Course Syllabus

DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA

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Program: Oceanographic Engineering

1. **Course number and name**

   MATG1048 - DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA

2. **Credits and contact hours**

   3 credits and 4 contact hours

3. **Instructor's course or coordinator's name**

   JESUS ALEJANDRO APONTE GONZALEZ

4. **Text book, tittle, author, and year**

   • Farlow, J. & Hall, J.E. & McDill, J.M. & West, B.. Differential Equations and Linear Algebra (Second edition)

   a.Other supplemental materials

   • Edwards, C.H. & Penney, D.E. & Calvis, D.C.. Differential Equations and Linear Algebra (Fourth edition)

   • Strang, G.. Differential Equations and Linear Algebra (First edition)

5. **Specific course information**

   a. Brief description of the content of the course (catalog description)

   This transversal course is aimed at the basic training of students in the engineering area who require mathematical foundations to analyze the differential equations that arise in the process of modeling natural phenomena in the different areas of study. The course combines classical quantitative methods, such as integration of linear and non-linear differential equations and systems of equations and Laplace transforms, with qualitative methods that make use of relevant topics in linear algebra, which in turn are developed in an integrated and effective way.

   b. Prerequisites

   VECTOR CALCULUS - MATG1046

   c. This course is: Required

6. **Specific goals for the course**

   a. Specific outcomes of instruction

   1.- Solve differential equations to obtain explicit forms of their solutions, using elementary quantitative methods.

   2.- Apply the qualitative method for the analysis of solutions of differential equations to obtain relevant information from mathematical models, by studying directional fields and isoclines.

3.- Apply linear algebra for the study of solutions systems of linear and nonlinear differential equations, by using the concepts of vector spaces and linear transformations.

4.- Use Laplace transforms to solve initial value problems of linear differential equations, using the inverse Laplace transform and transformed pairs.

b. Explicity indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

7. Brief list of topics to be covered

1.- Evaluation activities
2.- First-order differential equations
3.- Vector spaces
4.- Second-order differential equations
5.- Linear transformations
6.- Systems of differential equations
7.- Laplace transforms

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