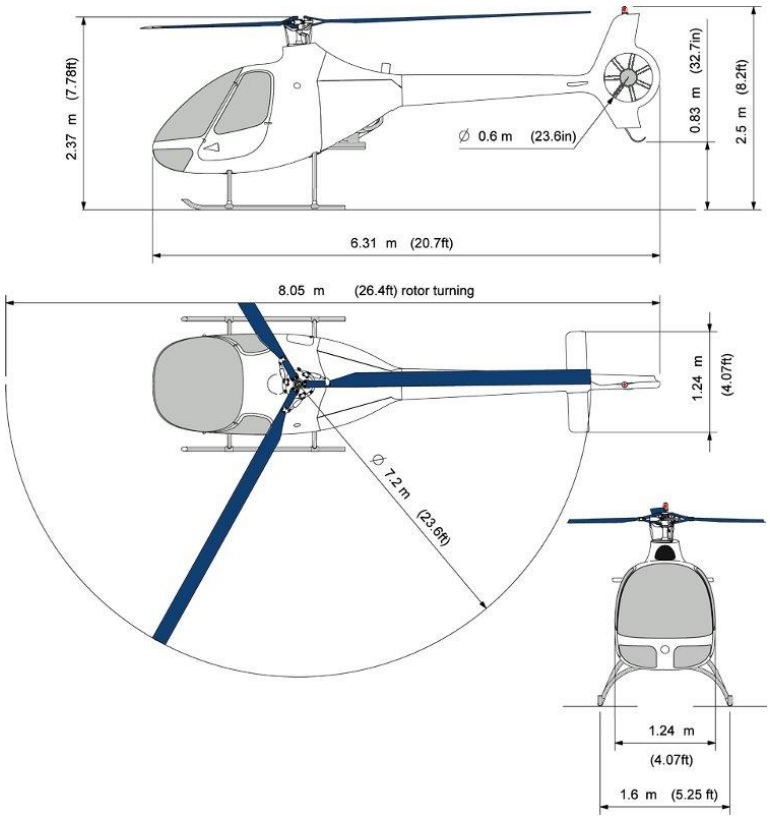
Guimbal Cabri

PRIVATE & COMMERCIAL COURSE



University *of* Dubuque

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Performance Standards:

Within this document prescribed performance standards have been implemented for both PTS standards as well as good practice. Safety shall always be utmost priority and these standards are to facilitate training and protect student, instructor, and aircraft.

CALLOUTS

CONDITION	CALLOUT
Before Takeoff	**Rotor Green, Warning Lights Out, Temperature and Pressure Green**
Crossing into Movement Area	**Traffic Clear, Clearance received**
Airspeed Reaches V_y	**ROTATE**
300’ Above Ground Level	**Clear Left, Center, Right**
Cruising or Pattern Altitude	**Leveling Off, Adjusting Power**
Any Airspeed Change	**Increasing to (#), Decreasing to (#)**
Turning Final	**FINAL CLEAR** **Announce Selected Approach**

V-SPEEDS Guimbal Cabri G2

References:

POH Guimbal Cabri G2

Speeds:

Rotation (Normal)..... 50 KIAS

V_Y Best Rate of Climb..... 50 KIAS

Practice Maneuvering Speed ..... 65 KIAS

V_{NE} Never Exceed Power On..... 130 KIAS
.....-2 KIAS per 1000' AGL
V_{NE} Never Exceed Power Off..... 110 KIAS
.....-2 KIAS per 1000' AGL
Auto-Rotation Recommended IAS ..... 30-50 KIAS

Final Approach (Normal) .....Walking Pace KIAS
Final Approach (Steep) ..... Slow Walking Pace KIAS

Final Approach (Shallow)..... Fast Walking Pace KIAS

Maximum Level Speed ..... 100 KIAS @ 100%

Economical Cruise Speed..... 90 KIAS @ 85%

Max Endurance.....6 hr. @ 55 KIAS

Best Glide..... 80 KIAS

Best Range..... 80 KIAS

Straight and Level Flight

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Attitude or pitch control with the cyclic is the most important aspect of straight and level flight. A level flight attitude is best determined by referencing the horizon with a fixed point in the cabin, or outside this can be the compass or rotor disk. Airspeed is determined by attitude and controlled by the cyclic. An acceptable normal training speed for the Guimbal is 70 KIAS.

