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### DECLARED TRAINING ORGANISATION (DTO) TRAINING PROGRAM – TRAINING SYLLABUS WCM LICENCE

#### NOTES:

#### DTO Training Programme and Syllabi

**141.08.13** A DTO training programme if not already contained in the applicable regulations and technical standards shall include at least the following information-

- (a) the aim of the course;
- (b) crediting of previous experience and pre-entry requirements, including appropriate procedures for a student that wish to complete his or her training after having started at a different training organisation;
- (c) a list of all air and FSTD exercises to be taught, including a description of the objective of each exercise;
- (d) a syllabus summary if applicable;
- (e) the structure and content of the theoretical knowledge instruction;
- (f) the structure of the entire course and integration of theoretical knowledge instruction, FSTD and flight training; and
- (g) student progress checks for theoretical knowledge and flight training, as appropriate.

1. *This training program can be copied and included in the DTO Procedures Manual as Appendices.*

#### APPENDIX A - SYLLABUS OF THEORETICAL KNOWLEDGE FOR THE WCM LICENCE

	ITEM DESCRIPTION	WCM
<b>1.</b>	<b><u>Aim of training course</u></b>	
	The aim of the course is to train a candidate to the level of proficiency required for the issue of a category rating for Weight-shift Controlled Microlight aeroplanes, and to provide the training necessary to act as pilot-in-command of any Weight-shift Controlled Microlight aeroplane for which he or she holds a valid type rating, engaged in non-revenue flights under visual flight rules.	✓

<b>2.</b>	<b><u>THEORETICAL KNOWLEDGE COURSE</u></b>	✓
2.1	The theoretical knowledge course must cover the subjects as detailed in the syllabus:	
	➤ Principles of Flight	✓
	➤ Aviation Legislation	✓
	➤ Aviation Meteorology	✓
	➤ Aircraft Engines, Airframes and Instruments	✓
	➤ General Navigation	✓
	➤ Human Performance Limitations and Passenger care	✓
	➤ Restricted Radio Telephony Operator's Certificate as prescribed in AIC 30.	✓
	➤ The theoretical knowledge course must cover the subjects as detailed in the syllabus:	✓
<b>3.</b>	<b><u>THEORETICAL KNOWLEDGE COURSE SYLLABUS</u></b>	
	<b><u>3.1 PRINCIPLE OF FLIGHT:</u></b>	✓
	<b><u>3.1.1 GENERAL:</u></b>	
	➤ <b>PHYSICS AND MECHANICS</b>	✓
	• Speed, velocity, force	
	• Pressure – Bernoulli's Principle	
	• Motion of body along a curved path	
<b>Note:</b>	<i>The student must have a good understanding of the speed squared law as applicable to Lift with specific reference to gusts and lulls, and their effect on your flight path.</i>	
	➤ <b>AEROFOILS, LIFT AND DRAG</b>	✓
	• Air resistance and air density	
	• Aerofoil shapes	
	• Lift and drag – Angle of attack and airspeed	
	• Distribution of lift, Centre of pressure	
	• Drag – Induced, parasite – Form, skin, interference	
	• Lift/drag ratio and aspect ratio	
	• Wake turbulence	
	➤ <b>EQUILIBRIUM</b>	✓
	• The four forces: Lift, weight, thrust and drag	
	• Centre of gravity (C of G) position	
	• The balance of the four forces: Straight & Level	
	Climbing	
	Descending	
	➤ <b>STABILITY</b>	✓
	• Positive, neutral, negative	
	• Lateral and directional stability	
	• Longitudinal stability	
	• Wash-out	

<b>3.</b>	<b><u>THEORETICAL KNOWLEDGE COURSE SYLLABUS</u></b>	
	<b><u>3.1 PRINCIPLE OF FLIGHT:</u></b>	
	<b><u>3.1.1 GENERAL:</u></b>	✓
	➤ <b>LOOSE FORMATION/ GROUP FLYING</b>	✓
	• Law Governing	
	• Procedures and hazards	
	➤ <b>TURNING FLIGHT</b>	✓
	• The forces in the turn	
	• Compensation for loss of lift	
	➤ <b>THE STALL</b>	✓
	• Airflow separation	
	• Stalling angle – Relationship to airspeed	
	• Wing loading	
	• Wing loading increase with bank angle increase	
	• High-speed stall	
	➤ <b>AIRCRAFT PERFORMANCE</b>	✓
	• Power curves	
	• Effect of temperature, altitude, density, moisture etc.	
	• Range and endurance	
	• Climbing performance Rate of climb	
	• Angle of climb	
	• Take-off and landing performance Take-off run available	
	• Take-off distance available Landing distance available	
	• Take-off and initial climb - performance effect of –	
	○ wind, wind gradient and wind shear	
	○ weight, pressure, altitude, temperature and density & ground surface and gradient	
	• Approach and landing – performance Effect of –	
	○ wind, wind gradient and wind shear	
	○ weight	
	○ turbulence and gusts and ground effect	
	<b><u>3.1.1 PRINCIPLE OF FLIGHT – WEIGHT SHIFT CONTROL SPECIFIC</u></b>	✓
	➤ <b>FLYING CONTROLS</b>	✓
	• The three axes: Vertical, Lateral, Longitudinal	
	Yaw, & Pitch, Roll	
	• Operation and function of the base-bar	
	• Operation and function of thrust	
	• Principles and purpose of mass distribution	
	• Principles and effect of changes to the following:	
	• hang point,	
	• batten bungee tension,	
	• batten shapes	
	• wing-tip washout	
	• reflex	
	• Operation and function of billow shift and roach	
	• Loss of bar movement in advanced spiral dive	

<b>3.</b>	<b><u>THEORETICAL KNOWLEDGE COURSE SYLLABUS</u></b>	
	<b><u>3.1 PRINCIPLE OF FLIGHT:</u></b>	✓
	<b><u>3.1.1 GENERAL:</u></b>	
	➤ <b>AEROFOILS, LIFT AND DRAG</b>	✓
	• Distribution of lift, Centre of pressure with specific reference to swept back, washed out, flex wings with reflex	
	➤ <b>WEIGHT AND BALANCE</b>	✓
	• Limitations on aircraft weight	
	• Limitations in relation to aircraft balance	
	• Weight and Centre of gravity calculations	
	➤ <b>THE STALL</b>	✓
	• Progressive stall characteristics of swept back washed out wing	
	• Whip Stall - tumble	
	➤ <b>PERFORMANCE</b>	✓
	• Performance of wing in rain	
	• Pendulum effect @ Rotation	
	• Pilot induced oscillations (P.I.O.), Causes, symptoms and recovery.	
	➤ <b>STABILITY</b>	✓
	• Relationship of gross weight to	
	• control in pitch	
	• control in turbulence	
	• Luff lines	
	• Reflex	
	• Swept back wings	
	➤ <b>LOAD FACTOR AND MANOEUVRES</b>	✓
	• Manoeuvring speed limitations (gusty conditions)	
	• Effect on stalling speed	
	• Effect on glide slope	
	• Effect on base-bar trim position	
	• Effect on approach slope and round out technique	
	<b><u>3.2 AIR LAW :</u></b>	✓
	• Applicable acts, regulations and other documents	
	• Structure and function of CAR's, CATS AIP's, Notams, AIC's and AIPsupplements.	
	• Classification of aircraft	
	• Aircraft documentation	
	• Aircraft equipment	
	• Aircraft radio equipment	
	• Aircraft weight schedule	
	• Documents to be carried on board	
	• Documents and records to be maintained and produced on request	
	• Offences in relating to documents and records	
	• Airworthiness aspects	
	• Flight crew licensing	
	• Microlight aeroplane pilot - Privileges and limitations	
	• Microlight aeroplane ratings	

	• Personal flying logbook	
	• Airspace classification	
	• General flight rules	
	• Visual flight rules	
	• Special flight rules	
	• Flight operations	
	• General provisions	
	• Air traffic services	
	• Flight plans	
	• Air-proximity reporting procedures	
	• Incident/accident reporting	
	• International operations	
	• Operation of Non-type certified aircraft	
	• Marine living resources act and Proclaimed nature reserves	
	<b>3.3 AVIATION METEOROLOGY:</b>	✓
	• <b>THE ATMOSPHERE</b>	✓
	• Composition and structure	
	• Vertical divisions	
	• <b>PRESSURE, DENSITY AND TEMPERATURE</b>	✓
	• Barometric pressure, isobars	
	• Changes of pressure, density and temperature with altitude	
	• Solar and terrestrial energy radiation, temperature	
	• Lapse rate	
	• Stability and instability	
	• Effects of radiation, advection subsidence and c	
	• <b>HUMIDITY AND PRECIPITATION</b>	✓
	• Water vapor in the atmosphere	
	• Dew point and relative humidity	
	• <b>PRESSURE AND WIND</b>	✓
	• High- and low-pressure areas	
	• Gradient wind	
	• Vertical and horizontal motion	
	• Effect of wind gradient and windshear on take-off and landing	
	• Relationship between isobars and wind, Buys Ballot's law	
	• Turbulence and gustiness	
	• Local winds, land and sea breezes, berg winds, valley winds	
	• <b>CLOUD FORMATION</b>	✓
	• Cloud types	
	• Convection clouds	
	• Orographic clouds	
	• Stratiform and cumulus clouds	
	• <b>VISIBILITY</b>	✓
	• Fog, mist and haze	
	• Radiation, advection, frontal	
	• Formation and dispersal	
	• Reduction of visibility due to mist, snow, smoke, dust and sand	
	• Hazards of flight due to low visibility, horizontal and vertical	

