

AMATEUR BUILT AIRCRAFT CONSTRUCTOR / OPERATIONS COURSE

Syllabus Detail

1. Introduction To Aircraft

- Terminology.
- Wing /Mainplane.
- Fuselage.
- Empenage.
- Nacelle.
- Cowling.
- Fairing.

2. Principles of Flight

- Axes of Aircraft.
- Chord Line.
- Camber.
- Angle of Attack.
- Stalling Angle.
- Variable Camber (Flight Controls).Ailerons, Elevators, Rudder, Spoilers, Tabs, Flutter.
- Lift Augmentation (Flaps and Slats).

3. Static and Dynamic Stability

- Lateral and Longitudinal Dihedral.
- Parasol.
- Sweepback.
- "T" Tail Configuration.
- Canard Design.
- Elementary Introduction to the Importance of C of G.

4. Engineering Data Interpretation

- Aircraft Drawings (Details, Assembly and Installation).
- Bill of Materials.
- Parts Lists.
- Standards Hardware.
- Material Specifications.
- Revision Status.
- Drawing Symbols.
- Parts Catalogue's.

5a Materials of Construction (Wood)

- Hardwood and Softwood.
- Grain Orientation.
- Wood Standards (Especially "A" Grade Sitka Spruce)
- Defects, Knots, Spikes,Moisture Content, Shakes, Slits, Rot, Insects, Chemical Degradation.
- Plywoods - Aviation vs Marine Types.

5a Cont

- Adhesives, Epoxies, Casein.
- Nailing and Screwing.
- Glueing Pressure.
- Curing Temperatures and Times.
- Wood protection and Finish.

5b Metals (Light Alloys)

- Aluminium and Copper Alloys (2024S)
- Aluminium and Zinc Alloys (7075S)
- Magnesium and Silicone Alloys (6000 Series)
- Cladding.
- Corrosion (Chemicals and Electrolytic).
- Forming of Metals, Bending, Pressing, Drawing and Spinning.
- Bend Allowance, Set Back (Bend Deduction).
- Flat Pattern Layout.
- Other Fabrication, Drilling, Deburring, Folding Machine, Hole Punches, Forming Blocks.
- Rivet Types and Uses.
- Riveting.

5c Metals (Ferrous Alloys)

- Aircraft Steels, 4130 and 4140, Sheet and Tube stock.
- Normalising, Heat Treatment, Stress Relief.
- Brazing and Welding - CASA Licensed Welder(s).

5d Plastics and Composites

- Occupational Health and Safety.
- Materials, Thermo and Thermo Setting plastics (Acrylics Etc), Fibre Glass, Carbon Fibres.
- Resins - Classifications Contamination, Lifting.
- Layups, Cleanliness, Contamination Etc.
- Curing, Temperatures and Times.
- Finishing (Gel Coats Etc).

6. Aircraft Structures

- Monocoque.
- Semi-Monocoque.
- Spars, Longerons, Stringers, Keel Frames, Formers, Bulkheads, Ribs, Webs, Lift and Jury Struts, Drag Bracing.
- Engine Mounts.

7. Protection and Finish

- Painting and Priming.
- Sealants.
- Plating Processes (Hydrogen Embrittlement Relief).
- Anodising.
- Alodine.

8. Aircraft Hardware

- Bolts, Nuts, Screws, Pins, Control Cable Fittings (Including Tensioners), Pipe Fittings and Lines, Hose Assemblies.

9 Aircraft Practises

- Split Pinning, Lockwiring, Tab Washers, Lockwashers, Bearing Lubrication, Lock Chemicals.
- Torque Wrenches and Tensiometers.
- Measuring Instruments, Vernier Caliper, Micrometers, Etc.

10 Aircraft Rigging

- Symmetrical Rigging (Including Levelling) .
- Control Surface Balancing, Rigging (Including Cable Tensioning).
- Bonding of Control Surfaces.
- Flutter (Aeroelasticity).
- Safety and Dual Inspections.

11 Weighing of Aircraft and Weight Control

- Determination of C of G.
- Weight Reduction Methods.
- Data Recording and Verification.

12 Engine Installation

- Engine Control Rigging.
- Baffling.
- Ignition and Ignition Shielding (Radio Interference) and Switching.
- Plumbing, Including Engine and Airframe Oil and Fuel Systems.
- Vacuum System.

- Cowling.

12b Engine Types

- Lycoming.
- Continental.
- Rotax.
- Automotive Conversions (Volkswagen, Subaru, Corvair, Other types - V8,s, V6,s).
- Liquid Cooling.
- Air Cooling.
- Oil Cooling.
- Reduction Drives.

13 Electrical and Instrument Systems.

- Simple Wiring including Crimping.
- Soldering.
- Screening.
- Avionics Installation (Simplified).
- Fuses and/or Circuit Breakers.
- Terminal Blocks.
- Switches and Batteries.
- Instruments - CAO.20.18.1.
- Pitot and Static Check (Use of Trailing Static if Necessary).
- Calibration and Placarding.

14 Preparing for The Test Flight

- Water Purge Test (Fuel Tanks).
- Fuel Calibration.
- Unuseable Fuel Determination.
- Work and Data Sheets.
- Engine Preparation and Test Running and Inspection (Precautions for Initial).
- Final and Independent Inspection.

15 Course Timing

The Course duration is of 40 hours run over 5 weekend days (Either Saturdays or Sundays).