



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 Technology

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

Teleinformatics Engineering 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	04	-

4. Name of the curricular component:

Applied Electromagnetism

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

TI0115

6. Prerequisites	No ()	Yes (x)	
		Code	Name of the curricular component / activity
		CB0536	Integral and Differential Calculus III
		TI0113	Electromagnetism

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

8. Equivalences	No ()	Yes (x)	
		Code	Name of the curricular component / activity
		TI0050	Applied Electromagnetism

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

Morning Afternoon Night

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.

10. Regime of the curricular component:

(x) Semester

() Yearly

() Modular

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

The electromagnetic phenomena are the basis for the telecommunications engineering. Thus, this course aims to provide the foundations necessary to understand these phenomena and the mathematical models used in their characterization in physical system.

12. Objectives fo the curricular component:

Provide the basic knowledge of electromagnetic theory required to understand the related phenomena in the telecommunications area and to apply this theory to solve telecommunications engineering problems.

13. Syllabus:

Vector analysis review. Maxwell's equations in differential form and boundary conditions. Electrostatic, magnetostatic and electromagnetostatic field applications; electromagnetic energy, power, potential, and moment.

14. Program:

1. **Vector analysis review:** vector and scalar fields: vector operations; coordinate system transformations; differential vector operators; integral vectorial theorems.
2. **Maxwell's equations in differential form and boundary conditions:** Maxwell's equations and boundary conditions, displacement current, boundary conditions, Lorentz's force.
3. **Electrostatic, magnetostatic and electromagnetostatic field applications:** Laplace's and Poisson's equations solutions in rectangular, cylindrical and spheric coordinates; numerical methods: finite difference method, moments method, finite element method.
4. **Electromagnetic energy, power, potential, and moment:** general energy relations; Thomson's theorem; Electromagnetic power, pontential and moment concepts; virtual work principle.

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- Paris, Demetrius T., Hurd, F. K.; "Teoria Eletromagnética Básica", Guanabara Dois, 1984.
- 2- Sadiku, Matthew N. O. – "Elementos de Eletromagnetismo", 3rd edition, Bookman, 2004.
- 3- Hayt, William H. Jr. and Buck, John A. – "Eletromagnetismo", 6th edition, Livros Técnicos e Científicos, 2003.

17. Complementary bibliography:

- 1- Paul, Clayton R., Eletromagnetismo para engenheiros: com aplicações aos sistemas digitais e interferência eletromagnética. Rio de Janeiro: Livros Técnicos e Científicos, 2006.
- 2- Kraus, John D. and Carver, Keith R. – “Electromagnetics”, 3rd edition, McGraw-Hill.
- 3- Edminister, Joseph A. – “Eletromagnetismo”. São Paulo: McGraw-Hill, c1980.
- 4- Reitz, John R.; Milford, Frederick, J. and Christy, Robert W.; “Fundamentos da Teoria Eletromagnética”, 3rd edition, Editora Campus.
- 5- Macedo, Annita; “Eletromagnetismo”, Editora Guanabara, 1988.
- 6- Quevedo, Carlos Peres; “Eletromagnetismo”, Edições Loyola, 1993.