<b>3.</b>	<b>THEORETICAL KNOWLEDGE COURSE SYLLABUS</b>	
	<b>3.3 AVIATION METEOROLOGY:</b>	✓
	• <b>AIRMASSES</b>	✓
	• Weather associated with pressure systems	
	• <b>FRONTS</b>	✓
	• Formation of cold and warm fronts	
	• Associated clouds and weather, cold front	
	• <b>ICE ACCRETION</b>	✓
	• Conditions conducive to ice formation	
	• Effects of hoar frost, rime ice, clear ice	
	• Effects of icing on microlight performance	
	• Precautions and avoidance of icing conditions	
	• Powerplant icing	
	• <b>THUNDERSTORMS</b>	✓
	• Formation - airmasses, frontal, orographic	
	• Conditions required	
	• Development process	
	• Recognition of favourable conditions for formation	
	• Hazards	
	• Effects of lightning and severe turbulence	
	• Avoidance of flight in the vicinity of thunderstorms	
	• <b>FLIGHT OVER MOUNTAINOUS AREAS</b>	✓
	• Hazards	
	• Influence of terrain on atmospheric processes	
	• Mountain waves, windshear, turbulence, vertical movement, rotor effects	
	• <b>CLIMATOLOGY</b>	✓
	• General world circulation	
	• South African summer patterns	
	• South African winter patterns	
	• The South Westerly Buster	
	• The Cape Doctor	
	• The Black South Easter	
	• <b>ALTIMETRY</b>	✓
	• Operational aspects of pressure settings	
	• Pressure altitude, density altitude	
	• Height, altitude, flight level	
	• <b>THE METEOROLOGICAL ORGANISATION</b>	✓
	• Forecasting service	
	• <b>WEATHER ANALYSIS AND FORECASTING</b>	✓
	• Weather charts, symbols, signs	
	• Significant weather charts	
	• Prognostic charts for general aviation	
	• <b>WEATHER INFORMATION FOR FLIGHT PLANNING</b>	✓
	• Reports and forecasts for departure, en route, destination and alternate(s)	
	• Interpretation of coded information METAR, TAF	
	• availability of ground reports for surface wind, windshear, visibility	

	• <b>METEOROLOGICAL BROADCASTS FOR AVIATION - ATIS, SIGMET</b>	✓
	• <b>MICRO-METEOROLOGY</b>	✓
	• Rotors	
	• Venturis	
	• Katabatic and Anabatic winds	
	• Thermal activity	
	• Dust devils	
	• The immediate environment.	
	• Wind indicators	
	• Cloud forms	
	• Topography	
	• Dams	
	<b>3.4 AIRCRAFT ENGINES, AIRFRAMES AND INSTRUMENTS:</b>	
	➤ <b>AIRCRAFT AIRFRAME</b>	✓
	• UNDERCARRIAGE	
	• Structure	
	• Materials	
	• Wear and tear considerations	
	• WING	
	○ Structure	
	○ Materials	
	○ Wear and tear considerations	
	▪ Repairs	
	▪ Sail assessment	
	▪ Wind	
	▪ UV	
	▪ Turbulence	
	▪ Hard Landings	
	➤ <b>POWERPLANT AND SYSTEMS</b>	✓
	• Engines – general	
	• principles of 2 and 4 stroke engines	
	• Maintenance	
	○ spark plug replacement	
	○ air-filter cleaning	
	○ cooling system	
	○ V-belt adjustment	
	○ gearbox oil change	
	○ renewing carb rubbers	
	○ adjusting idle	
	○ exhaust springs	
	○ manufacturer maintenance schedule	
	• Lubrication	
	• Ignition systems	
	• Carburetion and Fuel system	
	○ Principles of float type carburettor	
	○ Fuel-bypass (choke)	
	○ Recognition of faulty mixture	
	○ Methods to maintaining correct mixture ratio	

	○ Carburettor jetting and needle and seat inspection	
	○ Balancing carburettors	
	○ Carburettor icing	
	○ Emergency use of Fuel-bypass (choke)	
	● Fuel	
	○ Types	
	○ Suitability	
	○ Hazards of avgas	
	○ Contamination	
	○ Fuel strainers and drains	
	○ Fire hazards	
	○ containers	
	○ transportation	
	○ de-canting	
	● Electrical system	
	○ general	
	○ batteries	
	○ circuit breakers and fuses	
	○ recognizing malfunctions	
	➤ <b>PROPELLER</b>	✓
	● nomenclature	
	● construction, shape and types	
	● forces on blades	
	● designs	
	● effect of blade pitch changes	
	● maintenance and care	
	● tracking	
	➤ <b>INSTRUMENTS</b>	✓
	● Airspeed indicator	
	● Altimeter	
	● VSI	
	● Magnetic compass	
	● Precautions when carrying magnetic objects	
	● Errors	
	● Engine instruments	
	● Temperature and pressure gauges	
	● Digital instruments	
	● RPM	



	<b>3.5 GENERAL NAVIGATION:</b>	✓
	➤ <b>FORM OF THE EARTH</b>	✓
	• Axis, poles	
	• Meridians of longitude	
	• Parallels of latitude	
	➤ <b>DIRECTION</b>	✓
	• True north	
	• Earth's magnetic field, variation – annual change	
	• Magnetic north	
	• Magnetic influences within the microlight	
	• Compass deviation	
	• Turning, acceleration errors	
	• Avoiding magnetic interference with the compass	
	➤ <b>DISTANCE</b>	✓
	• Nautical mile, statute mile, kilometre	
	➤ <b>AERONAUTICAL MAPS AND CHARTS (TOPOGRAPHICAL)</b>	✓
	• Projections and their properties	
	• Scale	
	• ICAO 1:250 000 and 1: 500 000 charts	
	• main properties	
	• Scale	
	• depiction of height	
	• Topography	
	• Relief	
	• Cultural features	
	• Aeronautical symbols	
	• Aeronautical information	
	➤ <b>CHARTS IN PRACTICAL NAVIGATION</b>	✓
	• Plotting positions	
	• Latitude and longitude	
	• Bearing and distance	
	• Use of navigation protractor	
	• Measurement of tracks and distances	
	• Conversion of units	
	• Magnetic north	
	• Magnetic influences within the microlight	
	• Compass deviation	
	• Turning, acceleration errors	
	• Avoiding magnetic interference with the compass	

	➤ <b>PRINCIPLES OF NAVIGATION</b>	✓
	• IAS, RAS (CAS) and TAS	
	• Track, true and magnetic	
	• Wind velocity, heading and ground speed	
	• Triangle of velocities	
	• Calculation of heading and ground speed	
	• Drift, wind correction angle	
	• EET and ETA	
	• Dead reckoning, position, fix	
	➤ <b>FLIGHT PLANNING</b>	✓
	• Selection of charts	
	• Route and aerodrome weather forecasts and reports	
	• Assessing the weather situation	
	• Plotting the route	
	• Considerations of controlled airspace, airspace restrictions, danger areas, etc.	
	• Use of AIP and NOTAMS	
	• ATC liaison procedures in controlled airspace	
	• Fuel considerations	
	• En-route safety altitude(s)	
	• Alternate aerodromes	
	• Communications and radio/navaid frequencies	
	• Compilation of flight log	
	• Compilation of ATC flight plan	
	• Selection of check points, time and distance marks	

	➤ <b>PRACTICAL NAVIGATION</b>	✓
	• Compass headings, use of deviation card	
	• Organisation of in-flight workload	
	• Departure procedure	
	• Maintenance of heading and altitude	
	• Use of visual observations	
	• Establishing position, checkpoints	
	• Revisions to heading and ETA	
	• Arrival procedures, ATC liaison	
	• Use of minute marker graph.	
	➤ <b>GLOBAL POSITIONING SYSTEM (GPS)</b>	✓
	• Limitations	
	• Application	
	• Principles	
	• Presentation and interpretation	
	• Coverage	
	• Errors and accuracy	
	• Factors affecting reliability and accuracy	
	• Legalities	
	<b>3.6 HUMAN PERFORMANCE LIMITATIONS AND PASSENGER CARE:</b>	

	<b>3.6.1 HUMAN PERFORMANCE LIMITATIONS :</b>	✓
	➤ <b>INTRODUCTION</b>	✓
	• Oxygen	
	○ Hypoxia	
	○ Hyperventilation	
	• Barotraumas	
	• Common ailments	
	• Decompression	
	• Air sickness	
	• Hearing	
	• Sight	
	• Toxic hazards	
	• Blood pressure	
	• Epilepsy	
	• Alcohol and drugs	
	• Knowledge and the senses	
	• Disorientation	
	• Avoiding the air proximity	
	• Stress	
	➤ Management of stress	
	• Emotional factors	
	• Social psychology	
	○ The Ego Factor	
	○ Intermediate syndrome	

	<b>3.6.2 PASSENGER CARE:</b>	✓
	➤ <b>Embarking / Disembarking</b>	
	➤ <b>Seatbelt and comfort</b>	
	➤ <b>Briefing</b>	
	• Open cockpit flying	
	• clothing, long hair and security	
	• cameras and loose articles	
	➤ <b>Human performance limitation as applicable to your passenger</b>	
	➤ <b>Eye-contact and communication</b>	
	➤ <b>Air law as applicable to passengers</b>	
	➤ <b>Passenger seat and flying control access</b>	
	➤ <b>Signing of indemnities</b>	

## APPENDIX B - PRACTICAL TRAINING SYLLABUS OF FLIGHT INSTRUCTION FOR WCM

EXERCISE	ITEM DESCRIPTION	WCM
<b><u>Exercise 1</u></b>	<b><u>Familiarisation with the aircraft</u></b>	✓
	➤ Characteristics of the aircraft	
	➤ Cockpit layout	
	➤ Systems	
	➤ Check lists, drills, controls	
<b><u>Exercise 1E</u></b>	<b><u>Emergency drills</u></b>	✓
	➤ Action in the event of fire on the ground and in the air	
	➤ Engine cabin and electrical system fire	
	➤ Systems failure	
	➤ Escape drills, location and use of emergency equipment and exits	
<b><u>Exercise 2</u></b>	<b><u>Preparation for and action after flight</u></b>	✓
	➤ Flight authorisation and aircraft acceptance	
	➤ serviceability documents	
	➤ equipment required, maps, etc.	
	➤ external checks	
	➤ internal checks	
	➤ harness, seat or rudder panel adjustments	
	➤ starting and warm up checks	
	➤ power checks	
	➤ running down system checks and switching off the engine	
	➤ parking, security and picketing (e.g. tie down)	
	➤ completion of authorisation sheet and serviceability documents	
<b><u>Exercise 3</u></b>	<b><u>Air experience</u></b>	✓
	➤ Flight exercise (General)	
	➤ introduce student to Aircraft Type Specific flight	
<b><u>Exercise 3A</u></b>	<b><u>Air experience</u></b>	✓
	➤ Primary effects when laterally level and when banked	
	➤ Secondary effects of power and control bar (pitch and bank)	
	➤ Effects of:	
	• Airspeed	
	• Slipstream	
	• Power	
	• Trimming controls	
	• Other controls, as applicable	
	➤ Operation of:	
	➤ Mixture control (If applicable)	
	➤ Carburettor heat (If applicable)	
	➤ Cabin heating/ventilation (If applicable)	
	➤ Airmanship	

