**PRACTICAL FLIGHT TRAINING MANUAL FOR NPL**

**WEIGHT SHIFT CONTROLLED MICROLIGHT**

The practical syllabus has been broken up into 5 phases. The aim of the course is to train a candidate to the level of proficiency required for the issue of a type rating for light sport weight shift controlled microlights, and to provide the training necessary to act as pilot-in-command of any light sport weight shift controlled microlight for which he or she holds a valid class or type rating, engaged in non-revenue flights under visual flight rules.

Each lesson will be repeated until a satisfactory level is obtained.

The lessons are set out as follows:

Phase 1:

Lesson 1: Exercise 1 – 3 Air experience

Lesson 2: Exercise 4 & 5: Effects of controls and taxiing

Lesson 3: Exercise 6: Straight and level

Phase 2:

Lesson 4: Exercise 7 & 8: Climbing and descending

Lesson 5: Exercise 9: Turning

Lesson 6: Exercise 10A & B: Slow flight and stalling

Lesson 7: Exercise 12 & 13: Initial Circuits

Lesson 8: Exercise 12 & 13: Advanced Circuits

Phase 3

Lesson 9: Exercise 12 & 13: Cross wind circuits and landings

Lesson 10: Exercises 1E, 5E, 12E & 13E: Circuit emergencies

Lesson 11: Exercise 12 & 13: Check ride to first solo

Lesson 12: Exercise 14: First Solo

Lesson 13: Exercise 12 & 13: Solo circuits

Phase 4:

Lesson 14: Exercise 15: Advanced turning

Lesson 15: Exercise 16: Forced landing without power

Lesson 16: Exercise 17A: Low level flying

Lesson 17: Exercise 17B: Precautionary landing

Phase 5:

Lesson 18: Exercise 18A: Navigation – dual

Lesson 19: Exercise 18A, B & C: Navigation with problems and GPS - dual

Lesson 20: Exercise 18A: Navigation – solo

Lesson 21: Exercise 19: Basic instrument flight

Phase 6:

Lesson 22: Flight test prep

Lesson 23: NPL flight test

Lesson 24: NPL test – NAV

Phase 1:

Lesson 1: Exercise 1 – 3 Air experience

Briefing: Familiarisation with the component parts, controls and system of the weight shift controlled microlight. How to prepare the aircraft and pilot for flight, and how to leave the aircraft after flight.

Exercise: Explanation of the microlight weight shift controlled microlight

 Cockpit layout

 Systems

 Check lists, drills, controls; and

 emergency drills, consisting of –

 (a) action in the event of fire on the ground and in the air;

 (b) equipment or system failures; and

 (c) escape drills.

 Local rules

 Flight authorisation and microlight weight shift controlled microlight acceptance

Serviceability documents

Required equipment, maps, etc.

External checks

Internal checks

Seat, harness and controls adjustment

Starting and warming-up checks including safety, people, animals, aircraft and airlaw

Seating position – suitable clothing

Starting and warming-up checks

Power checks

Running down and switching off of engine

Parking, security and picketing

Completion of authorisation and flight folio sheets

Rules: Sign the school rules

 Privileges of the student and punctuality

Lesson 2: Exercise 4 & 5: Effects of controls and taxiing

Briefing: Taxiing and effects of controls; ailerons, rudder, flap, trim, power

Exercise: Taxiing:

 Pre-taxi checks, initiating the taxi, speed control, use of brakes, position of stick in the taxi, engine handling, control of direction and turning, effects of wind and use of flying controls, marshalling signals, wing control including wing tilting in confined spaces, effects of wind and control of wind, airmanship (wing tip, prop blast awareness)

 Primary and secondary effects of bar movement backwards and forwards

 Primary and secondary effects of bar movement left and right (roll)

 Primary and secondary effects of thrust

 Effects of the following on wing controllability:

 Airspeed

 Power changes

 Combination of thrust and pitch for instant attitude change

 Effect of change in weight

 Methods of assessing aircraft attitude

Aircraft systems: The ignition system. Why a dead cut cannot be done at high RPM and only at idle. What is max and min mag drop of your aircraft? What causes a mag drop?

Safety: Introduction of the unmanned joining procedure at Hoedspruit Civil if the tower is closed.

Checklist and its use: Purpose: only as an aid after the check has been done to confirm it has been done. For the lesson the instructor is to teach before start and start up. Rest of checks are for demonstration only.

Lesson 3: Exercise 6: Straight and level

Briefing: Theory of straight and level flight

Air Exercise: To attain and maintain flight in a straight line and at a constant altitude.

