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	03	-

4. Name of the curricular component:
Applied Algebra I

5. Code of the curricular component (filled by PROGRAD)**:**
CB0801

6. Prerequisites	No ( )	Yes (x)	
		Code	Name of the curricular component / activity
		CB0664	Fundamentals of Calculus
		CB0699	Applied Algebra I

7. Co-requisite	No (x)	Yes ( )	
		Code	Name of the curricular component / activity

8. Equivalences	No ( )	Yes (x)	
		Code	Name of the curricular component / activity
		TI0049	Applied Mathematics for Engineering

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

---

[1]   Fill with *Bachelor (Engineer), Licenciate,* 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

Differential equations are the main tool in the mathematical modeling of problems in areas such as Physics, Chemistry, Biology, Ecology, and Engineering, hence its importance as a course of curricula of these areas of knowledge.

---

12. Objectives for the curricular component:

Use differential equations to model geometric and physical problems. Develop methods to determine solutions of ordinary differential equations of first and second order.

---

13. Syllabus:

Differential First Order Equations. Linear Differential Equations of the Second Order. Laplace transform.

---

14. Program:

1. First-order differential equations - separable equations; exact equations; integrating factors. homogeneous equations; Bernoulli's equation; Ricatti's equation.
2. Second-order linear differential equations - homogeneous equations: fundamental solutions; homogeneous equations with constant coefficients; non-homogeneous equations: method of variation of parameters; non-homogeneous equations with constant coefficients; oscillations; solutions in power series.
3. Laplace transform - definition and properties; initial value problems; equations with non-continuous terms; Dirac's delta function and its transform; convolutions.

---

15. Workload description

Number of Weeks:	Number of Credits:	Total Workload in Hours:	Theory Workload in Hours:	Practice Workload in Hours:
16	04	64	48	16

---

16. Basic bibliography:

1- W. E. Boyce e R. C. DiPrima. Equações Diferenciais Elementares e Problemas de Valores de Contorno, 9a Edição. LTC, Rio de Janeiro, 2010;

2- D. G. de Figueiredo e A. F. Neves. Equações Diferenciais Aplicadas, 2ª Edição. SBM, Rio de Janeiro, 2005;

3- F. Brauer e J. A. Nohel. Ordinary Differential Equations: a First Course. W. A. Benjamin, Inc., New York, 1967.

17. Complementary bibliography:

1- E. Kreyszig. Matemática Superior. LTC , 2a. ed. 1985;

2- T. Apostol. Calculus I e II, John Wiley & Sons, 1962;

3- D. G. Zill. Equações Diferencias com Aplicações em Modelagem, Ed. Thomson;

4- E. C. de Oliveira e M. Tygel. Métodos Matemáticos para Engenharia. SBM, Rio de Janeiro, 2005;

5- M. Taylor. Introduction to Differential Equations. AMS, Providence, 2011.