<b><u>Exercise 5</u></b>	<b><u>Taxiing</u></b>	✓
	➤ Pre-taxi checks	
	➤ Starting, control of speed and stopping,	
	➤ Engine handling	
	➤ Control of direction and turning	
	➤ Turning in confined spaces	
	➤ Parking area procedure and precautions	
	➤ Effects of wind and use of flying controls,	
	➤ Effects of ground surface	
	➤ Freedom of rudder movement	
	➤ Marshalling signals	
	➤ Instrument checks	
	➤ Air traffic control procedures	
	➤ Airmanship	
<b><u>Exercise 5E</u></b>	<b><u>Emergencies</u></b>	✓
	➤ Brake and steering failure	
	➤ Taxi Emergencies	
	➤ Engine Emergencies	
<b><u>Exercise 6</u></b>	<b><u>Straight and level</u></b>	✓
	➤ At normal cruising power, attaining and maintaining straight and level flight	
	➤ Flight at critically high airspeeds	
	➤ Demonstration of inherent stability, including recovering from PIO (Pilot Induced Oscillations)	
	➤ Control in pitch, including use of trim	
	➤ Lateral level, direction and balance, trim	
	➤ At selected airspeeds (use of power)	
	➤ During speed and configuration changes	
	➤ Use of instruments for precision	
	➤ Shutting down engine in flight, restarting engine in flight	
	➤ Airmanship	
<b><u>Exercise 7</u></b>	<b><u>Climbing</u></b>	✓
	➤ Entry, maintaining the normal and max rate climb, levelling off	
	➤ Levelling off at selected altitudes	
	➤ En route climb (cruise climb)	
	➤ Recovery to normal climb	
	➤ Maximum angle of climb	
	➤ Use of instruments for precision	
	➤ Airmanship	

<b><u>Exercise 8</u></b>	<b><u>Descending</u></b>	✓
	➤ Entering, maintaining and levelling off	
	➤ Levelling off at selected altitudes	
	➤ Glide, powered and cruise descent (including effect of power and airspeed)	
	➤ Side slipping (Consideration of aircraft limitations)	
	➤ Use of instruments for precision flight	
	➤ Airmanship	
<b><u>Exercise 8</u></b>	<b><u>Side - slips</u></b>	N/A
	➤ Effects of controls in a side slip	
	➤ Principles involved.	
	➤ Types of side slip.	
	➤ How exercise applies to flying	
	➤ Airmanship	
<b><u>Exercise 9</u></b>	<b><u>Turning</u></b>	✓
	➤ Entry and maintaining medium level turns	
	➤ Resuming straight flight	
	➤ Faults in the turn – (in correct pitch, bank, balance), corrections	
	➤ Climbing turns	
	➤ Descending turns	
	➤ Slipping turns (N/A)	
	➤ Turns onto selected headings, use of gyro heading indicator and compass	
	➤ Use of instruments for precision	
	➤ Airmanship	
<b><u>Exercise 9</u></b>	<b><u>Descending and Climbing Turns</u></b>	✓
<b><u>NOTE:</u></b>	Ideally, climbing turns should not exceed 15° bank angles, to optimize rate of climb	
	➤ Entry and maintaining medium descending and climbing turns	
	➤ Resuming straight and level flight	
	➤ Turns onto selected headings, use of gyro heading indicator and compass	
	➤ Use of instruments	
	➤ Airmanship.	

<b>Exercise 10A</b>	<b>Slow flight</b>	✓
<b>NOTE:</b>	The objective is to improve the student's ability to recognise inadvertent flight at critically low speeds and provide practice in maintaining the aeroplane in balance while returning to normal airspeed.	
	➤ 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	
	➤ Airspeed recognition / trim speed	
	➤ Airmanship	
<b>Exercise 10B</b>	<b>Stalling</b>	✓
	➤ Safety checks	
	➤ Symptoms	
	➤ Recognition	
	➤ Clean stall and recovery without power and with power	
	➤ Recovery when a wing drops	
	➤ Approach to stall in the approach to landing, with and without power,	
	➤ Airmanship	
<b>Exercise 11</b>	<b>Spin avoidance/Spinning</b>	N/A
	➤ Safety checks	
	➤ Stalling and recovery at the incipient spin stage (stall with excessive wing drop, about 45°)	
	➤ Instructor induced distractions during the stall	
	➤ Airmanship	
<b>NOTE 1:</b>	➤ <i>At least two hours of stall awareness and spin avoidance flight training shall be completed during the course.</i>	
<b>NOTE 2:</b>	➤ Consideration of manoeuvre limitations and the need to refer to the aeroplane manual and mass and balance calculations.	

<b>Exercise 12</b>	<b><u>Take-off and climb to downwind position</u></b>	✓
	➤ Pre-take-off checks	
	➤ Into wind take-off	
	➤ Safeguarding the nosewheel	
	➤ Crosswind take-off	
	➤ Crosswind	
	➤ Drills during and after take-off	
	➤ Short take-off and soft field procedure/techniques including performance calculations	
	➤ Noise abatement procedures	
	➤ Airmanship	
<b>Exercise 13</b>	<b><u>Circuit, approach and landing</u></b>	✓
	➤ Circuit procedures, downwind, base leg	
	➤ Powered approach and landing	
	➤ Crosswind Landings	
	➤ Crosswind approach techniques	
	➤ Safeguarding the nose wheel	
	➤ effect of wind on approach and touchdown speeds	
	➤ crosswind approach and landing	
	➤ glide approach and landing	
	➤ short landing and soft field procedures/techniques	
	➤ wheel landing (tail wheel aeroplanes/gyroplanes)	
	➤ missed approach/go around	
	➤ noise abatement procedures	
	➤ Airmanship	
<b>Exercise 12/13E</b>	<b><u>Emergencies</u></b>	✓
	➤ aborted take-off	
	➤ engine failure after take-off	
	➤ engine shutdown and restarting in flight	
	➤ go-around	
<b>Exercise 14</b>	<b><u>First solo</u></b>	✓
<b>NOTE:</b>	During flights immediately following the solo circuit consolidation the following should be revised.	
	➤ Instructor's briefing, observation of flight and de-briefing	
	➤ The local area, restrictions, map reading	
	➤ Use of radio aids for homing	
	➤ Turns using magnetic compass, compass errors	
	➤ Airmanship	



<b>Exercise 15</b>	<b><u>Advanced turning</u></b>	✓
	➤ steep turns (45°), level and descending	
	➤ stalling in the turn and recovery	
	➤ recoveries from unusual altitudes, including spiral dives	
	➤ Airmanship	
<b>Exercise 16</b>	<b><u>Forced landing without power</u></b>	✓
	➤ forced landing procedure	
	➤ choice of landing area, provision for change of plan	
	➤ gliding distance	
	➤ descent plan	
	➤ key positions	
	➤ engine cooling	
	➤ engine failure checks	
	➤ use of radio	
	➤ base leg	
	➤ final approach	
	➤ landing	
	➤ forced landing with power	
	➤ actions after landing	
	➤ Airmanship	
<b>Exercise 17A</b>	<b><u>Low level flying</u></b>	✓
	➤ Safety considerations	
	➤ 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	
<b>Exercise 17B</b>	<b><u>Precautionary landing</u></b>	✓
	➤ full procedure away from aerodrome to break-off height	
	➤ occasions necessitating	
	➤ in-flight conditions	
	➤ landing area selection	
	➤ normal aerodrome	
	➤ disused aerodrome	
	➤ ordinary field	
	➤ circuit and approach	
	➤ actions after landing	
	➤ Airmanship	

<b>Exercise 18 A</b>	<b>Navigation</b>	✓
	<ul style="list-style-type: none"> <li>• Flight planning</li> </ul>	
	<ul style="list-style-type: none"> <li>• weather forecast and actuals</li> </ul>	
	<ul style="list-style-type: none"> <li>• map selection and preparation</li> </ul>	
	<ul style="list-style-type: none"> <li>- choice of route</li> </ul>	
	<ul style="list-style-type: none"> <li>- controlled airspace</li> </ul>	
	<ul style="list-style-type: none"> <li>- danger, prohibited and restricted areas</li> </ul>	
	<ul style="list-style-type: none"> <li>- safety altitudes</li> </ul>	
	<ul style="list-style-type: none"> <li>• calculations</li> </ul>	
	<ul style="list-style-type: none"> <li>- magnetic heading(s) and time(s) en route</li> </ul>	
	<ul style="list-style-type: none"> <li>- fuel consumption</li> </ul>	
	<ul style="list-style-type: none"> <li>- mass and balance</li> </ul>	
	<ul style="list-style-type: none"> <li>- mass and performance</li> </ul>	
	<ul style="list-style-type: none"> <li>- flight information</li> </ul>	
	<ul style="list-style-type: none"> <li>- NOTAMS etc.</li> </ul>	
	<ul style="list-style-type: none"> <li>- Radio frequencies</li> </ul>	
	<ul style="list-style-type: none"> <li>- Selection of alternate aerodromes</li> </ul>	
	<ul style="list-style-type: none"> <li>• Aeroplane documentation</li> </ul>	
	<ul style="list-style-type: none"> <li>• Notification of the flight</li> </ul>	
	<ul style="list-style-type: none"> <li>- pre-flight administrative procedures</li> </ul>	
	<ul style="list-style-type: none"> <li>- Flight plan form</li> </ul>	
	<ul style="list-style-type: none"> <li>• Departure</li> </ul>	
	<ul style="list-style-type: none"> <li>• organisation of cockpit workload</li> </ul>	
	<ul style="list-style-type: none"> <li>• departure procedures</li> </ul>	
	<ul style="list-style-type: none"> <li>- altimeter settings</li> </ul>	
	<ul style="list-style-type: none"> <li>- ATC liaison in controlled/regulated airspace</li> </ul>	
	<ul style="list-style-type: none"> <li>- setting heading procedure</li> </ul>	
	<ul style="list-style-type: none"> <li>- noting of ETAs</li> </ul>	
	<ul style="list-style-type: none"> <li>• maintenance of altitude and heading</li> </ul>	
	<ul style="list-style-type: none"> <li>• revisions of ETA and heading</li> </ul>	
	<ul style="list-style-type: none"> <li>• log keeping</li> </ul>	
	<ul style="list-style-type: none"> <li>• use of radio</li> </ul>	
	<ul style="list-style-type: none"> <li>• use of nav aids</li> </ul>	
	<ul style="list-style-type: none"> <li>• minimum weather conditions for continuation of flight</li> </ul>	
	<ul style="list-style-type: none"> <li>• in-flight decisions</li> </ul>	

