MA 565- Energy Methods

Course Code:	MA-565
UTAA Credit (Theoretical-Laboratory hours/week):	3(3-0)
ECTS Credit:	6.0
Department:	Mechanical and Aeronautical Engineering
Language of Instruction:	English
Level of Study:	Graduate
Offered Semester:	Fall and Spring Semesters.

Course Objectives

Derivation of differential equations governing the deflections of plates and beams.
To obtain the approximate values of plate and beam deflections. Determining the stability conditions of columns by using energy methods

Course Content

Strain Energy, Principle of Virtual Work, Betti's and Maxwell's Reciprocity Theorem, Castigliano's Theorems, Crotti-Engesser Theorem, Principle of Minimum Total Potential Energy, Weighted-Residual Methods, Principle of Minimum Strain Energy, Energy Methods Applied to Buckling, Hamilton's Principle

Course Learning Outcomes

1-Calculation of stress, strain and deflection values of structural elements by using energy methods

2- approximate solutions in case the exact solution cannot be reached

3-Determination of column stability by using energy methods

4-Vibration analysis of continuous systems