

PHYS-401

Astrophysics III : stellar and galactic dynamics

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| Cursus | Sem. | Type |
|--------------------------|----------|------|
| Ing.-phys | MA1, MA3 | Opt. |
| Physicien | MA1, MA3 | Opt. |
| Space technologies minor | H | Opt. |

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|----------------------------|-----------------|
| Language of teaching | English |
| Credits | 4 |
| Session | Winter |
| Semester | Fall |
| Exam | Oral |
| Workload | 120h |
| Weeks | 14 |
| Hours | 4 weekly |
| Courses | 2 weekly |
| Exercises | 2 weekly |
| Number of positions | |

Summary

The aim of this course is to acquire some knowledge on specific dynamical phenomena related to the origin, equilibrium, and evolution of star clusters, galaxies, and galaxy clusters.

Content

1. Introduction: distances, sizes, masses of stellar dynamics systems such as star and galaxy clusters.
2. Potential theory.
3. The orbits of stars.
4. Equilibria of collisionless systems.
5. Stability of collisionless systems.
6. Disk dynamics.
7. Kinetic theory: relaxation processes, thermodynamics of self-gravitating systems, Fokker-Planck approximation.
8. Collisions and encounters of stellar systems

Learning Prerequisites**Recommended courses**

Bachelor in physics or mathematics and Astrophysics I and II

Learning Outcomes

By the end of the course, the student must be able to:

- Theorize the laws of stellar dynamics

Transversal skills

- Access and evaluate appropriate sources of information.

Teaching methods

Ex cathedra and exercises supervised in classroom

Assessment methods

oral exam (100%)

Resources

Ressources en bibliothèque

- [Galactic dynamics / Binney](#)