<b>Exercise 18 A</b>	<b><u>Navigation problems at lower levels and in reduced visibility</u></b>	✓
	• transiting controlled/regulated airspace	
	• diversion procedures	
	• uncertainty of position procedure	
	• lost procedure	
	• Arrival, aerodrome joining procedure	
	• ATC liaison in controlled/regulated airspace	
	• altimeter setting	
	• entering the traffic pattern	
	• circuit procedures	
	• parking	
	• security of aeroplane/aircraft	
	• refuelling	
	• closing of flight plan, if appropriate	
	• post-flight administrative procedures	
<b>Exercise 18 B</b>	<b><u>Navigation problems at lower levels and in reduced visibility</u></b>	✓
	• actions prior to descending	
	• hazards (e.g. obstacles, and terrain)	
	• difficulties of map reading	
	• effects of wind and turbulence	
	• vertical situational awareness (avoidance of controlled flight into terrain)	
	• avoidance of noise sensitive areas	
	• Joining the circuit	
	• bad weather circuit and landing	
<b>Exercise 18C</b>	<b><u>Navigation (Other)</u></b>	✓
	➤ Navigation with GPS	
	➤ Navigation with Efix	
<b>Exercise 19</b>	<b><u>Basic instrument flight</u></b>	
	(Not applicable to NPL training)	

## APPENDIX C – THEORETICAL TRAINING SYLLABUS FOR WCM INSTRUCTORS

1.	<b>1. AIM OF TRAINING COURSE</b>	✓
	The aim of the course is to train a candidate to the level of proficiency required for the issue of a Grade C national flight instructors rating in the category Weight-shift Controlled Microlight Aeroplanes(WCM).	
2.	<b>THEORETICAL KNOWLEDGE COURSE</b>	✓
	Restricted Radio Telephony Operator's Certificate as prescribed in AIC 30.9	
3	<b>THEORETICAL KNOWLEDGE COURSE SYLLABUS</b>	✓
3	<b>General</b>	
3.1	<b>PHYSICS AND MECHANICS</b>	✓
	(a) Speed, velocity, force	
	(b) Pressure – Bernoulli's Principle	
	(c) Motion of body along a curved path	
	Note: The student must have a good understanding of the speed squared law as applicable to Lift with specific reference to gusts and lulls, and their effect on your flight path.	
3.2	<b>AEROFOILS, LIFT AND DRAG</b>	✓
	(a) Air resistance and air density	
	(b) Aerofoil shapes	
	(c) Lift and drag – Angle of attack and airspeed	
	(d) Distribution of lift, Centre of pressure	
	(e) Drag – Induced, parasite – Form, skin, interference	
	(f) Lift/drag ratio and aspect ratio	
	(g) Wake turbulence	
3.3	<b>EQUILIBRIUM</b>	✓
	(a) The four forces: Lift, weight, thrust and drag	
	(b) Centre of gravity (C of G) position	
	(c) The balance of the four forces: Straight and level	
	i. Climbing	
	ii. Descending	
3.4	<b>STABILITY</b>	✓
	(a) Positive, neutral, negative	
	(b) Lateral and directional stability	
	(c) Longitudinal stability	
	(d) Wash-out	
3.5	<b>LOOSE FORMATION/ GROUP FLYING</b>	✓
	(a) Law Governing	
	(b) Procedures and hazards	
3.6	<b>TURNING FLIGHT</b>	✓
	(a) The forces in the turn	
	(b) Compensation for loss of lift	
3.7	<b>THE STALL</b>	✓
	(a) Airflow separation	
	(b) Stalling angle – Relationship to airspeed	
	(c) Wing loading	
	(d) Wing loading increase with bank angle increase	
	(e) High-speed stall	
	(f) Whip Stall	

<b>3.8</b>	<b>AIRCRAFT PERFORMANCE</b>	✓
	(a) Power curves	
	- Effect of temperature, altitude, density, moisture etc.	
	- Range and endurance	
	(b) Climbing performance	
	- Rate of climb	
	- Angle of climb	
	(c) - Take-off and landing performance	
	- Take-off run available	
	- Take-off distance available	
	- Landing distance available	
	(d) Take-off and initial climb - performance	
	Effect of –	
	- Wind, wind gradient and wind shear	
	- Weight	
	- Pressure, altitude, temperature and density	
	- Ground surface and gradient	
	(e) Approach and landing – performance	
	Effect of –	
	- Wind, wind gradient and wind shear	
	- Weight	
	- Turbulence and gusts	
	- Ground effect	
<b>4</b>	<b>PRINCIPLES OF FLIGHT</b>	✓
<b>4.1</b>	<b>FLYING CONTROLS</b>	✓
	(a) The three axes: Vertical, Lateral, Longitudinal	
	Yaw, Pitch, Roll	
	(b) Operation and function throttle and control bar	
	(c) Principles and purpose of mass and aerodynamic balance	
	(d) Operation and purpose of trimming controls	
<b>4.2</b>	<b>WEIGHT AND BALANCE</b>	✓
	(a) Limitations on aircraft weight	
	(b) Limitations in relation to aircraft balance	
	(c) Weight and centre of gravity calculations	
<b>4.3</b>	<b>THE SPIN</b>	N/A
	(a) Causes of a spin	
	(b) Autorotation	
	(c) Effect of the C of G on spinning characteristics	
<b>4.4</b>	<b>PERFORMANCE</b>	✓
	(a) take off and initial climb performance	
	(b) approach and landing performance – effect of use of flaps	
<b>4.5</b>	<b>STABILITY</b>	✓
	(a) Relationship of C of G to control in pitch	
<b>4.6</b>	<b>LOAD FACTOR AND MANOEUVRES</b>	✓
	(a) Definition of load factor – Vn envelope	
	(b) Effect on stalling speed	
	(c) In-flight precautions	

<b>5</b>	<b>Air Law</b>	✓
	(1) Applicable acts, regulations and other documents	
	(2) Structure and function of CAR's, CATS AIP's, Notams, AIC's and AIP supplements.	
	(3) Classification of aircraft	
	(4) Aircraft documentation	
	(5) Aircraft equipment	
	(6) Aircraft radio equipment	
	(7) Aircraft weight schedule	
	(8) Documents to be carried on board	
	(9) Documents and records to be maintained and produced on request	
	(10) Offences in relating to documents and records	
	(11) Airworthiness aspects	
	(12) Flight crew licensing	
	(13) NPL - Privileges and limitations	
	(14) NPL aeroplane ratings and categories	
	(15) Personal flying logbook	
	(16) Airspace classification	
	(17) General flight rules	
	(18) Visual flight rules	
	(19) Special flight rules	
	(20) Flight operations	
	(21) General provisions	
	(22) Air traffic services	
	(23) Flight plans	
	(24) Air-proximity reporting procedures	
	(25) Incident/accident reporting	
	(26) International operations	
	(27) Operation of Non-type certified aircraft	
	(28) Marine living resources act and Proclaimed nature reserves	
<b>6</b>	<b>AVIATION METEOROLOGY</b>	✓
<b>6.1</b>	<b>THE ATMOSPHERE</b>	✓
	(a) Composition and structure	
	(b) Vertical divisions	
<b>6.2</b>	<b>PRESSURE, DENSITY AND TEMPERATURE</b>	✓
	(a) Barometric pressure, isobars	
	(b) Changes of pressure, density and temperature with altitude	
	(c) Solar and terrestrial energy radiation, temperature	
	(d) Lapse rate	
	(e) Stability and instability	
	(f) Effects of radiation, advection subsidence and convergence	
<b>6.3</b>	<b>HUMIDITY AND PRECIPITATION</b>	✓
	(a) Water vapour in the atmosphere	
	(b) Dew point and relative humidity	
<b>6.4</b>	<b>PRESSURE AND WIND</b>	✓
	(a) High- and low-pressure areas	
	(b) Gradient wind	
	(c) Vertical and horizontal motion	
	(d) Effect of wind gradient and windshear on take-off and landing	
	(e) Relationship between isobars and wind, Buys Ballot's law	
	(f) Turbulence and gustiness	
	(g) Local winds, land and sea breezes, berg winds, valley winds	
<b>6.5</b>	<b>CLOUD FORMATION</b>	✓
	(a) Cloud types	
	(b) Convection clouds	
	(c) Orographic clouds	
	(d) Stratiform and cumulus clouds	