 1. At normal cruising power, attaining and maintaining straight and level flight;

 2. Flight at critically high airspeeds;

 3. Demonstration of inherent stability;

 4. Control in pitch

 5. Demonstrate pitch/bank bar movement to counter turbulence

 6. At selected airspeeds (use of power);

 7. During speed changes;

 8. Use of instruments for precision;

 9. Airmanship.

Safety: Introduction of FREDA checks

Aircraft system:

Phase 2:

Lesson 4: Exercise 7 & 8: Climbing and descending

Briefing: Theory of climbing and descending and use of power

Air Exercise: How to initiate the climb and descent and levelling off.

 Levelling off at selected altitudes

 How to sustain the climb and descent and to control the speed and rate of descent

 Use of rudder use to keep nose straight

 Maximum rate and maximum angle of climb

 Effects of flap on aircraft climb performance and descent rate

 Use of the trimmer, only to trim pressure off, not for attitude adjustment

 Different types of climb; best rate, best angle and the cruise climb

 Review again the previous lesson if required

 How to guard against cooling to fast during an extended descent

Aircraft systems: What is a climb and cruise prop?

Safety: Check blind spots before lining up to a runway

Checklists and its use: For the lesson the student must be able to do previous checks by himself and the instructor is to teach the engine and system checks. Rest of checks are demonstrated only.

Lesson 5: Exercise 9: Turning

Ground briefing: Theory of turning

Air exercise: Entry and maintaining medium level turns (30° angle of bank);

 Resuming straight flight;

 Faults in the turn – (incorrect pitch, bank, balance);

 Climbing turns;

 Descending turns;

 Turns onto selected headings, use of either gyro heading indicator or compass;

 Use of instruments for precision

 Judging bank angle by wing-tip reference

 Judging bank angle by aerofoil reference

 Turns onto specified land marks.

Aircraft systems: The radio stack and how to operate each one individually and its purpose

Safety: Routing to and from the GF. Further use of the FREDA check.

Checklists and its use: For the lesson the student must be able to do previous checks himself and the instructor is to teach the before take-off checks. Rest of the checks are demonstrations only.

Lesson 6: Exercise 10A & B: Slow flight and stalling

Ground briefing: Theory of air flow over the control surfaces and the theory of the stall. In the event of a severe stall with a steep nose down attitude, recovery is with bar slightly forward, and enter a diving turn to bleed speed off.

Air exercise: Slow flight

 Safety checks

 Introduction to slow flight

 Controlled flight down to critically slow airspeed

 Application of full power with correct attitude and balance to achieve normal climb speed;

 Stalling

 HASELLL check

 Symptoms

 Recognition

 Initial stalls are power off recover until student confident thereafter ALL stall recoveries will be power on recoveries

 Min height loss power on recoveries 200ft

 Recovery when a wing drops

Aircraft systems: Brake system of the aircraft

Safety: Routing to and from the GF

 Use of FREDA check

Checklist and its use: For the lesson the student must be able to do previous checks himself and the instructor is to teach the crew briefing. Rest of checks are demonstrations only.

Lesson 7: Exercise 12 & 13: Initial Circuits

Ground briefing: Introduction to the circuit and all aspects of the circuit including terminology. Nose wheel and torque considerations.

Air exercise: The take-off: The student can do the take off. Emphasis must be on airspeed and direction after take-off. Holding centreline by wing banking and steering.

 Fly an accurate circuit up to downwind.

 Approach: The student can do the approach, emphasis on speed and rate of descent control.

 Initially the instructor to demonstrate the landing and the student to feel through and learn. Emphasis must be on how all the previous lessons learnt are included in the circuit. This must continue until the student can do the circuit without any aid from the instructor.

Aircraft systems: The electrical system e.g. Alternator, battery, ammeter, master switch etc.

 Differences between a circuit breaker and a fuse

Safety: Circuit radio work. Student to attempt to do all radio work in circuit with assistance from the instructor initially.

Checklist and its use: Student must be able to do all ground checks. Student to be briefed on the whole circuit and the checks to be used.

Lesson 8: Exercise 12 & 13: Advanced Circuits

Ground briefing: The go around – a good judgement call

 The balloon that cannot be landed

Air exercises: All aspects of the circuit need to be consolidated.

 A thorough briefing on the landing.

 Into wind and down wind take-offs

 Emphasize to the student where to look on landing.

 Three important factors in landing, round out, hold off height and aircraft attitude.

 Student must do all circuit work including landings.

 Recovery from goose stepping

Aircraft systems: The static system: altimeter, ASI, VSI

 The dynamic system: ASI

Safety: Circuit radio work to be with little assistance from the instructor.

Checklist and its use: Student must do all the ground checks. Student must also be capable in the circuit.