Altitude will be controlled primarily by the Collective. Each input will require a corresponding input from the anti-torque pedals to maintain trim. An increase in Collective will also result in a pitch up or pitch down requiring a corrective input to be applied in the cyclic.

The governor will maintain the RPM. If the Governor should fail throttle adjustments will be required as collective is raised or lowered, accordingly. Green Rotor Arc should be maintained.

Objective:

Fly the helicopter at a constant airspeed, altitude, and heading.

Notes:

When checking the engine instruments, include the carb heat gauge to make sure sufficient heat is being applied. While icing is unlikely during full throttle operations, it is possible in a phases of flight to include cruising.

Performance Standards:

	Private	Commercial
Airspeed	+/- 10 KTS	+/- 5 KTS
Altitude	+/- 100’	+/- 50’
Heading	+/- 10^{o}	+/- 5^{o}

Normal Climbs and Descents

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

1. Climbs, pilot should adjust airspeed to approximately 60 KIAS. Once a controlled airspeed has been established the collective should be raised and corresponding right pedal to correct for yaw. Vertical Speed Indicator should indicate a positive 500 fpm rate climb. Approximately 50' prior to selected altitude pilot should begin increasing airspeed back to selected cruise speed. Upon reaching Altitude and Airspeed, collective should be adjusted to maintain Straight and Level Flight.
2. Descents, pilot should adjust airspeed to approximately 60 KIAS. Once a controlled airspeed has been established the collective should be lowered and corresponding left pedal to correct for yaw. Vertical Speed Indicator should indicate a negative 500 fpm rate climb. Approximately 50' prior to selected altitude pilot should begin increasing airspeed back to selected cruise speed. Upon reaching Altitude and Airspeed, collective should be adjust to maintain Straight and Level Flight.

Objective:

Climbs and Descents are to be a smooth transition from one designated altitude to another while traveling no faster than 500 fpm in either direction vertically. This should be done while maintaining a controlled attitude.

Procedure:

1 > Clear Above/Below Aircraft
2 > Adjust Collective
3 > Coordinate trim with correct pedal
4 > Maintain Level Attitude
5 > Adjust speed as desired
6 > Level off
7 > Apply Collective as Needed to sustain Altitude
8 > Pedal as Required

Notes:

Always be mindful of trim indications. While performing climbs and descents, a tendency to lack trim coordination is prevalent and should be avoided as much as possible.

Performance Standards:	Private	Commercial
Airspeed	+/- 10 KTS	+/- 5 KTS
Altitude	+/- 100'	+/- 50'
Heading	+/- 10^{o}	+/- 5^{o}

Turns

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

From a straight and level flight attitude of 70 KIAS a clearing check should be performed in the direction of the intended turn. Smoothly apply cyclic input in the direction of the turn until the desired angle of bank has been reached. Unlike an airplane the pedals should not be used to assist the turn. Use the Horizon to maintain a 70 Knot attitude and a desired bank angle with the cyclic. As angle of bank increases, Vertical lift will have to be increased, thus Collective should be raised to maintain altitude. Keeping aircraft in trim with the use of the anti-torque pedals will be required. Begin the recovery from the turn just prior to your desired heading. Applying cyclic in the opposite direction of the turn, reducing the collective if required back to your previous cruise power, and coordinating trim as well.

Objective:

To turn the aircraft using a constant angle of bank at a constant airspeed and altitude.

Procedure:

1. Visually Clear in direction of turn
2. Verbal Call, “Clear (Direction)
3. Smoothly Apply Cyclic in direction of turn
4. Apply Collective to maintain Altitude
5. Coordinate Trim (As Required)
6. Level off just before reaching chosen heading
7. Adjust collective to maintain level un-accelerated flight
8. Coordinate Trim

Notes:

Always be mindful of trim indications. While performing turns, power must be adjusted to compensate for shift in Vertical Lift Component, as such a tendency to lack trim coordination is prevalent and should be avoided as much as possible.

Performance Standards:	Private	Commercial
Airspeed	+/- 10 KTS	+/- 5 KTS
Altitude	+/- 100’	+/- 50’
Heading	+/- 10^{o}	+/- 5^{o}

TAFFIC PATTERN

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

1. Upwind Leg – After take-off, climb out at 60 KIAS. Upon reaching 300’ AGL or end of runway or otherwise instructed by ATC begin a 90 degree turn to Crosswind
2. Crosswind Leg – