NORMAL TAKEOFF AND CLIMB	
OBJECTIVE	The normal takeoff is one in which the airplane is headed directly into the wind or the wind is very light, and the takeoff surface is firm with no obstructions along the takeoff path, and is of sufficient length to permit the airplane to gradually accelerate to normal climbing speed (V_Y).
ELEMENTS	1. Checklist complete 2. Taxi into takeoff position 3. Full throttle 4. Check engine instruments 5. "Airspeed alive" 6. Rotate at 55 kts 7. Hold approximately 5° nose up 8. Accelerate to and climb out at V_Y 9. At 1000' AGL, accelerate to $V_{Y\text{-}CRUISE}$ and landing light off 10. Complete the ATO Checklist 11. Cruise Climb

CROSSWIND TAKEOFF AND CLIMB	
OBJECTIVE	The crosswind takeoff technique is used to maintain proper ground track while departing a firm or a soft runway. This involves the correct use of aileron/rudder cross control.
ELEMENTS	1. Note wind direction and speed 2. Checklist complete 3. Taxi into takeoff position 4. Deflect ailerons into wind – use rudder as required for directional control 5. Full throttle 6. Check engine instruments 7. "Airspeed alive" 8. As speed builds reduce aileron and vary rudder inputs to maintain proper directional control 9. Rotate at 55 mph 10. Hold approximately 5° nose up 11. Accelerate to and climb out at V_Y 12. See Normal Takeoff

SHORT-FIELD TAKEOFF AND MAX PERFORMANCE CLIMB	
OBJECTIVE	Taking off and climbing from fields where the takeoff area is restricted by obstructions requires that the pilot operate the airplane at the limit of its takeoff capabilities. The pilot must use all available runway, correctly configure the airplane, develop maximum available horsepower before brake release, rotate at the correct speed, climb at V_X to clear the obstacle, accelerate to V_Y then cycle gear up.
ELEMENTS	1. Checklist complete (flaps 10°) 2. Taxi into takeoff position (use all available runway) 3. Hold brakes 4. Full throttle 5. Check engine instruments 6. Release brakes 7. "Airspeed alive" 8. Rotate to lift off at 55 kts 9. Maintain V_X attitude and airspeed until obstacle cleared 10. Flaps up at or after 200' AGL 11. Accelerate to V_Y 12. See Normal Takeoff

SOFT-FIELD TAKEOFF AND CLIMB	
OBJECTIVE	Takeoffs and climbs from soft fields require the use of the operational techniques for getting the airplane airborne as quickly as possible to eliminate drag caused by tall grass, soft sand, mud, snow, etc., and may or may not require climbing over an obstacle. These same techniques are also useful on a rough field where it is advisable to get the airplane off the ground as soon as possible to avoid damaging the landing gear.
ELEMENTS	1. Checklist complete (flaps 10°) 2. Taxi into position with a smooth turn while maintaining full aft elevator 3. Apply full throttle without stopping aircraft 4. Reduce backpressure as aircraft accelerates to keep nose wheel just clear of the ground 5. Lift off at lowest possible airspeed 6. Maintain aircraft in ground effect until reaching V_Y 7. Pitch to V_Y attitude (approximately 5°) 8. Flaps up at 200' AGL 9. See Normal Takeoff *Note: Soft field takeoff with an obstacle – accelerate in ground effect to V_X attitude and airspeed until obstacle is cleared*

NORMAL APPROACH AND LANDING	
OBJECTIVE	This type of approach and landing involves the use of techniques for what is considered a normal situation; that is, when engine power is available, the wind is light or the final approach is made directly into the wind, the final approach path has no obstacles, and the landing surface is firm and of ample length to gradually bring the airplane to a stop.
ELEMENTS	1. Approach checklist completed before entering downwind 2. Slow to 105 kts on downwind (2300 RPM) 3. Midfield, perform landing checklist 4. Abeam threshold, 1700 RPM, 10° flaps, begin descent at 85 kts 5. At 45° point, turn base, flaps 20°, 75 kts 6. On final, flaps 30°, 65 kts 7. Adjust pitch and power to maintain 3° GP so as to be stabilized at V_{REF} no lower than 400' AGL 8. Maintain aiming point with pitch/power corrections until approaching round out 9. Reduce power to idle above threshold 10. Flare airplane so that main gear contacts the runway first 11. Maintain directional control and lower nose wheel before braking