Phase 3

Lesson 9: Exercise 12 & 13: Cross wind circuits and landings

Ground briefing: The influence of the wind on the circuit

Air exercises: A thorough briefing on the landing

 Emphasize to student where to look

 Crosswind technique: Rotate speed in strong winds, effect of wind on circuit geometry, approach speed and adjusting for gusts, cross control technique

Safety: Student to do all radio work

Checklist and its use: Student to do all ground and circuit checks

Lesson 10: Exercises 1E, 5E, 12E & 13E: Circuit emergencies

Ground briefing: Emergencies with respect to take off, landing, go around and engine failure.

 Emergencies on the ground

 Emergencies with regard to braking and steering

Air exercises: Aborted take off

 Engine failures after take off.

 The go around

 Missed approach

 Demonstrate ground emergencies

 Procedure to follow with regard to fault finding, planning of the descent, and radio call.

 Student to do all circuits and all the landings.

 Action in the event of fire in flight and on the ground

 Glide approach and flapless landings

Safety: Student to do all radio work.

 Checklist and its use: Student must be able to do all checks.

Lesson 11: Exercise 12 & 13: Check ride to first solo

Ground briefing: Purpose of flight to student

Air exercise: Consolidation of circuit and circuit procedures as well as circuit emergencies.

 Student must be competent.

 Normal circuit and glide approaches must be covered.

Emergencies: Engine fire on the ground

Checklist: Student pilot licence present

 Pre-solo test written

Lesson 12: Exercise 14: First Solo

Ground briefing: Aircraft performance in climb and speed

 Difference in landing

Air Exercise: Student to complete one normal circuit

Checklist: Before flying solo a learner must in addition to being proficient in exercises 1 to 13;

 be able to reasonably execute a simulated emergency landing from any position in the circuit.

 He or she must also have completed a minimum of 6 (six) hours of dual instruction.

 He or she must be the holder of a valid Student Pilot licence and have successfully passed the required exams.

Lesson 13: Exercise 12 & 13: Solo circuits

Ground briefing: Dual check will be done for the first three hours of circuit work

Air Exercise: Normal circuits

 Student to practice on the accuracy of touch down point

 Aim point for the round out to be the numbers

 Accurate approaches and speed control to be emphasized

 Instructor to evaluate progress of student

 Student to assess own landings and discuss his mistakes with the instructor.

 Student to end the flight when he becomes either tires or is uncomfortable with the weather.

 The dual check should encompass the following:

 Glide approaches

 Aim point

Emergencies: Engine fire in the air

Phase 4:

Lesson 14: Exercise 15: Advanced turning

Ground briefing: Theory of steep turns angle of bank ≥ 45°

 Wake turbulence / disorientation

Air Exercise: Entry into the steep turn

 Use of power to maintain speed

 Attitude for altitude control, cover VSI and altimeter if required

 Rolling out of the turn and use of power, recovering to straight and level flight

 This flight will also serve as the check ride to authorise the student to fly solo to the GF.

Emergencies: Stuck throttle cable

Lesson 15: Exercise 16: Forced landing without power

Ground briefing: Forced landing setup and procedures

Air exercise: Setup of the glide and speed control in the glide

 Planning of the glide, 2 key points and their respective heights

 Fault finding and reasons for an engine failure

 Radio call and pax briefing

 Use of hammer head to lose altitude

 Short final approach checks

(1) Forced-landing procedure;

(2) Choice of landing area, provision for change of plan;

(3) Gliding distance;

(4) Descent plan;

(5) Key positions;

(6) Engine cooling;

(7) Engine failure checks;

(8) Use of radio, Mayday call;

(9) Passenger briefing;

(10) Base leg;

(11) Final approach;

(12) Landing;

(13) Actions after landing;

(14) Airmanship.

 This flight will also serve as the check ride to authorise the student to fly solo to the GF.

Lesson 16: Exercise 17A: Low level flying

Briefing: The dangers of low flying and the use of power

Safety considerations and risks and dangers of low flight;

Selection of the appropriate speed and configuration;

Awareness of the danger factors and their recognition;

Transition to low level flight;

Control of speed and height;

Following ground contours;

Emphasis on regulations governing low flying.

 Effect of drift

Lesson 17: Exercise 17B: Precautionary landing

Ground briefing: Procedure used for precautionary landing

 Reasons for precautionary landing

Air exercise: Field selection and which has preference

 Inspections and the race track circuit

 Type of landing to be executed

 Can the student fly the aircraft out of field after problem has been rectified?

