

## **ST5011 NONLINEAR ANALYSIS OF STRUCTURES**

### DETAILED SYLLABUS

#### **OBJECTIVE**

To study the concept of nonlinear behaviour and analysis of elements and simple structures.

#### **UNIT I INTRODUCTION TO NONLINEAR ANALYSIS**

Material nonlinearity, geometric nonlinearity; statically determinate and statically indeterminate bar systems of uniform and variable thickness.

#### **UNIT II INELASTIC ANALYSIS OF FLEXURAL MEMBERS**

Inelastic analysis of uniform and variable thickness members subjected to small deformations; inelastic analysis of bars of uniform and variable stiffness members with and without axial restraints

#### **UNIT III VIBRATION THEORY AND ANALYSIS OF FLEXURAL MEMBERS**

Vibration theory and analysis of flexural members; hysteretic models and analysis of uniform and variable stiffness members under cyclic loading

#### **UNIT IV ELASTIC AND INELASTIC ANALYSIS OF PLATES**

Elastic and inelastic analysis of uniform and variable thickness plates

#### **UNIT V NONLINEAR VIBRATION AND INSTABILITY**

Nonlinear vibration and Instabilities of elastically supported beams.

#### **REFERENCES**

1. Fertis, D.G, Non-linear Mechanics, CRC Press, 1999.
2. Reddy.J.N, Non-linear Finite Element Analysis, Oxford University Press, 2008.
3. Sathyamoorthy.M, Nonlinear Analysis of Structures, CRC Press, 2010.