CROSSWIND APPROACH AND LANDING	
OBJECTIVE	Many runways or landing areas are such that landings must be made while the wind is blowing across rather than parallel to the landing direction. Therefore, all pilots should be prepared to cope with these situations when they arise. The same basic principles and factors involved in normal, soft, or maximum performance approach and landing apply to crosswind approach and landings. Only the additional techniques required for correcting wind drift are discussed here.
ELEMENTS	1. Establish appropriate approach configuration (normal, soft field, short-field) 2. Maintain alignment with centerline using crab into wind 3. Transition to wing-low method prior to touchdown 4. Round out and flare while maintaining wing-low into crosswind 5. As aircraft slows increase aileron deflection into the wind 6. Opposite rudder deflection rudder is required to maintain directional control

SLIP TO A LANDING	
OBJECTIVE	This technique is used to land on a runway during crosswind conditions. It is typically employed before the flare, but can be accomplished during the flare as competency improves.
ELEMENTS	1. Establish on stabilized final approach 2. Lower upwind wing into the wind 3. Simultaneously apply opposite rudder to maintain runway centerline 4. Maintain drift control with aileron 5. Maintain directional control with rudder 6. Flare as normal 7. Optimally, land with upwind main gear touching first

GO-AROUND/REJECTED LANDING	
OBJECTIVE	Regardless of the height above the ground at which it is begun, a safe go around may be accomplished if an early decision is made, a sound plan is followed, and the procedure is performed properly.
ELEMENTS	1. Full throttle 2. Pitch up for and accelerate to V_Y 3. Flaps 20° 4. Reduce control force by trimming nose down 5. Maneuver to the side of runway 6. Retract remaining flaps above 200’ AGL 7. Pitch to approximately 5° nose up 8. Continue with Normal Takeoff Profile *Note: Steps 1, 2 and 3 are completed simultaneously*

SHORT-FIELD APPROACH AND LANDING	
OBJECTIVE	This short field operation requires the use of a procedures and techniques for the approach and landing at fields which have a relatively short landing area or where an approach must be made over obstacles which limits the available landing area.
ELEMENTS	1. Specify touchdown point on downwind 2. Normal pattern 3. Stabilize final descent at 61 kts (no wind airspeed) no lower than 400’ AGL 4. Maintain aiming point with pitch/power corrections until approaching round out 5. Reduce throttle slowly during flare 6. Maintain directional control and lower nose wheel before braking 7. Retract flaps to 0° and apply brakes (simulate maximum braking for training) *Note: Flaps down for max aerodynamic braking on contaminated surfaces*

SOFT-FIELD APPROACH AND LANDING	
OBJECTIVE	The approach for a soft field is similar to a normal or short field approach depending on field selection. The major difference between the techniques is that during the soft field landing, the airplane is held 1 to 2 feet off the surface as long as possible to dissipate the forward speed to touch down at the minimum forward speed at the minimum rate of descent. The final approach speed for short field landings is equally appropriate to soft field landings, but there is no reason for a steep angle of descent unless obstacles are present in the approach path.
ELEMENTS	1. Specify touchdown point on downwind 2. Normal pattern (longer downwind if combined with short-field technique) 3. Adjust pitch and power to maintain 3° GP so as to be stabilized at V_{REF} no lower than 400’ AGL 4. Maintain aiming point with pitch/power corrections until approaching round out 5. During landing flare adjust pitch/power for minimum sink rate 6. Touchdown at slowest possible airspeed with nose-high pitch attitude 7. Lower nose gently to surface and taxi clear of runway with full aft elevator

POWER-ON STALL	
OBJECTIVE	Power-on stall recoveries are practiced from straight climbs, and climbing turns with 20° of bank, to simulate an accidental stall occurring during takeoffs and departure climbs.
ELEMENTS	1. Clearing turns 2. Perform the maneuver no lower than 1,500’ AGL 3. Set power to 1500 RPM 4. Flaps 10° (if specified) 5. Maintain level flight and reduce airspeed to V_R 6. Full power 7. Coordinate with rudder pressure 8. Set a nose-high pitch attitude that will allow the airspeed to decrease slowly and evenly (not abrupt) 9. Recognize and announce symptoms of approaching stall 10. Maintain wings level, ball centered 11. Stall the airplane ***RECOVER-*** 12. Release backpressure and slowly lower nose to horizon (minimal altitude loss, NONE is ideal) 13. As airspeed increases, pitch for V_X or V_Y and establish a positive rate of climb 14. Level off and recover to cruise

