Introduction to celestial mechanics and solar system - course description

General information

Course name	Introduction to celestial mechanics and solar system
Course ID	13.7-WF-FizP-ICMSS-S17
Faculty	Faculty of Physics and Astronomy
Field of study	Physics
Education profile	academic
Level of studies	First-cycle studies leading to Bachelor's degree
Beginning semester	winter term 2018/2019

Course information

Semester	3
ECTS credits to win	5
Course type	obligatory
Teaching language	english
Author of syllabus	• prof. dr hab. Andrzej Maciejewski

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Exam
Class	30	2	-	-	Credit with grade

Aim of the course

Introduction of basic problems of celestial mechanics. Presenting scientific information concerning astronomy of the Solar System and extrasolar planetary systems.

Prerequisites

Knowledge of general astonomy and elementary physics.

Scope

- Motion in gravitational field and conservation laws.

- Kepler problem and motion in a central field.

- Two body problem.

- Determination of orbital elements from observations.

- Structure of the Solar System.

- Planetary and small bodies orbits.

- Extrasolar planetary systems.

Teaching methods

Conventional lecture, solving analytical and numerical problems.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Student is able to ennumerate basic laws of motion in simple gravitational fields. Students are able to describe and understand the Kepler problem. In particular, they can calculate Keplerian orbital elements and motions in them. They can also calculate orbital elements from observations. Student knows, understands and is able to describe the basic laws governing the motion of planets and small bodies. Can describe in detail the structure of the Solar System, and characterize its components. The student has a basic understanding of the evolution of planetary systems. Knows the basic methods of observing extrasolar planetary systems and can provide their basic characteristics		• a quiz • an exam - oral, descriptive, test and other	• Lecture • Class
Student is able to perform, according to his knowledge of physical laws, calculations used to solve problems and issues related to the orbital motion of bodies		• a quiz • an exam - oral, descriptive, test and other	• Lecture • Class

Assignment conditions

Lecture: The course credit is obtained by passing 2 written and oral final exams.

Class: Written test. A student is required to obtain at least the lowest passing grade from the test organized during class.

Before taking the examination the student needs to obtain passing grade in the computational exercises.

Final grade: 50% exam grade + 50% exercise grade.

Recommended reading

[1] Alessandra Celletti and Ettore Perozzi, Celestial Mechanics, Springer, 2007.

[2] H. Pollard, Mathematical Introduction to Celestial Mechanics, Prentice Hall, 1966.

[3] Morbidelli, Modern Celestal Mechanics, Taylor & Francis, 2002.

Further reading

[1] G. Beutler, Methods of Celestial Mechanics, vol.!, Springer, 2005.

Notes

Modified by dr hab. Piotr Lubiński, prof. UZ (last modification: 01-08-2018 14:48)