<b>6.6</b>	<b>VISIBILITY</b>	✓
	(a) Fog, mist and haze	
	(b) Radiation, advection, frontal	
	(c) Formation and dispersal	
	(d) Reduction of visibility due to mist, snow, smoke, dust and sand	
	(e) Hazards of flight due to low visibility, horizontal and vertical	
<b>6.7</b>	<b>AIRMASSES</b>	✓
	(a) Weather associated with pressure systems	
<b>6.8</b>	<b>FRONTS</b>	✓
	(a) Formation of cold and warm fronts	
	(b) Associated clouds and weather, cold front	
<b>6.9</b>	<b>ICE ACCRETION</b>	✓
	(a) Conditions conducive to ice formation	
	(b) Effects of hoar frost, rime ice, clear ice	
	(c) Effects of icing on microlight performance	
	(d) Precautions and avoidance of icing conditions	
	(e) Powerplant icing	
<b>6.10</b>	<b>THUNDERSTORMS</b>	✓
	(a) Formation of airmasses, frontal, orographic	
	(b) Conditions required	
	(c) Development process	
	(d) Recognition of favourable conditions for formation	
	(e) Hazards	
	(f) Effects of lightning and severe turbulence	
	(g) Avoidance of flight in the vicinity of thunderstorms	
<b>6.11</b>	<b>FLIGHT OVER MOUNTAINOUS AREAS</b>	✓
	(a) Hazards	
	(b) Influence of terrain on atmospheric processes	
	(c) Mountain waves, windshear, turbulence, vertical movement, rotor effects	
<b>6.12</b>	<b>CLIMATOLOGY</b>	✓
	(a) General world circulation	
	(b) South African summer patterns	
	(c) South African winter patterns	
	(d) The South Westerly Buster	
	(e) The Cape Doctor	
	(f) The Black South Easter	
<b>6.13</b>	<b>ALTIMETRY</b>	✓
	(a) Operational aspects of pressure settings	
	(b) Pressure altitude, density altitude	
	(c) Height, altitude, flight level	
<b>6.14</b>	<b>THE METEOROLOGICAL ORGANISATION</b>	✓
	(a) Forecasting service	
<b>6.15</b>	<b>WEATHER ANALYSIS AND FORECASTING</b>	✓
	(a) Weather charts, symbols, signs	
	(b) Significant weather charts	
	(c) Prognostic charts for general aviation	
<b>6.16</b>	<b>WEATHER INFORMATION FOR FLIGHT PLANNING</b>	✓
	(a) Reports and forecasts for departure, <i>en route</i> , destination and alternate(s)	
	(b) Interpretation of coded information METAR, TAF	
	(c) availability of ground reports for surface wind, windshear, visibility	

<b>6.17</b>	<b>METEOROLOGICAL BROADCASTS FOR AVIATION</b>	✓
	ATIS, SIGMET	
	(18) MICRO-METEOROLOGY	
	(a) Rotors	
	(b) Venturies	
	(c) Katabatic and Anabatic winds	
	(d) Thermal activity	
	(e) Dust devils	
	(f) The immediate environment.	
	1. Wind indicators	
	2. Cloud forms	
	3. Topography	
<b>7</b>	<b>AIRCRAFT ENGINES, AIRFRAMES AND INSTRUMENTS</b>	✓
<b>7.1</b>	<b>AIRCRAFT AIRFRAME</b>	✓
	(a) Structure	
	(b) Materials (Steel, composite, dacron, aluminium, Stainless, Mylar, Carbon etc)	
	(c) Wear and tear considerations	
	- Repairs	
	- Sail assessment	
	- Wind	
	- UV	
	- Turbulence	
	- Hard Landings	
	- Causes of wear (vibration. Corrosion, UV, Turbulence, Hard landings, trairling)	
	- Suspension (Types eg. Steel, shocks, bungees, composite)	
	- Wheels and tires	
<b>7.1</b>	<b>POWERPLANT AND SYSTEMS</b>	✓
	(a) Engines –	
	The 4 stroke engines	
	- The principal of operation of the four-stroke engine.	
	- Operation of the inlet and exhaust valves	
	- The four-stroke Engine	
	- The principal of operation of the four-stroke engine.	
	- Operation of the inlet and exhaust valves.	
	- The crankshaft and connecting rod.	
	- Piston and piston rings.	
	- Cylinders.	
	- Arrangement of cylinders.	
	- Cylinder head.	
	The 2-stroke Engine	
	- The construction of the 2-stroke engine.	
	- The operation of the 2-stroke engine and the 2-stroke cycle.	
	- The operation of the rotary valve. (Rotax 582, 618).	



	The fuel system.	
	- The operation of the carburettor.	
	- The float and float chamber.	
	- The main jet.	
	- The idle jet.	
	- The power jet.	
	- The choke system.	
	- The throttle control.	
	- The fuel filter.	
	- The water trap.	
	- The air filter.	
	- Maintenance of the carburettor.	
	- The operation of the constant-vacuum carburettor.(As per Rotax 912)	
	- The operation of the piston-type carburettor.(As per Rotax 503, 582, 618)	
	The cooling system	
	- The operating principle of the cooling system.	
	- Coolants (glycol based), anti freeze.	
	- The water pump, operating principle and the tell-tail hole.	
	- The pressure cap, operating principle.	
	- The thermostat, operating principle.	
	- Operating temperature, problems associated with engine operatingtemperature too hot and too cold.	
	- The radiator, operating principle.	
	- The radiator overflow-header tank, operating principle.	
	- The air-cooled engine operating principle.	
	- The fan and fan belt.	
	- Service intervals and preventative maintenance.	
	The exhaust system	
	- The function and operation of the exhaust, muffler, after-muffler.	
	- Back pressure and its importance to the 2-stroke engine.	
	- De-coking and carbon build-up, when to de-coke, 2-stroke engines.	
	- Exhaust springs, locking wire, copper slip.	
	- Checking for cracks and security of system.	
	- Exhaust temperature min/max, operational.	
	- The principle of carburettor heat and the exhaust.	
	- The vibration mounting, engine and exhaust	
	- Causes of vibration and types of vibration.	
	- The purpose of the vibration mounting.	
	The Fuel System	
	- Fuel storage	
	- Water contamination.	
	- Dirt contamination.	
	- Aircraft fuel tanks	

	Types of fuel	
	- Octane number.	
	- Avgas.	
	- Types	
	- Suitability	
	- Hazards of avgas	
	- Contamination	
	- Fuel strainers and drains	
	- Fire hazards	
	- containers	
	- transportation	
	- de-canting	
	Two-stroke oil	
	- Outboard oil	
	- Mixing ratios.	
	Fuel hose and fittings	
	- The fuel hose.	
	- Braided fuel hose.	
	- Hose clamps.	
	- Rooting of fuel hose.	
	Aircraft fuel tanks	
	- Water trap position and operation.	
	- Fuel tank caps and breathers.	
	- Fuel cocks, and reserve fuel tanks.	
	Fuel pumps, their construction and operation	
	- Fuel pressure.	
	- The electrical fuel pump.	
	- The vacuum pump.	
	- The hand-primer fuel pump.	
	- the combination of vacuum and electric fuel pumps.	
	Layout of the complete fuel system	
	- Carburettor.	
	- Fuel filters.	
	- Fuel water trap.	
	- Fuel hosing.	
	- Fuel taps/reserve.	
	- Fuel tanks and breather systems.	
	Carburettor icing	
	- Theory of carburettor icing.	
	- Weather conditions conducive to carburettor icing.	
	- Preventing carburettor icing.	
	- Warning signs of carburettor icing.	

	Service schedules and intervals	
	- Air filter.	
	- Fuel filter.	
	- Cables and connecting linkages.	
	- Carburettor flange/to inlet manifold.	
	The oil lubrication system	
	- The qualities of oil, engine oil, gear oil, 2-stroke oil.	
	- Types: mineral and synthetic oils.	
	- Oil grades and viscosity's.	
	- The four functions of oil.	
	- The operation of the lubrication system of the 2-stroke engine.	
	- The operation of the lubrication system of the 4-stroke engine.	
	- The operation of oil pressure relief valve, oil pressure min/max 4-stroke engine.	
	- The oil pressure pump operation, 4-stroke engine.	
	- The oil filter operation, 4-stroke engine.	
	- The oil filter checking for contamination, 4-stroke engine.	
	- The automatic oil lubrication system, 2-stroke engine.	
	- Mixing of 2-stroke oil.	
	- Differences between wet and dry oil sump, 4-stroke engine.	
	- Oil and oil filter change schedules, 4-stroke engine.	
	- Oil temperature, min/max, warm up, operating temperature.	
	- Testing of water contamination, 2- and 4-stroke engines.	
	Electrical system	
	- general	
	- batteries	
	- circuit breakers and fuses	
	- recognizing malfunctions	
	- The battery basic principle of operation.	
	- Battery maintenance.	
	- The operating principle of the starter motor.	
	- The rectifier regulator, operating principle.	
	- The charging circuit.	
	- The spark plug, types of spark plug hot/cold, long/short reach, electrode/gap setting, colour of electrodes, engine operating conditions (rich/lean, amount of oil), problems associated with spark plugs, plug caps, high tension cables.	
	- The ignition circuit dual and single CDI (capacitor discharge ignition).	
	- Points, condenser.	
	- Fuses (correct fuses), values.	
	- The earth straps and connections.	
	- Preventative maintenance.	
	- Service intervals.	

