

Course Syllabi

1. MAES-00087 DIFFERENTIAL EQUATIONS

2. 144 credits hours.

3. Bibliography

- Ecuaciones diferenciales con problemas de valores en la frontera, Dennis Zill, 2018
- Ecuaciones diferenciales y problemas con valores en la frontera, EDWARDS, C. HENRY Y PENNEY, DAVID E., 2009

4. Specific Course Information

- The subject of differential equations helps us to model the behavior or evolution of magnitudes that depend on variables, that is, the dynamics of a process; solving it allows predicting their behavior and gives the possibility to analyze the phenomenon under different conditions. In this subject the student consolidates his mathematical training as an engineer and enhances his ability in the field of applications to successfully address, in subsequent courses, the mathematical concepts involved. This course aims to identify, formulate and solve complex engineering problems by applying engineering, science and mathematics principles. RA2. Design. Applies engineering design to produce solutions that meet specific needs taking into account public health, safety and well-being, as well as global, cultural, social, environmental and economic factors. the themes: Linear and nonlinear ordinary differential equations, through which methods are tested to solve equations of first order and simple of superior order, with initial and frontier value. Systems of ordinary differential equations with constant coefficients, whose solutions will be determined, by applying the systematic method of elimination and the method that uses concepts of matrix algebra. Laplace transforms and transforms inverse. Ec partial differential urations, themed that contains the way to solve problems by the classic method of separation of variables. In addition, it is complemented by software for graphical representation of functions.
- Corequisites:
 - CCFF-00033 THERMODYNAMICS
- Prerequisites:
 - MAES-00085 INTEGRAL CALCULUS

5. Learning Objectives of the Course

- Develop in educating the ability to understand and solve exercises and problems of differential equations that arise in mathematical physics, through models that predict the behavior of a real world system.
 - Apply the different methods of solving linear and non
 - linear ordinary differential equations of first order and higher order to determine solutions to different engineering problems.
 - Study the approach and solution of mathematical models in those that apply differential equations.
 - Solve partial differential equations through the method of separation of variables to treat problems involving temperature changes.
- Learning Outcomes
 - It uses the method of separation of variables to solve partial differential equations, based on scientific and mathematical principles.
 - Apply methods to solve systems of linear differential equations with constant coefficients to face

complex problems in engineering, obtaining solutions based on science and mathematics.

- It applies mathematical and engineering principles to solve problems of differential equations with initial conditions, especially with discontinuous or periodic functions, using the laplace transform.
- It applies mathematical and engineering principles to solve problems of differential equations with initial conditions, especially with discontinuous or periodic functions, using the laplace transform.
- It uses basic principles to solve linear and non-linear differential equations of first order and higher order, using qualitative and analytical approaches to solve engineering problems, based on mathematical principles.
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- It uses basic principles to solve linear and non-linear differential equations of first order and higher order, using qualitative and analytical approaches to solve engineering problems, based on mathematical principles.
- It identifies and applies mathematical, physical and chemical models in differential equations or systems to design engineering solutions that address specific needs, considering health, safety and global and environmental factors.

6. Course Topics

- Linear differential equations of first order
- Differential linear equivalencies of second order and higher order
- The transformation of laplace
- Linear differential equation systems
- Introduction to particular differential equations