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	Optional	-	-

4. Name of the curricular component:
Applied Analysis I

5. Code of the curricular component (filled by PROGRAD)**:**
CB0700

6. Prerequisites	No ( )	Yes (x)	
		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

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

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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

Given the insertion of the Federal University of Ceará (UFC), in particular, the Center of Technology (CT), in international collaboration programs such as the mobility of undergraduate students among several engineering schools, a better preparation of UFC students with the aim of minimizing the curricular differences found in such schools as the French ones. In this context, mathematics is pointed out as one of the greatest difficulties faced by the student of engineering in mobility. In engineering courses in France, for example, students are required to have mathematical knowledge which, in the UFC, is more characteristic of a bachelor student of the Mathematics course. In this sense, the creation of courses with contents of applied mathematical analysis, deepened for students of all undergraduate engineering courses, with regular offer under the responsibility of the Department of Mathematics, will contribute to the more comprehensive mathematical training of the engineering student of the CT, especially for those interested in some academic mobility program.

12. Objectives for the curricular component:

Introduce definitions of mathematical objects, statements, interpretations and demonstrations of theorems, among others. In addition, we aim to develop the reasoning for rigor, overlapping with an approach that is mainly aimed at the application of problem solving methods.

13. Syllabus:

Finite and infinite sets; real numbers; sequences of real numbers; numerical series; notions of topology; limits of functions; continuous functions; derivatives; Taylor's formula and derivative applications; the Riemann integral; calculation with integrals; sequences and series of functions.

14. Scheme

1. Finite and infinite sets: natural numbers, finite sets, infinite sets, enumerable sets.
2. Real numbers: completeness of real numbers.
3. Real number sequences: limit of a sequence, operations with limits, infinite limits.
4. Numerical series: convergent series, absolutely convergent series, convergence tests, commutativity.
5. Topology notions: open sets, closed sets, compact sets.
6. Limits of functions: definition and properties, lateral boundaries, limits at infinity, infinite limits, indeterminate expressions.
7. Continuous functions: definition and properties, continuous functions in a range, continuous functions in compact sets, uniform continuity.
8. Derivatives: definition, operational rules, functions derivable in a range.
9. Taylor's formula and derivative applications: Taylor's formula, convex and concave functions, newton's method.
10. Riemann’s integral: definition and properties, sufficient conditions of integrability.
11. Calculus with integrals: the classical theorems of integral calculus, the integral as limit of sums, logarithms and exponentials, the improper integral.
12. Sequences and functions series: simple convergence and uniform convergence, properties of uniform convergence, power series, trigonometric functions, Taylor series.

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- Elon Lages Lima: Análise Real vol 1.

17. Complementary bibliography:

1- Stephen Abbott: Understanding Analysis.