Academic Year/course: 2022/23

27037 - Mathematical Astronomy

Syllabus Information

Academic Year: 2022/23
Subject: 27037 - Mathematical Astronomy
Faculty / School: 100 - Facultad de Ciencias
Degree: 453 - Degree in Mathematics
ECTS: 6.0
Year: 4
Semester: Second semester
Subject Type: Optional
Module:

1. General information

1.1. Aims of the course

These approaches and objectives are neither directly nor indirectly aligned with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning outcomes of the module very little or even nothing has to do with the aim of providing training and competence to contribute to some extent to the achievement of the said SGDs.

2. Learning goals

3. Assessment (1st and 2nd call)

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

Throughout the academic period of classroom lectures the student's performance and achievements will be assessed by means of a process of continuous assessment, based on a series of tasks involving the detailed written solution of exercices and problems and the oral presentation of some academic works. Student's active paticipation during the lectures will also be considered.

Up to 60 % of the final grade can be obtained in a written examination at the end of the academic period (afer finishing the usual period of lectures). This percentage might be reduced by carrying out some additional academic works, depending on the interest and previous performance of the student, and on the quality and rigour of the results throughout the continuous assessment process.

In any case, the stutudent has the right to pass the subject by means of a unique, global written examination.

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, practice sessions and autonomous work and study.

4.2. Learning tasks

This course is organized as follows:

- **Lectures.** Theoretical contents will be explained by the teacher.

- **Practice sessions** with oral discussion of proposed problems whose solution the students should previously have handed in.
- **Autonomous work and study.** Problems proposed for personal work

In principle, teaching activities and students' performance assessment will take place in a conventional face-to-face learning mode, except in the case that (due to the health situation) new, unexpected, administrative regulations issued by the competent governmental, regional or academic authorities might compel us to resort to some telematic environment to carry out such activities.

4.3. Syllabus

- **Topic 1.** Space and time reference frames. Astronomical coordinate systems.
- **Topic 2.** Two-body problem. Keplerian motion.
- **Topic 3.**. Artificial satellite orbits.

4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website and Moodle.

4.5. Bibliography and recommended resources

- Abad, Alberto J.. Astrodinámica / Editorial Bubok [http://www.bubok.es//libro/detalles/219952/Astrodinamica]. 2012.
- Abad, A., Docobo, J.E., Elipe, A.. Curso de astronomía / Prensas Universitarias de Zaragoza, 2002.
- Bond, V.R., Allman, M.C.. Modern Astrodynamics (Fundamentals and Perturbation methods). Princeton University Press, 1996.
- Danby, J. M. A. Fundamentals of celestial mechanics / J. M. A. Danby . - 2nd ed., 3rd printing corr. and enl. Richmond, Virginia : Willmann-Bell, 1992.
- Battin, Richard H.. An Introduction to the Mathematics and Methods of Astrodynamics. Rev. ed. American Institute of Aeronautics and Astronautics. 1999.
- Elices, T.. Introducción a la Dinámica Espacial. Instituto Nacional de Técnica Aeroespacial. 1991.
- Green, Robin M.. Spherical astronomy / Robin M. Green . Cambridge [etc.] : Cambridge University Press, cop. 1985.
- Vallado, David A.. Fundamentals of Astrodynamics and Applications. 3rd. ed. Springer. 2007.

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=27037