	<b>The gear box and reduction gear</b>	
	- Types of gear box and construction.	
	- The operating principle of the gear box.	
	- Engine-to-gear box coupling	
	- The slipper clutch, 4-stroke engine (Rotax 912/914).	
	Locking Wire	
	- The correct locking-wire procedures.	
	- Parts on the engine to be secured with locking wire.	
<b>7.2</b>	<b>PROPELLER</b>	✓
	- The operational principle of the propeller	
	- Types of propeller: pusher, tractor.	
	- Fixed pitch, ground adjustable, in-flight adjustable	
	- Forces on blades	
	- The effects of incorrect pitch setting, out of balance, engine rpm	
	- Tracking and its effects if adjustment is incorrect	
	- Designs	
	- Effect of blade pitch changes	
	- Maintenance and care	
<b>7.3</b>	<b>INSTRUMENTS</b>	✓
	(a) Airspeed indicator	
	(b) Altimeter	
	(c) VSI	
	(d) Magnetic compass	
	- Precautions when carrying magnetic objects	
	- Errors	
	(e) Engine instruments	
	(f) Temperature and pressure gauges	
	(g) Digital instruments	
	(h) RPM	
<b>8</b>	<b>General Navigation</b>	✓
<b>8.1</b>	<b>FORM OF THE EARTH</b>	✓
	(a) Axis, poles	
	(b) Meridians of longitude	
	(c) Parallels of latitude	
<b>8.2</b>	<b>DIRECTION</b>	✓
	(a) True north	
	(b) Earth's magnetic field, variation & annual change	
	(c) Magnetic north	
	(d) Magnetic influences within the microlight	
	(e) Compass deviation	
	(f) Turning, acceleration errors	
	(g) Avoiding magnetic interference with the compass	
<b>8.3</b>	<b>DISTANCE</b>	✓
	(a) Nautical mile, statute mile, kilometre	

<b>8.4</b>	<b>AERONAUTICAL MAPS AND CHARTS (TOPOGRAPHICAL)</b>	✓
	(a) Projections and their properties	
	(b) Scale	
	(c) ICAO 1:250 000 and 1: 500 000 charts	
	(d) main properties	
	(e) Scale	
	(f) depiction of height	
	(g) Topography	
	(h) Relief	
	(i) Cultural features	
	(j) Aeronautical symbols	
	(k) Aeronautical information	
<b>8.5</b>	<b>CHARTS IN PRACTICAL NAVIGATION</b>	✓
	(a) Plotting positions	
	(b) Latitude and longitude	
	(c) Bearing and distance	
	(d) Use of navigation protractor	
	(e) Measurement of tracks and distances	
	(f) Conversion of units	
<b>8.6</b>	<b>PRINCIPLES OF NAVIGATION</b>	✓
	(a) IAS, RAS (CAS) and TAS	
	(b) Track, true and magnetic	
	(c) Wind velocity, heading and ground speed	
	(d) Triangle of velocities	
	(e) Calculation of heading and ground speed	
	(f) Drift, wind correction angle	
	(g) EET and ETA	
	(h) Dead reckoning, position, fix	
<b>8.7</b>	<b>FLIGHT PLANNING</b>	✓
	(a) Selection of charts	
	(b) Route and aerodrome weather forecasts and reports	
	(c) Assessing the weather situation	
	(d) Plotting the route	
	(e) Considerations of controlled airspace, airspace restrictions, danger areas, etc.	
	(f) Use of AIP and NOTAMS	
	(g) ATC liaison procedures in controlled airspace	
	(h) Fuel considerations	
	(i) <i>En-route</i> safety altitude(s)	
	(j) Alternate aerodromes	
	(k) Communications and radio/navaid frequencies	
	(l) Compilation of flight log	
	(m) Compilation of ATC flight plan	
	(n) Selection of check points, time and distance marks	

<b>8.8</b>	<b>PRACTICAL NAVIGATION</b>	✓
	(a) Compass headings, use of deviation card	
	(b) Organisation of in-flight workload	
	(c) Departure procedure	
	(d) Maintenance of heading and altitude	
	(e) Use of visual observations	
	(f) Establishing position, checkpoints	
	(g) Revisions to heading and ETA	
	(h) Arrival procedures, ATC liaison	
	(i) Use of minute marker graph.	
<b>8.9</b>	<b>GLOBAL POSITIONING SYSTEM (GPS)</b>	✓
	(a) Limitations	
	(b) Application	
	(c) Principles	
	(d) Presentation and interpretation	
	(e) Coverage	
	(f) Errors and accuracy	
	(g) Factors affecting reliability and accuracy	
	(h) Legalities	
<b>9</b>	<b>HUMAN PERFORMANCE LIMITATIONS AND PASSENGER CARE</b>	✓
<b>9.1</b>	<b>HUMAN PERFORMANCE LIMITATIONS</b>	✓
	(1) Introduction – Basic physiology	
	(2) Oxygen	
	(a) Hypoxia	
	(b) Hyperventilation	
	(3) Barotraumas	
	(4) Common ailments	
	(5) Decompression	
	(6) Air sickness	
	(7) Hearing	
	(8) Vision	
	(9) Toxic hazards	
	(10) Blood pressure	
	(11) Epilepsy	
	(12) Alcohol and drugs	
	(13) Knowledge and the senses	
	(14) Disorientation	
	(15) Avoiding the air proximity	
	(16) Stress	
	(18) Management of stress	
	(19) Emotional factors	
	(20) Social psychology and Emotional factors	
	(a) The Ego Factor	
	(b) Intermediate syndrome	
	(c) family and work-related problems	
	(d) Recognizing potential problems in your passenger	

<b>9.2</b>	<b>PASSENGER CARE</b>	✓
	(1) Embarking / Disembarking	
	(2) Seatbelt and comfort	
	(3) Briefing	
	(a) Open cockpit flying	
	(b) clothing, long hair and security	
	(c) cameras and loose articles	
	(4) Human performance limitation as applicable to your passenger	
	(5) Eye-contact and communication	
	(6) Air law as applicable to passengers	
	(7) Passenger seat and flying control access	
	(8) Signing of indemnities	
<b>10</b>	<b>PRINCIPLES OF FLIGHT INSTRUCTION</b>	✓
	(1) The learning Process	
	(a) Characteristics of Learning	
	(b) The Principles of Learning	
	(c) Perception and Insight	
	(d) Memory	
	(e) Forgetting and Retention	
	(f) Transfer of Learning	
	(g) Levels of Learning	
	(h) Domains of Learning	
	(i) Learning skills and Learning curve	
	(2) Barriers to learning	
	(a) Self-concepts	
	(b) Defence mechanisms	
	(c) Stress and Anxiety	
	(d) The overconfident and impatient student	
	(3) Human behaviour and effective communication	
	(a) Human needs	
	(b) Motivation	
	(c) Effective communication	
	(d) Barriers to effective communication	
	(e) Instructor responsibilities	
	(f) Instructor professionalism	
	(4) Teaching Methods	
	(a) Lecture Method	
	(b) Co-operative of Group Learning Method	
	(c) Guided Discussion Method	
	(d) Demonstration / Performance Method	
	(e) Computer based Training Method	
	(f) Integrated Method of Flight Instruction	
	(g) The Positive approach to Flight Instruction	
	(5) Planning Instructional Activity	
	(a) Course development	
	(b) Organization of material	
	(c) Lesson Plan	
	(d) Instructional Aids	
	(6) Critique and Evaluation	
	(a) The Instructor's Critique	
	(b) Types of Testing	
	(c) Oral Quizzing	
	(d) Types of Written Test Questions	
	(e) Characteristics of a Good Test	
	(f) Review and Evaluation	

11	<b>TECHNIQUES OF INSTRUCTION</b>	✓
	<b>(1) Practical lesson planning</b>	✓
	(a) assessing student	
	(b) progressive practical skills planning	
	(c) assessing weather	
	<b>(2) Familiarization with the practical training course for national pilots licence</b>	✓
	(a) lesson codes	
	(b) familiarisation with lessons	
	(c) goals for each lesson	
	<b>(3) Techniques</b>	✓
	(a) Pre-empting known problem areas	
	(b) Eye height memory	
	(c) Teaching multi-tasking	
	(d) Handing over control	
	(e) Showing and doing technique	
	(4) Common problems in the training environment	
	(a) Identifying the formation of bad habits	
	(b) Repetition of mistakes	
	(c) Attitude problems	
	(d) Reckless behaviour	
	(e) Personality clashes	



## APPENDIX D – PRACTICAL TRAINING SYLLABUS FOR WCM INSTRUCTORS

<b>1</b>	<b>ADMINISTRATION</b>	✓
	(1) Student training files	
	(2) Progress reports	
	(3) Logbooks	
	a. Student log book	
	b. Aircraft log book	
	c. Instructor log book	
	(4) Authorization sheets	
	(5) Application forms	
	(6) Medicals	
	(7) Maintenance of Instructor personal training file	
	(8) The filing, use and format of legislation, AIPs, AIP amendments, AIC's, Notams and other relevant documents.	
<b>2</b>	<b>GROUND SCHOOL</b>	✓
	(1) Instructional aids	
	(2) Textbooks	
	(3) Additional notes	
	(4) Reference library	
	(5) Lecture methods and preparation	
	(6) Lecture schedules	
	(7) Student briefings	
	a. Pre-flight briefing	
	b. Post-flight briefing	
	c. Preparation for exams	
	d. After exams	
<b>3</b>	<b>PATTER FLYING (WEIGHT-SHIFT CONTROLLED MICROLIGHT AEROPLANES)</b>	✓
	<i>In the case of a Grade C national flight instructor rating (weight-shift controlled microlight aeroplanes), patter training to include the following exercises. All the patter flying will be with a Grade A instructor.</i>	
	<b>EXERCISE 1: FAMILIARISATION WITH THE AIRCRAFT</b>	✓
	<b>Aim:</b> To become familiar with the component parts, controls and system of the aeroplane.	
	(1) characteristics of the aircraft	
	(2) cockpit layout	
	(3) systems	
	(4) check lists, drills, controls	
	<b>EXERCISE 1 E: EMERGENCY DRILLS</b>	✓
	<b>EXERCISE 1 E: ACTION IN EVENT OF FIRE</b>	✓
	<b>Aim:</b> Fire is extremely rare in modern microlight aeroplanes but it is essential that a pilot has a thorough knowledge of the procedures to be adopted in his or her particular type of aeroplane in order to extinguish a fire both on the ground and in the air.	
	(1) Identification of fire	
	(2) Isolation / extinguishing of fire	
	(3) Flight procedures / emergency actions	
	(4) Airmanship	