POWER-OFF STALL	
OBJECTIVE	The practice of power-off stalls is usually performed with normal landing approach conditions in simulation of an accidental stall occurring during landing approaches. The stalls can be performed to either imminent or full stall conditions.
ELEMENTS	1. Clearing turns 2. Perform the maneuver no lower than 1,500’ AGL 3. Set power to 1500 RPM 4. Maintain altitude while airspeed decreases 5. Slowly lower flaps to 30° 6. Begin stabilized descent at approach speed (65 kts) 7. Level off at planned altitude 8. As airspeed decreases, recognize and announce symptoms of approaching stall 9. Stall the airplane ***RECOVER-*** 10. Full power 11. Reduce pitch slightly (minimal altitude loss, NONE is ideal) 12. Flaps 20° 13. As airspeed increases, retract remaining flaps 14. Establish climb attitude at V_X or V_Y 15. Level off and recover to cruise

SLOW FLIGHT	
OBJECTIVE	To develop pilots sense of feel and ability to use the controls correctly, and to improve proficiency in performing maneuvers in which very low airspeeds are required.
ELEMENTS	1. Clearing turns 2. Perform the maneuver no lower than 1,500' AGL 3. Reduce power to 1500 RPM 4. Apply back pressure on the elevator to reduce airspeed and maintain altitude, TRIM CONSTANTLY 5. Slowly lower flaps to 30° 6. 55-60 kts, add power to ≈1900 RPM to maintain altitude 7. Use pitch attitude to control airspeed 8. Maintain directional control with outside visual references 9. Practice gentle climbs, descents, and turns at constant airspeed ***RECOVER-*** 10. Full power 11. Reduce the angle of attack by lowering the nose and maintain altitude 12. Flaps 20° 13. Retract remaining flaps as airspeed increases and return to cruise

STEEP TURNS	
OBJECTIVE	This maneuver consists of a turn in either direction using a bank steep enough to cause an over banking tendency during which maximum turning performance is attained and relatively high load factor imposed.
ELEMENTS	1. Clearing turns 2. Reduce throttle to 2100 RPM to obtain 95 kts (below V_A) 3. Establish bank of 45° or 50° as appropriate 4. Adjust pitch, bank and power as necessary to maintain altitude and airspeed 5. After completing a 360° turn, roll wings level and immediately start a steep turn in the opposite direction. Adjust pitch, bank and power as necessary to maintain altitude and airspeed. 6. Time roll out so that wings reach level flight on entry heading (1/2 bank angle lead-out) *Note: 45° is used for Private, 50° is used for Commercial*

S-TURNS ACROSS A ROAD	
OBJECTIVE	S-Turns are used to develop pilot's ability to compensate for drift during turns along a selected reference on the ground. The maneuver consists of crossing a road at a 90° angle and beginning a series of 180° turns of equal radius in opposite directions, re-crossing the road at a 90° angle, just as each 180° turn is completed.
ELEMENTS	1. Clearing turns 2. Establish 100 kts (2300 RPM) 3. Select a road where a safe landing can be made if required, and enter downwind at 1,000' AGL 4. Apply wind drift correction and bank angle to track a constant radius 180° turn back towards the road using approximately but not to exceed 45° of bank 5. At 180° of turn and over road, begin maneuver in opposite direction 6. Depart maneuver on entry heading

TURNS AROUND A POINT	
OBJECTIVE	The turns around a point is a proficiency maneuver used to help the pilot develop the ability to control the aircraft while dividing attention between flight path and traffic, while maintaining a constant radius around a reference point and using an angle of bank no greater than 45°. Drift control must be maintained throughout the entire maneuver.
ELEMENTS	1. Clearing turns 2. Establish 100 kts (2300 RPM) 3. Select a ground reference point near an area where an emergency landing can be made. 4. Enter downwind of selected point at 1,000' AGL 5. Maintain constant altitude and radius around point while adjusting bank and drift correction using approximately 45° of bank at the steepest point of the turn 6. Depart maneuver on entry heading

