



Course Title: AIRCRAFT STRUCTURE -II

Credit Units: 03

Course Code: AERO306

Course Level: UG

L	T	P/S	SW/ FW	TOTAL CREDIT UNITS
2	1	-	-	3

Course Objective

The objective of this course is to make the students understand the analytical study of the buckling behaviour of columns and plates. The students will also study the post buckling behaviour of plates and the behaviour of field beams under tension.

Pre-requisites: Aircraft Structures-I and Applied Mathematics

Course Contents/Syllabus:

	Weightage (%)
Module I : Elasticity of Columns	25
Descriptors/Topics: Euler column, higher order differential equations for columns, energy approach, dynamic approach of predicting buckling loads, approximate methods for prediction of buckling loads. Effect of shear on buckling loads. Large deflection of columns. Columns with eccentricity in geometry. Open section columns. Torsional buckling of open section columns. Flexural torsional buckling of open section columns.	
Module II : Stability of Elastic Plates	25
Descriptors/Topics : Governing differential equation for stability of plates under uni-axial compressive loads. Energy equation for appropriate solution for buckling loads, Rayleigh Ritz technique, Galerkin technique. Buckling loads under biaxial compressive loads and shear loads. Finite difference equations for estimating buckling loads. Buckling of stiffened plates. Buckling of plates with different boundary conditions.	
Module III : Post-buckling Behaviour of Plates	15
Descriptors/Topics : Concept of effective width, buckling behaviour of plates.	
Module IV : Complete Tension and Semi-tension Field Beams	15

Descriptors/Topics :	
Module V : Stress and Strain measurements	20
Descriptors/Topics : Theory of strain measurement; Study of stress fields using methods of photo-elasticity.	

Student Learning Outcomes:

- Describe buckling and post buckling behaviour of columns, plates, thin-sheets, open-sections and field beams under loads.
- Calculate and demonstrate stress- strain by photo-elastic methods.

Pedagogy for Course Delivery: Session Plan / course-material uploading, Class-room teaching associated with assignments, quiz, viva-voce and evaluation.

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total
100	NA	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment – 30%					End Term Examination
Components (Drop down)	Mid-Term Exam	Project/Assignment	Viva	Attendance	70
Weightage (%)	10	7	8	5	70

Text & References:

- Iyengar NGR, “Structural stability of Columns and Plates”, Affiliated East-West Press (Pvt) Ltd, New Delhi, 1st Ed.1986
- Timoshanko S.P. and Goodier J.N., “Theory of Elastic Stability”, McGraw Hill Book Co, Reprinted,1989
- Chajis C., “Introduction to Structural Stability”, Prentice Hall Inc., Engle Wood Cliff, 1986
- David J. Perry, “Aircraft Structures”, McGraw Hill, 1949.
- T.H.G. Megson “Aircraft Structures for Engineering Students”, Edward Arnold, UK
- Rivello RM, “Theory and Analysis of Flight Structures”, McGraw Hill.
- Experimental Stress Analysis by Dally & Raleigh.

Any other Study Material:

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