



UNIVERSIDADE FEDERAL DO CEARÁ

**FEDERAL UNIVERSITY OF CEARÁ
OFFICE OF THE VICE PROVOST FOR UNDERGRADUATION (PROGRAD)
COORDINATION FOR PROJECT AND CURRICULUM DEVELOPMENT
CURRICULUM DEVELOPMENT DIVISION**

1. Academic unit offering the curricular component (Faculty, Center, Institute, Campus):

Center of Sciences

2. Department offering the curricular component (when applicable):

Mathematics Department

3. Undergraduate course(s) offering the curricular component

Code of the Course	Name of the Course	Course Degree ¹	Curriculum (Year/Semester)	Nature of the Component ²	Semester of Offer ³	Habilitation ⁴
91	Telecommunications Engineering	Bachelor	2015.1	Mandatory	02	-

4. Name of the curricular component:

Applied Algebra I

5. Code of the curricular component (filled by PROGRAD):

CB0699

6. Prerequisites	No (x)	Yes ()	
		Code	Name of the curricular component / activity

7. Corequisite	No (x)	Yes ()	
		Code	Name of the curricular component / activity

8. Equivalences	No ()	Yes (x)	
		Code	Name of the curricular component / activity
		CB0696	Introduction to Algebra

9. Day period of the curricular component (more than one option can be selected):

- ¹ Fill with *Bachelor (Engineer), Licenciante, or Technologist.*
- ² Fill with *Mandatory, Optional, or Elective.*
- ³ Fill when mandatory.
- ⁴ When elective, fill with the habilitation or emphasis to which the curricular component is linked.

(x) Morning

(x) Afternoon

(x) Night

10. Regime of the curricular component:

(x) Semester

() Yearly

() Modular

11. Justificatory for the creation/regulamentation of this curricular component

Engineering has a strong appeal for the understanding and usage of methods for solving systems of equations with computational aid. In this sense, the deeper approach conducted by the Mathematics Department on the course topics with the aim of providing a better theoretical foundation and intellectual development, will favor the usage of algebra to several applications, thus contributing to a wider and deeper mathematical formation for the Telecommunications Engineering students.

12. Objectives for the curricular component:

Promote to the student an in-depth mastery of linear algebra and several of its methods for the search of solution of systems of simultaneous linear equations.

13. Syllabus:

Linear equations; vector spaces; linear transformations; polynomials; determinants; shapes canonical elementary; rational and Jordan forms; inner-product spaces; operators over inner-product spaces; bilinear forms.

14. Program:

1. Linear equations: analysis of the existence of a solution and methods of resolution for systems of linear equations;
2. Vector spaces: definition, examples, subspaces, intersection and sum of subspaces, linear combinations, generating sets, linear dependence and independence, basis dimension, coordinates, basis change;
3. Linear transformations (LT): definition, examples, the $L(U, V)$ space, kernel and image of a LT, isomorphism, automorphism, LT matrix, LT operations;
4. Polynomials;
5. Determinants;
6. Elementary canonical forms;
7. The rational and Jordan forms: eigenvalues, eigenvectors, characteristic polynomial, diagonalization of operators;
8. Inner-product spaces: definition, norm, distance, orthogonality, Gram-Schmidt, angle between vectors, self-adjoint operators;
9. Operators on inner-product spaces;
10. Bilinear forms: anti-symmetrical, symmetrical, quadratic.

15. Workload description

Number of Weeks:	Number of Credits:	Total Workload in Hours:	Theory Workload in Hours:	Practice Workload in Hours:
16	04	64	64	-

16. Basic bibliography:

- 1- Sheldon Axler. Linear Algebra Done Right K.

17. Complementary bibliography:

- 1- K. Hoffman e R. Kunze. Linear Algebra, 2ª edição;
- 2- Elon Lages Lima. Álgebra Linear, 7ª edição.