STEEP SPIRAL	
OBJECTIVE	Perform a continuous gliding turn, during which a constant radius around a point on the ground is maintained similar to turns around a point. The radius should be such that the steepest bank will not exceed 60°. This maneuver will improve pilot techniques for power-off turns, wind drift control, planning, orientation and division of attention.
ELEMENTS	1. Clearing turns 2. Select ground reference point and altitude sufficient to continue through a series of at least 3 - 360° turns 3. Establish 68 kts power off-glide. 4. Abeam reference point, establish power-off gliding turn 5. Maintain 68 kts glide and constant turn radius about reference point not to exceed 60° angle of bank 6. Clear engine each 1,000' – upwind to minimize drift 7. Recover at or above 1,500' AGL on entry heading

CHANDELLE	
OBJECTIVE	This maneuver is a climbing turn beginning from approximately straight-and-level flight, and ending at the completion of 180° turn in a wings-level, nose-high attitude at the minimum controllable airspeed. The maneuver demands that the maximum flight performance of the aircraft be obtained; that is the plane should gain the most altitude possible for the given degree of bank and power setting without stalling.
ELEMENTS	1. Clearing turns 2. Power to 2300 RPM to establish 100 kts 3. Roll into immediate 30° bank in either direction 4. Smoothly apply full power 5. Begin pitch towards approximately 11° while increasing power to full throttle 6. Continue pitch towards approximately 11° until reaching 90° of turn 7. After 90° of turn begin reducing bank while maintaining approximately 11° of pitch 8. At 180°, wings level at approximately 5 kts above stall 9. Recover to cruise while maintaining final altitude

LAZY EIGHTS	
OBJECTIVE	To develop the pilot's feel for varying control forces, and the ability to plan and remain oriented while maneuvering the plane with positive accurate control.
ELEMENTS	1. Clearing turns 2. Establish 100 kts (2300 RPM) 3. Begin slowly pitching up and banking to obtain maximum pitch up and approximately 15° bank at the 45° point 4. Passing 45° point, bank slowly increasing to approximately 30°, pitch decreasing, passing through level flight attitude at the 90° point 5. Passing 90° point, both bank and pitch decreasing to maximum pitch down and approximately 15° bank at the 135° point 6. Passing 135° point, bank still decreasing while adjusting pitch to arrive at 180° point with 0° pitch and 0° bank at the entry altitude and entry airspeed 7. Perform maneuver in opposite direction

EIGHTS ON PYLONS	
OBJECTIVE	This training maneuver also involves flying the airplane in circular paths, alternately left and right, in the form of a figure 8 around two selected pylons. In this case no attempt is made to maintain a constant turn radius. Instead, the plane is flown at such an altitude and airspeed that the line parallel to the aircraft's lateral axis and extending from the pilot's eye appears to pivot on each of the pylons.
ELEMENTS	1. Clearing turns 2. Establish 100 kts (2300 RPM) 3. Select suitable pylons perpendicular to wind-line in unpopulated areas with an emergency landing site within glide distance 4. Enter at 45° to downwind at pivotal altitude *NOTE: 100 kts = 885' pivotal altitude* 5. Abeam first pylon bank toward the pylon 6. Maintain correct lateral axis position (reference line on pylon) *Pylon forward – control forward – reduce bank angle* *Pylon rearward – control rearward – increase bank angle* 7. After completing turn on first pylon allow 3-5 seconds of straight and level, then roll toward second pylon 8. After completing turn around second pylon, depart on entry heading

POWER OFF 180° ACCURACY APPROACH AND LANDING	
OBJECTIVE	This type of approach and landing involves the use of techniques to further develop judgment in estimating distances and glide ratios without power available in order to touchdown on a preselected landing spot.
ELEMENTS	1. Approach checklist completed before entering downwind 2. Slow to 100 kts (2300 RPM) 3. Specify touchdown point on downwind 4. On downwind establish 100 kts, level, landing checklist completed 5. Abeam landing point, reduce power to idle, establish 68 kts descent, trim 6. Turn base at pilot's discretion based on altitude and wind conditions, flaps as necessary 7. Adjust pitch, flaps and airspeed as necessary to reach the desired landing spot. 8. Flare airplane so that main gear contacts the runway first 9. Maintain directional control and lower nose wheel before braking