	<b>EXERCISE 1 E: RESTARTING THE ENGINE IN FLIGHT</b>	✓
	<b>Aim:</b> Engines could, at some time or another, stop whilst in flight. It is important that the candidate must show exceptional presence of mind in this situation, and be able to either take over from his student immediately, or guide him through it.	
	<b>Note:</b> This exercise only to be attempted within easy glide of the training airfield and to be treated as a simulated emergency until the engine is successfully re-started.	
	(1) Engine failure checks	
	(2) Engine restart procedures	
	(3) Airmanship	
	<b>EXERCISE 2: PREPARATION FOR, AND ACTION AFTER FLIGHT</b>	✓
	<b>Aim:</b> To explain how to prepare the aircraft and pilot for flight, and how to leave the aircraft after flight.	
	(1) Flight authorisation and aeroplane acceptance	
	(2) Serviceability documents	
	(3) Required equipment, maps, etc.	
	(4) External checks	
	(5) Internal checks	
	(6) Seat, harness and controls adjustment	
	(7) Starting and warming-up checks including safety, people, animals, aircraft and air law	
	(8) Power checks	
	(9) Action in the event of being blown over	
	(10) Running down and switching off of engine	
	(11) Parking, security and picketing; and	
	(12) Completion of authorisation and flight folio sheets	
	(13) Ground handling	
	(14) Assessing student, communication and explanation of each aspect	
	<b>EXERCISE 4 : EFFECT OF CONTROLS</b>	✓
	<b>Aim:</b> To explain and demonstrate how each control affects the aircraft in flight.	
	(1) Methods of assessing aircraft attitude	
	(2) Primary effects when laterally level and when banked;	
	(3) Further effects of power and control bar	
	(a) airspeed	
	(b) slipstream	
	(c) power changes	
	(d) trimming of controls	
	(e) other control effects, as applicable (billow shift etc)	
	(4) Use of engine controls	
	(5) How much control to hand over to the student and when,	
	(6) How to get full control back from the student – action in the event of a student locking on controls.	
	(7) Typical errors to expect during type conversions.	
	(8) Airmanship	

<b>EXERCISE 5 : TAXIING</b>	✓
<b>Aim:</b> To safely control the aeroplane while manoeuvring on the ground in different wind conditions and on different surfaces.	
(1) Pre-taxi checks	
(2) Starting, control of speed, and stopping	
(3) Engine handling	
(4) Control of direction and turns	
(5) Turns in confined spaces	
(6) Tail-wheel considerations (if applicable)	N/A
(7) Parking area procedure and precautions	
(8) Effects of wind and use of flying controls	
(9) Effects of ground surface	
(10) Freedom of rudder movement	N/A
(11) Marshalling signals	
(12) Instrument checks	
(13) Air traffic control procedures	
(15) Emergencies (brake and steering failure)	
(16) Typical problems with student co-ordination	
(17) What to expect from a student during type conversion.	
(18) Airmanship	
<b>EXERCISE 6A : STRAIGHT AND LEVEL FLIGHT</b>	✓
<b>Aim:</b> 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) Demonstration of inherent stability	
(3) Control in pitch, including use of trim	
(4) Lateral level, direction and balance, trim	
(5) At selected airspeeds (use of power)	
(6) During speed and configuration changes	
(7) Use of instruments.	
(8) Typical student problems and how to address them.	
(9) Airmanship	
<b>EXERCISE 6B: ADVANCED - LOOSE FORMATION / GROUP FLYING</b>	✓
<b>Aim:</b> to safely fly in loose formation with other aircraft and know safe landing and taking off procedures	
(1) Positioning in front, behind or alongside other aircraft	
(2) Taking off and landing considerations	
(3) Turning	
(4) Wake turbulence	
(5) Awareness of other aircraft	
(6) Blind spots	
(7) Manoeuvres in front of other aircraft and their effect	
(8) Radio work	
(9) Common perception errors of students and how to rectify it.	
<b>EXERCISE 7 : CLIMBING</b>	✓
<b>Aim:</b> To enter and maintain a steady full-power climb and then return to level flight at a predetermined altitude, and to enter and maintain a steady cruise-climb.	
(1) Entry, maintaining the normal and maximum rate climb and levelling off	
(2) Levelling off at selected altitudes	
(3) <i>En-route</i> (cruise) climb	
(4) Maximum angle of climb	
(5) Use of instruments	
(6) Typical student problems and how to address it.	
(7) Airmanship	

<b>EXERCISE 8 : DESCENDING</b>	✓
<b>Aim:</b> To enter and maintain a steady glide-descent and then, at a predetermined altitude, to return to level flight or to climb, and to enter and maintain a steady cruise descent.	✓
(1) Entry, maintaining and levelling off	
(2) Levelling off at selected altitudes	
(3) Glide, powered and cruise descent (including effect of power and airspeed)	
(4) Use of instruments for precision	
(5) Side-slipping	
(6) Typical student reactions and problems	
(7) Airmanship	
<b>EXERCISE 8: SIDE-SLIPPING</b>	N/A
<b>Aim:</b> The learner should be shown and become convinced of the effect of side-slipping on the relationship between heading and ground path. How this out-of-balance manoeuvre can be used to increase the rate of descent for a given airspeed and its usefulness in crosswind landings. (While the learner is learning how to use the controls during a side-slip, the exercise should be performed at altitude.)	
(1) Effects of controls in a side-slip	
(2) Principles involved	
(3) Types of side-slips	
(4) How exercise applies to flying	
(5) Common reactions and errors of students and how to rectify it	
(6) Airmanship	
<b>EXERCISE 9: MEDIUM TURNS</b>	✓
<b>Aim:</b> To enter and maintain a medium (up to approximately 30° bank angle) turn whilst maintaining level flight and then to return to straight and level flight on a new predetermined heading.	✓
(1) Entry and maintaining medium level turns	
(2) Resuming straight and level flight	
(3) Faults in the turn – balance	
(4) Turns onto selected headings, use of gps and compass (if applicable)	
(5) Use of instruments	
(6) Addressing typical student errors	
(7) Airmanship.	
<b>EXERCISE 9 : DESCENDING AND CLIMBING TURNS</b>	✓
<b>Note:</b> Ideally, climbing turns should not exceed 15 deg bank angles, to optimise rate of climb.	
<b>Aim:</b> To enter and maintain a medium (up to approximately 30° bank angle) turn whilst maintaining a climb or descent, or to enter and maintain a turn from a straight climb or descent.	✓
(1) Entry and maintaining medium descending and climbing turns	
(2) Resuming straight and level flight	
(3) Faults in the turn – balance	
(4) Turns onto selected headings, use of gyro heading indicator and compass	
(5) Use of instruments	
(6) Addressing typical student errors	
(7) Airmanship.	

	<b>EXERCISE 9 : SLIPPING TURNS</b>	N/A
	<b>Note:</b> A thorough explanation of the side slip characterises of different wings must be explained, and if possible, demonstrated.	
	<b>Aim:</b> To understand the initiation of a slipping turn and know when it is appropriate.	
	(1) Use of controls to induce and recover from a slipping turn	
	(2) Height loss in a slipping turn	
	(3) Recovery from a slipping turn	
	(4) Recognizing disorientation in the student	
	(5) Pre-empting reactions from students and formulating appropriate responses	
	(6) Airmanship	
	<b>EXERCISE 10 A. SLOW FLIGHT</b>	✓
	The objective is to improve the learner's ability to recognise inadvertent flight at critically low speeds and provide practice in maintaining the microlight aeroplane in balance should this situation occur.	✓
	(1) Safety checks	
	(2) Introduction to slow flight	
	(3) Controlled flight	
	(a) clean at stall speed plus 10 MPH	
	(4) Application of full power with correct attitude to achieve level speed	
	(5) Typical student problems and addressing them	
	(6) Airmanship.	
	<b>EXERCISE 10 B: STALLING</b>	
	<b>Aim:</b> To recognise and enter a fully-developed stall from various modes of flight both straight and turning, and to recover with minimum height-loss to a safe flight mode; to become familiar with the 'feel' of the aeroplane in slow flight just above the stall speed; and to recognise the symptoms of the incipient stall and to restore the aeroplane to safe flight before the stall occurs.	✓
	(1) Airmanship	
	(2) Safety checks	
	(3) Symptoms	
	(4) Recognition	
	(5) Clean stall and recovery without power and with power	
	(6) Recovery when a wing drops	
	(7) Approach to stall in the approach configuration, with and without power	
	(8) After engine failure while climbing steeply at full power	
	(9) Understanding student reluctance and gradually building confidence.	
	(10) Pre-empting reactions from students and formulating appropriate responses	
	<b>EXERCISE 11- SPINNING &amp; SPIN AVOIDANCE (GROUND LECTURE ONLY)</b>	N/A
	<b>Aim:</b> To understand and recognise the onset of situations that may lead to an inadvertent spin, and to learn how to instinctively take the necessary control actions to effect a recovery back to normal flight condition before a spin occurs; i.e.: to recover at the incipient stage.	
	(1) Cause of spin	
	(2) Recognition of incipient spin	
	(3) Recovery from the incipient spin	
	(4) Understanding student reluctance and gradually building confidence.	
	(5) Recognizing disorientation in the student	
	(6) Pre-empting reactions from students and formulating appropriate responses	
	(7) Airmanship	

	<b>EXERCISE 12 : TAKE OFF AND CLIMB TO DOWNWIND POSITION</b>	✓
	<b>Aim:</b> To safely take-off and climb the aeroplane to position on the downwind leg at circuit height; to land safely in the event of an engine failure after take-off or at any time in the circuit; and to decide against continuation of the take-off – taking the appropriate action – if for some reason continuation would be unsafe.	✓
	(1) Pre-take-off checks	
	(2) Factors affecting the length of the take-off roll and the initial climb	
	(3) Into wind take-off	
	(4) Nose wheel considerations	
	(5) Drills during and after take-off	
	(6) Short take-off and soft-field procedures / techniques, including performance calculations	
	(7) Undulating (rough field) considerations	
	(8) Aborted take-off	
	(9) Engine failure after take-off up to early downwind	
	(10) Addressing typical student errors	
	(11) Airmanship	
	<b>EXERCISE 13: CIRCUIT, APPROACH AND LANDING</b>	✓
	<b>Aim:</b> To fly an accurate circuit and carry out a safe approach and landing.	✓
	(1) Circuit procedures, downwind, base leg, key points	
	(2) Powered approach and landing	
	(3) Nose wheel / tail wheel considerations	
	(4) Effect of wind on approach and touchdown speeds	
	(5) Glide approach and landing	
	(6) Short-landing and soft-field procedures / techniques	
	(7) Go-around / Bulk landings	
	(8) Correcting bad approaches	
	a. Hot and high	
	b. Low and slow	
	(11) The hold-off period and touch-down	
	(12) Effect of ground surface and gradient on the landing run	
	(13) Use of brakes (if applicable)	
	(14) Control during ground run	
	(15) Addressing typical student errors	
	(16) Airmanship	
	<b>EXERCISE 12 &amp; 13 E: CROSS-WIND TAKE-OFF AND LANDING</b>	✓
	<b>Aim:</b> To be able to handle both cross-wind take-offs and landings, including downwind landings in an emergency; to be able to input the correct amount of control to correct drift to ensure the track is a continuation of the take-off and landing path of the aeroplane.	✓
	(1) Aerodynamic and mechanical considerations	
	(2) Cross-wind take-offs	
	(3) The circuit	
	(4) Approach and cross-wind landings	
	a. crabbing method	
	(5) Addressing typical student errors	
	(6) Airmanship	