 PAN call

 Actions after landing

Operations: Soft field take off and landing

 How to execute the manoeuvre

Phase 5:

Lesson 18: Exercise 18A: Navigation – dual

Ground briefing: Navigation

 Map reading

Air exercise: Flight planning:

 (a) Weather forecast and actual;

 (b) Map selection and preparation;

 (i) choice of route;

 (ii) controlled airspace;

 (iii) danger, prohibited and restricted areas;

 (iv) safety altitudes;

 (c) Calculations-

 (i) magnetic heading(s) and time(s) *en route;*

 (ii) fuel consumption;

 (iii) mass and balance;

 (iv) mass and performance;

 (d) Flight information-

 (i) NOTAMS etc.;

 (ii) radio frequencies;

 (iii) selection of alternate aerodromes;

 (e) Weight shift controlled microlight documentation;

 (f) Notification of the flight-

 (i) pre-flight administrative procedures;

 (ii) flight plan form;

 Departure-

 (a) Organisation of cockpit workload;

 (b) Departure procedures-

 (i) altimeter settings;

 (ii) ATC liaison in controlled / regulated airspace;

 (iii) setting-heading procedure;

 (iv) noting of ETAs;

 (c) Maintenance of altitude and heading;

 (d) Revisions of ETA and heading;

 (e) Log keeping;

 (f) Use of radio;

 (g) Use of navaids (if applicable);

 (h) Minimum weather conditions for continuation of flight;

 (i) In-flight decisions;

 (j) Transiting controlled / regulated airspace.

 Set heading procedures

 FREDA checks

 Air Rep

 Heading control and the importance thereof

 Unmanned joining at destination aerodrome

 Flying of the circuit and landing

 Lesson objective: The student is not required to fly the aircraft at all times

 His responsibility is to learn the art of navigation and radio work

 The instructor is to assist the student in all aspects of NAV

Systems: mixture settings in flight

 How to use an EGT

Lesson 19: Exercise 18A, B & C: Navigation with problems and GPS - dual

Ground briefing: Navigation

 Deteriorating weather conditions

 Can you trust your fuel gauges

 How to circumnavigate a thunderstorm?

 Lost procedures: climb for better visibility

 Where is the sun?

 Slow safe cruise to conserve fuel

 Landmarks

 Last known position and time

 Talk to ATC and ask for assistance

Air exercise: 3 leg route; 1st leg: Map reading; 2nd leg: pinpoint navigation with focus on time and renewed ETA; 3rd leg: pinpoint navigation with focus on correcting for drift.

 Route

 Planning the navigation log, mass and balance, radio frequency, fuel use, airport information etc

 How to use a map and the correct way of folding it

 En route weather

 Filing of flight plans

 Set heading procedures

 Altimeter setting procedures

 FREDA checks

 Air Rep

 Use of the nav log and map reading

 Drift correction and the use of the 1 in 60 rule

 Heading control and the importance thereof

 Unmanned joining at destination aerodrome

 Flying of the circuit and landing

 Navigation with GPS

 Entering weigh-points;

 Reading GPS information;

 Following GPS routes;

 Practical limitations.

 Low level navigation

 Hazards (e.g. obstacles, other aircraft);

 Difficulties of map reading;

 Effects of wind and turbulence

 Bad-weather circuit and landing;;

 Vertical situational awareness

 Lesson objective: The student is to learn to fly and navigate simultaneously

 The instructor is to assist the student in all aspects of NAV

Lesson 20: Exercise 18A: Navigation – solo

Ground briefing: Planning of navigation and checking planned route and discussion thereon

Air exercise: navigation

 Route

 Planning the navigation log, mass and balance, radio frequency, fuel use, airport information etc

 How to use a map and the correct way of folding it

 En route weather

 Filing of flight plans

 Set heading procedures

 Altimeter setting procedures

 FREDA checks

 Air Rep

 Use of the nav log and map reading

 Drift correction and the use of the 1 in 60 rule

 Heading control and the importance thereof

 Unmanned joining at destination aerodrome

 Flying of the circuit and landing

 Lesson objective: The student is required to learn the art of navigation and

 radio work, and flying the aircraft simultaneously

Lesson 21: Exercise 19: Basic instrument flight

Briefing: Procedure to be followed during flight and use of instrumentation

 Physiological sensations

Air exercise: Navigational instruments;

 Engine instruments;

 Scanning techniques;

 GPS and other basic electronic navigation systems.

Phase 6:

Lesson 22: Flight test prep

Briefing: Discussion on the layout of the PPL flight test and what to expect

Air exercise: Brush up on all aspects to be tested

 Recap of all exercises

 Steep turns

 Stalls

 Spin avoidance

 Force landing

 Precautionary landing

 Circuits – flapless, short field, crosswind.

Lesson 23: NPL flight test

Briefing: As required by instructor

Exercise: NPL application form

 NPL skills test report

 Logbook up to date

 SPL with student

 All RAASA online examinations passed

Flight Test: as per RAASA skills test report form

Lesson 24: NPL test – NAV

Briefing: As required by instructor

Exercise: NPL application form

 NPL skills test report

 Logbook up to date

 SPL with student

 All RAASA online examinations passed

Flight Test: as per RAASA skills test report form