Universidad Zaragoza

Academic Year/course: 2021/22

27038 - Celestial Mechanics

Syllabus Information

Academic Year: 2021/22
Subject: 27038 - Celestial Mechanics
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

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. 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

This course will address the following topics:

- **Topic 1.** Motion in a central force field.
- **Topic 2.** Analytical dynamics: Lagrangian and Hamiltonian formulation.
- **Topic 3.** Orbital perturbations.

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 / Alberto Abad . Madrid : Bubok, 2012 [http://www.bubok.es//libro/detalles/219952/Astrodinamica].
- Bond, V. R., Allman, M. C.. Modern Astrodynamics (Fundamentals and Perturbation Methods). Princeton University Press. 1996.
- Goldstein, Herbert. Classical Mechanics / Herbert Goldstein, Charles Poole, John Safko . - 3rd. ed. Reading, Massachusetts [etc] : Addison-Wesley, cop. 2001.
- Meirovitch, L.. Methods of Analytical Dynamics. McGraw-Hill. 1970.
- Scheck, Florian. Mechanics : from Newton's laws to deterministic chaos / Florian Scheck . - 3rd ed. Berlin [etc.] : Springer, cop. 1999.
- Battin, Richard H.. An Introduction to the Mathematics and Methods of Astrodynamics. Rev. ed. American Institute of Aeronautics and Astronautics. 1999.
- Boccaletti, D., Pucacco, G.. Theory of Orbits (Vol. I: Integrable Systems and Non-perturbative Methods). Springer, 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.
- Elices, T.. Introducción a la Dinámica Espacial. Instituto Nacional de Técnica Aeroespacial. 1991.
- Vallado, David A.. Fundamentals of Astrodynamics and Applications. 3rd. ed. Springer. 2007.

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=27038