed problems.
3. Previous preparation on the student's part of the material to be covered during the computer lab sessions.

#### 4.2. Learning tasks

The course includes the following learning tasks:

1. Lectures.
2. Computer lab sessions.
3. Tutorials.

#### 4.3. Syllabus

The course will address the following topics:

##### 1. Logic

Connectives, truth tables, logical equivalence, tautologies, valid and invalid arguments, introduction to predicate logic.

##### 2. Number theory

Principle of induction, Euclidean division, Euclidean algorithm, Bézout's identity, fundamental theorem of arithmetic, congruences, Chinese remainder theorem, modular binary exponentiation, Fermat's little theorem, Euler's theorem, RSA.

### **3. Combinatorics**

Permutations, combinations, rule of sum, rule of product, binomial coefficients, pigeonhole principle, inclusion-exclusion principle, recurrence relations.

### **4. Graph theory**

Basic concepts, Eulerian graphs, Hamiltonian graphs, matrix representations of graphs, isomorphisms of graphs, trees, Kruskal's algorithm, Prim's algorithm, Dijkstra's algorithm.

## **4.4. Course planning and calendar**

### **Planning**

The amount of time required to obtain the expected learning outcomes is estimated at 150 hours, distributed as follows:

- 45 hours of lectures (3 hours per week)
- 12 hours of computer lab sessions (6 sessions of 2 hours each)
- 90 hours of independent learning
- 3 hours of final written exam

### **Scheduling**

The schedule of the face-to-face classroom sessions is set by the institution and can be found on its webpage. Dates for the assessment tests will be announced well in advance.

## **4.5. Bibliography and recommended resources**

### **Teruel:**

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30208&Identificador=12494>

### **Zaragoza:**

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30208&Identificador=12636>