	<b>EXERCISE 12 &amp; 13 E : RESTARTING THE ENGINE IN FLIGHT</b>	✓
	<b>Aim:</b> Engines could, at some time or another, stop whilst in flight. It is important that the candidate must show exceptional presence of mind in this situation, and be able to either take over from his student immediately, or guide him through it.	✓
	<b>Note:</b> This exercise only to be attempted within easy glide of the training airfield and to be treated as a simulated emergency until the engine is successfully re-started.	
	(1) Engine failure checks	
	(2) Engine restart procedures	
	(3) Airmanship	
	<b>EXERCISE 12 &amp; 13 E: RECOVERY FROM PILOT INDUCED OSCILLATIONS</b>	✓
	<b>Aim:</b> To identify the situation where PIO can occur and rectify it.	
	(1) Demonstrate the cause of Pilot Induced Oscillations	
	(2) Recognition of symptoms of Pilot Induced Oscillations	
	(3) Recover from PIO	
	(4) Most common situations of PIO	
	a. Rotation and early climb out	
	b. finals	
	(5) Recognising when the student is entering PIO	
	(6) Addressing typical student errors and taking control from the student	
	(7) Airmanship	
	<b>EXERCISE 12 &amp; 13 E: UNUSUAL AND DANGEROUS ATTITUDES / CONDITIONS</b>	✓
	<b>Aim:</b> To recognise potentially dangerous conditions of flight and to recover safely from unusual attitudes, with the emphasis of situations where a student may inadvertently cause unusual and dangerous attitude, how to recognize the onset and correct timorously	✓
	(1) Recovery from inadvertent mishandling of controls –	
	(b) at high speeds	
	(c) in stall recovery in various configurations	
	(d) in a steep turn	
	(e) following hitting wake turbulence in a 360° steep turn at 45° to 60° bank angles	
	(f) in high nose whip stall attitude	
	(g) typical reactions of students, and how to manage them	
	(2) Airmanship	
	<b>EXERCISE 15: ADVANCED TURNING (STEEP TURNS)</b>	
	<b>Aim:</b> To carry out a co-ordinated level turn at steep angles of bank and to recognise and recover from a spiral dive; and to avoid wake turbulence.	✓
	(1) Steep 360° turns (up to 45° bank angle) maintaining altitude, recovering to straight and level flight.	
	(2) Steep descending turns (up to 60° bank angle), completing a minimum of 2 complete orbits, without engine power and without entering spiral dive, then recovering to straight and level flight.	
	(3) Wake turbulence / disorientation	
	(4) Stalling in the turn and recovery	
	(5) Recoveries from unusual attitudes, including spiral dives	
	(6) Understanding student reluctance and gradually building confidence.	
	(7) Recognizing disorientation in the student	
	(8) Pre-empting reactions from students and formulating appropriate responses	
	(9) Airmanship	

	<b>EXERCISE 16: FORCED LANDING WITHOUT POWER</b>	✓
	<b>Aim:</b> To carry out a safe descent and landing in the event of the engine failing during flight. To be practiced at the training airfield, outside of the circuit pattern. The touch down must be no more than 25m before or after a point chosen by the candidate, and verbally conveyed to the pattern instructor before commencement.	✓
	(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) Use of radio, Mayday call	
	(8) Base leg	
	(9) Final approach	
	(10) Landing	
	(11) Actions after landing	
	(12) Techniques of building student confidence.	
	(13) Airmanship	
	<b>EXERCISE 17 A: LOW LEVEL FLYING</b>	✓
	<b>Aim:</b> To safely operate the aeroplane at heights lower than those normally used.	
	(1) Emphasis on regulations governing low flying	
	(2) Low-level familiarisation	
	(3) Effect of drift	
	(4) Effect of wind on ground speed	
	(5) Effect of wind in inducing apparent skids and slips in turns	N/A
	(6) Effect of precipitation (as applicable to type)	
	(7) Joining circuit in poor weather	
	(8) Bad-weather circuit	
	(9) Addressing typical student errors	
	(10) Airmanship	
	<b>EXERCISE 17 B: PRECAUTIONARY LANDINGS</b>	✓
	<b>Aim:</b> A precautionary landing is one not contemplated before the flight commenced and where engine power is still available, enabling the pilot the opportunity of selecting and inspecting a suitable landing area before executing a landing in an unfamiliar place.	✓
	(1) Occasions necessitating	
	(2) Full procedure away from aerodrome to break-off height	
	(3) In-flight conditions	
	(4) Landing area selection -	
	a. normal aerodrome;	
	b. disused aerodrome	
	c. ordinary field.	
	d. habitation for after-landing assistance	
	(5) Inspection of landing area	
	(6) Circuit and approach	
	(7) PAN call	
	(8) Actions after landing	
	(9) Specific emphasis on areas where students are generally weak.	
	(10) Airmanship	



	<b>EXERCISE 18 A : NAVIGATION</b>	✓
	<b>Aim:</b> To fly accurately and safely in VMC under VFR conditions, a predetermined route (CAR 62.04.2 (1) (a) and (b) without infringing the rules governing regulated airspace. To fly from one place to another using simple pilot navigation techniques, whilst relying on the minimum of artificial aids.	✓
	(1) Flight planning	
	a. weather forecast and actuals	
	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 (If applicable)	
	d. Flight information	
	i. NOTAMS etc.	
	ii. radio frequencies	
	iii. selection of alternate aerodromes	
	e. aeroplane documentation	
	f. notification of the flight	
	i. pre-flight administrative procedures	
	ii. flight plan form	
	(2) 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 nav aids (GPS etc)	
	h. Minimum weather conditions for continuation of flight	
	i. In-flight decisions	
	j. transiting controlled/regulated airspace	
	k. diversion procedures	
	l. uncertainty of position procedure	
	m. Lost procedure	
	(3) Arrival, aerodrome joining procedure	
	a. ATC liaison in controlled/regulated airspace	
	b. altimeter setting	
	c. entering the traffic pattern	
	d. circuit procedures	
	e. parking	
	f. security of aeroplane/aircraft	
	g. refuelling	
	h. closing of flight plan, if appropriate	
	i. post-flight administrative procedures	

	<b>EXERCISE 18 B : NAVIGATION PROBLEMS AT LOWER LEVELS AND IN REDUCED VISIBILITY</b>	✓
	<b>Aim:</b> To fly the aircraft safely at low levels and to observe the misleading visual effects caused by strong winds at low levels	
	(1) Actions prior to descending	
	(2) Hazards (e.g. obstacles, and terrain)	
	(3) Difficulties of map reading	
	(4) Effects of wind and turbulence	
	(5) Vertical situational awareness (avoidance of controlled flight into terrain)	
	(6) Avoidance of noise sensitive areas	
	(7) Joining the circuit	
	(8) Bad weather circuit and landing	
	<b>EXERCISE 18 C : NAVIGATION (OTHER)</b>	✓
	(1) Navigation with GPS	
	(2) Navigation with Efix	
	<b>EXERCISE 19 : BASIC INSTRUMENT FLYING (N/A)</b>	
<b>4</b>	<b>PRACTICAL AIRCRAFT WORK (WEIGHT-SHIFT CONTROLLED MICROLIGHT)</b>	✓
	In the case of a Grade C recreational flight instructor rating practical aircraft work covering the following:	✓
	<b>(1) Pre-flight</b>	✓
	<b>Aim:</b> To enhance pre-flight ability and the ability to encourage systematic, thorough and regular pre-flights on a variety of aircraft	✓
	(1) Airframe	
	a. Symmetry	
	b. Materials	
	c. Control surfaces	
	d. suspension	
	e. steering	
	f. brackets	
	g. Instrument console, including power supply to instruments, intercom, radio and aerial connections.	
	h. engine mount	
	i. wheels and tyres	
	j. brakes	
	k. tubing	
	l. cables	
	m. seats and seatbelts	
	n. fuel-tank	
	o. battery	
	(2) Engine, exhaust and gearbox	
	a. Oil leaks	
	b. Spark plug caps	
	c. Cables and electrical wiring	
	d. Carb rubbers	
	e. Fan belt / Radiator / Cooling system	
	f. Exhaust blow-by	
	g. Exhaust springs	
	h. Air filters	
	i. Carburettors	
	(3) Systems	
	a. Fuel system	
	b. Electrical system	

	<b>(2) Basic engine maintenance</b>	✓
	(1) Spark plug changes	
	(2) Main jets, needle jets and jet needles	
	(3) Balancing carburettors	
	(4) Replacing carb rubbers	
	(5) Cleaning air filters	
	(6) Replacing fuel filters	
	(7) Adjusting fan belts	
	(8) When to call the AP or Mechanic	
	<b>(3) Propellor</b>	✓
	(1) Replacing	
	(2) Torque	
	(3) Track	
	(4) Pitch and Track adjustments	
	<b>(4) Advanced wing work</b>	✓
	(1) Adjusting Pitch pressure	
	(2) Adjusting wing for turning problems	
	(3) Adjusting roll stability	
	(4) Adjusting hang point position	
	(5) Adjusting trim	
	(6) Batton profiling	
	(7) When to call the AP or <i>Wing Man</i>	
	<b>(5) Rigging and de-rigging</b>	✓
	De-rigging without damage	
	(1) Cable, sail, bracket and tube protection	
	(2) Trailoring without damage	
	(3) Rigging without damage	
	(4) Special techniques and considerations	