

<b>Module Title:</b>	Aircraft Structures and Systems
<b>Language of Instruction:</b>	English
<b>Credits:</b>	5
<b>NFQ Level:</b>	7
<b>Module Delivered In</b>	<a href="#">2 programme(s)</a>
<b>Teaching &amp; Learning Strategies:</b>	This module will be taught by Lectures, Tutorials and by using Model & Actual Aircraft and Sample Questions.
<b>Module Aim:</b>	The aim of this module is to introduce basic and intermediate aircraft structures and systems to the student, to enable them to understand how it applies to an aircraft operation and maintenance, and to develop basic analytical and troubleshooting skills essential to an aircraft technician.

Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Understand and explain the importance of airworthiness requirements in relation to structural strength
LO2	Define and describe the technical terms associated with the structure of an aircraft's fuselage, wings, stabilisers, control surfaces and their construction
LO3	Demonstrate a good knowledge of the operation of the main systems found on an aircraft.
LO4	Explain the design, construction and operation of components and subsystems that comprise one of the main systems of a commercial aircraft

Pre-requisite learning	
<b>Module Recommendations</b> <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
<b>Incompatible Modules</b> <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Requirements</b> <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

**Module Content & Assessment**

Indicative Content
<p><b>Airframe Structures — General Concepts</b> Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision. Aircraft bonding Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.</p>
<p><b>Airframe Structures — Aeroplanes Fuselage (ATA 52/53/56)</b> Construction and pressurisation sealing; Wing, tail-plane pylon and undercarriage attachments; Seat installation; Doors and emergency exits: construction and operation; Window and windscreen attachment.</p>
<p><b>Wings (ATA 57)</b> Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.</p>
<p><b>Stabilisers (ATA 55)</b> Construction; Control surface attachment. 11.3.4 Flight Control Surfaces (ATA 55/57) 1 2 — Construction and attachment; Balancing — mass and aerodynamic.</p>
<p><b>Nacelles/Pylons (ATA 54)</b> Nacelles/Pylons: — Construction; — Firewalls; — Engine mounts.</p>
<p><b>Air Conditioning and Cabin Pressurisation (ATA 21)</b> Pressurisation and air conditioning systems; Cabin pressure controllers, protection and warning devices. Heating Systems</p>
<p><b>Equipment and Furnishings (ATA 25)</b> Emergency equipment requirements; Seats, harnesses and belts. Cabin lay-out; Equipment lay-out; Cabin Furnishing Installation (level 2); Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.</p>
<p><b>Fire Protection (ATA 26)</b> Fire extinguishing systems; Fire and smoke detection and warning systems; System tests. Portable fire extinguisher.</p>
<p><b>Flight Controls (ATA 27)</b> Primary controls: aileron, elevator, rudder; Trim tabs; High lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system</p>
<p><b>Fuel Systems (ATA 28)</b> System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling</p>
<p><b>Hydraulic Power (ATA 29)</b> System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Pressure Control; Filters Power distribution; Indication and warning systems.</p>
<p><b>Ice and Rain Protection (ATA 30)</b> Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.</p>
<p><b>Landing Gear (ATA 32)</b> Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering. Air-ground sensing</p>
<p><b>Oxygen (ATA 35)</b> System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings;</p>
<p><b>Pneumatic/Vacuum (ATA 36)</b> System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.</p>
<p><b>Waste water (ATA 38)</b> Water system layout, supply, distribution, servicing and draining; Toilet System layout, flushing and servicing; Corrosion aspects.</p>

Assessment Breakdown	%
Continuous Assessment	10.00%
Project	20.00%
End of Module Formal Examination	70.00%

Continuous Assessment				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Short Answer Questions	Each student will take a short answer question exam, administered during term time for which a maximum of 10% will be awarded.	1,2,3,4	10.00	Week 12

<b>Project</b>				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Project	Projects relating to specific aircraft systems will be submitted before the end of the module for which a maximum of 20% will be awarded.	4	20.00	End-of-Semester

No Practical
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<b>End of Module Formal Examination</b>				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Formal Exam	Each student will sit a formal written examination at the end of the module for which a maximum of 70% will be awarded.	1,2,3,4	70.00	End-of-Semester

**ITCarlow reserves the right to alter the nature and timings of assessment**

**Module Workload**

<b>Workload: Full Time</b>		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Every Week	1.00
Tutorial	Every Week	0.50
	Total Hours	1.50

**Module Delivered In**

Programme Code	Programme	Semester	Delivery
CW_EEAER_B	<a href="#">Bachelor of Engineering (Honours) in Aerospace Engineering</a>	5	Group Elective 2
CW_EEACS_D	<a href="#">Bachelor of Engineering in Aircraft Systems</a>	5	Group Elective 2