Liverpool John Moores University

Title:	AIRCRAFT STRUCTURES
Status:	Definitive
Code:	**5511NCCG** (129444)
Version Start Date:	01-08-2021
Owning School/Faculty:	Engineering
Teaching School/Faculty:	Nelson Campus

Team	Leader
Christian Matthews	Y

Academic Level:	FHEQ5	**Credit Value:**	20	**Total Delivered Hours:**	60
Total Learning Hours:	200	**Private Study:**	140		

Delivery Options
Course typically offered: S1, S2, Sum, NS2 (S2 for Jan)

Component	Contact Hours
Lecture	48
Practical	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	Assignment	Assignment	100	

Competency	NCC Group Pass/Fail

Aims

The aims of the module are to teach the theory required for analyising beam deflections, instability, and criteria for strength.
To development of an appreciation of the Direct Stiffness method, the nature of elastic stability, the need for failure criterion and the nature of plastic strain is also covered. The student will be able to establish whether certain common types of structural component, under given loading conditions, are strong enough and are

safe against buckling failure.
To introduce the student to the methods used in the analysis of structures made of composite (i.e. non-homogeneous) materials.

Learning Outcomes

After completing the module the student should be able to:

1	Apply appropriate methods and techniques to simplify aircraft structures in order to perform stress calculations
2	Carry out practical investigations of structural members under multiple loadings
3	Demonstrate an understanding of the reasons for current airframe structural configurations
4	Evaluate the effect the designs produced have on weight, balance, aerodynamics, manufacture, cost, repair in-service, test requirements, service life, decommissioning.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Assignment	1	3	4
NCC Group Pass/Fail		2	

Outline Syllabus

Load distribution in statically determinate systems - principles of equilibrium.
Direct Stiffness Method (DSM)
Symmetric and unsymmetric beams under bending loads - stresses and deflections.
Yield criteria and elementary plasticity.
Macaulay's method to determine the deflection of beams.
Introduction to energy methods in structural analysis - calculation of deflections.
Structural instability - Euler method
Composite structures

Learning Activities

Lectures

These will not normally be traditional didactic lectures in which the student plays little active part, but will be delivered in small groups of up to 20 students in which their interaction with their tutor is a key ingredient of their learning experience.

The material of this module requires the development of significant practical skill. This will be taught within the lecture time, making these sessions a blend of lecture and workshop time. The sessions will be timetabled in spaces with physical resources appropriate to the delivered content.

Students will receive approximately 30 hours of taught material, supported by in-class exercises and discussions designed to help student assimilate learning and to provide early informal feedback on their progress.

Practical Work

This module contains directed practical work that students will undertake under the supervision of teaching staff and/or technicians. Some elements of this practical work will form part of the assessment for this module.

Independent Study

Students are expected to undertake personal reading and research into topic areas that have been stimulated from the lectures and seminars. This reading will enhance their academic work and enable valid contribution to lectures and seminars.

VLE support

This will provide links to academic web-sites and on-line journals, facilitate group discussion outside of the classroom, access to outline lecture notes, and provide students with assessment details.

Notes

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