

MATH-115(b) Advanced linear algebra II

Viazovska Maryna

Cursus	Sem.	Type
Physics	BA2	Obl.

Language of teaching	English
Coefficient	4
Session	Summer
Semester	Spring
Exam	Written
Workload	120h
Weeks	14
Hours	4 weekly
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

The purpose of this course is to introduce the basic notions of linear algebra and to prove rigorously the main results of the subject.

Content

- Inner products: orthonormal bases, orthogonal projections, orthogonal and unitary matrices, spectral theorem.
- Forms: linear forms, dual space, bilinear forms, sesquilinear forms, symmetric and hermitian matrices, Sylvester's theorem, singular values.
- Systemes of linear differential equations.

Keywords

inner product, bilinearity, orthogonality

Learning Prerequisites
Required courses

Linear algebra I

Learning Outcomes

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

- Give an example to illustrate the basic concepts of the course
- all concepts from the course
- Reconstruct elementary proofs
- Apply techniques from the course to various problems
- Compute eigenvectors/values, orthogonale bases, etc.
- Formulate accurate proofs and arguments
- Synthesize major results of the course to give a 'big picture' of the material and its potential application

Transversal skills

- Use a work methodology appropriate to the task.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Continue to work through difficulties or initial failure to find optimal solutions.

- Access and evaluate appropriate sources of information.

Teaching methods

Ex cathedra course, exercises in classroom

Expected student activities

Understanding the course notes, solving the exercises

Assessment methods

Written exam

Supervision

Office hours	Yes
Assistants	Yes
Forum	No

Resources**Bibliography**

- R. Cairolì, *Algèbre linéaire*, Presses Polytechniques Universitaires Romandes, 2e édition 1999.
- K. Hoffman, R. Kunze, *Linear Algebra*, Prentice-Hall, second edition, 1971.
- R. Dalang, A. Chabouni, *Algèbre linéaire*, Presses Polytechniques Universitaires Romandes, 2e édition, 2004.

Ressources en bibliothèque

- [Algèbre linéaire / Dalang](#)
- [Linear Algebra / Hoffman](#)
- [Algèbre linéaire / Cairolì](#)