29800 - Mathematics I

Syllabus Information

Academic Year: 2019/20

Subject: 29800 - Mathematics I

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

326 - Escuela Universitaria Politécnica de Teruel

Degree: 440 - Bachelor's Degree in Electronic and Automatic Engineering

444 - Bachelor's Degree in Electronic and Automatic Engineering

ECTS: 6.0

Year: 1

Semester: 440 - 440-First semester o Second semester

444-First semester

107-First semester

444 - First semester

Subject Type: Basic Education

Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, problem-solving, computer sessions, tutorials, exams, and autonomous work and study.

4.2.Learning tasks

This course is organized as follows:

- **Lectures** (42 hours). Whole group sessions where the knowledge that the students must acquire will be presented.
- **Problem-solving**. Resolution of exercises by the student that will serve as self-evaluation and to acquire the necessary skills.
- **Computer sessions** (Six 2-hour sessions). Oriented to practical knowledge related to the fields of the course.
- **Tutorials**, individual and voluntary, in which students will have the possibility to ask their doubts and questions on

the topics to the teacher. The time and place of these sessions will be set by the teacher at the beginning of the course.

- **Assessment tasks**. One midterm exam will take place as well as one 3-hour long final exam.

In addition, the students will have the possibility to attend the Course on Information Management for first-year students (organized and taught by the Hypatia library staff).

4.3.Syllabus

This course will address the following topics:

TOPIC 1. REAL NUMBERS

- The real line. Intervals. Inequalities. Absolute value. Sets in the real line.

TOPIC 2. INTRODUCTION TO COMPLEX NUMBERS

- Definition. Sum and Product. Conjugate. Modulus and Argument. Complex Exponential. Powers and Roots of Complex Numbers.

TOPIC 3. LIMITS AND CONTINUITY OF FUNCTIONS OF ONE VARIABLE

- Elementary functions. Composition of functions. Inverse function. Polar coordinates and sketch of graphs of functions. Limits of functions. Definition, main theorems. Evaluation of limits. Continuous functions, properties, and main theorems.

TOPIC 4: DIFFERENTIAL CALCULUS IN ONE VARIABLE

- Differentiation of functions: definition, differentiation rules, interpretation. Main theorems on differentiation. Extrema of functions. Taylor polynomial: definition, main theorems. Evaluation of limits with Taylor polynomial. Approximation of functions by polynomials.

TOPIC 5: INTEGRATION OF FUNCTIONS OF ONE VARIABLE

- Antiderivatives, integration rules, integration by parts and by decomposition in simple fractions. Integration by substitution and other methods to evaluate integrals. Definite integral and the fundamental theorem of calculus. Applications of integration: areas, volumes, and length. Physical applications of the definite integral.

TOPIC 6: FUNCTIONS OF SEVERAL VARIABLES

- Limits and continuity. Directional derivatives. Partial Derivatives. Differentiability. Derivatives and Chain Rule. Integration

4.4.Course planning and calendar

The time and place of lectures and computer sessions will be set by the Center.

The time and place of tutorials will be set by the teacher at the beginning of the course.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=29800&year=2019