Universidad Zaragoza

Academic Year/course: 2021/22

26914 - Differential Equations

Syllabus Information

Academic Year: 2021/22
Subject: 26914 - Ecuaciones diferenciales
Faculty / School: 100 - Facultad de Ciencias
Degree: 447 - Degree in Physics
ECTS: 6.0
Year: 2
Semester: First semester
Subject Type: Compulsory
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 methodology followed in this course is oriented towards the achievement of the learning objectives. It is based on:

Theory sessions: 40 hours of master classes, to provide the students with the structure of contents that will allow them to conduct, interpret and solve problems that will be presented in the practice sessions and carrying out the proposed tasks and autonomous works.

Practice sessions: There will be a total of 20 hours in each group, where problems will be solved jointly with the students. The proposed exercises will reinforce, apply, and extend upon concepts introduced in theory sessions. The students must have devoted time to study previously the problems proposed.

These problems should also be considered as a self-evaluation mechanism for the students. Students must come to the practice sessions prepared to participate actively.

Practical task and work: There will be a total of 6 hours in which students will do work and/or proposed task, in a tutored way, such that these can provide more depth on specific topics that may be of particular interest to only a few students.

Tutorials: A resource of great value to students is the tutoring sessions. The students will receive the complementary information needed to complete their autonomous training and work.

4.2. Learning tasks

The learning activities of this subject are theory sessions, practice sessions or problems and practical task and work.

4.3. Syllabus

The course will address the following topics:

First order differential equations. General solution. Separable equations. Exact Equations, integrating factors. Change of variables.

Linear equations with constant coefficients.

Linear equations with variable coefficients. Euler equation. Legendre equation. Method of variation of parameters. Green function.

Non-linear equations. Reduction of Order. Symmetries.

Series solutions to differential equations. Ordinary points and regular singular points. Hermite, Legendre and Bessel equations.

Systems of differential equations. Linear Systems of first order differential equations.

Partial differential equations. Physics problems. General and particular solutions. Boundary conditions and existence of solutions. Separation of variables.

4.4. Course planning and calendar

Calendar/Schedule of basic activities

The distribution of the different programmed activities is as follows:

Theory/Practice sessions: 40 hours of theory and 20 of problems.

Practical task and work: Six hours to complete your training.

Exams: A theory-practical test at the end of the semester.

Theory and practice sessions are taught throughout the first semester (September - January) of the second year of the Physics Degree. The practical task and works will be also developed throughout this semester.

Examination sessions: The global assessments are those that the Faculty of Sciences determines and publishes each year on the website.

The practical works will be evaluated by the teachers of the subject.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=26914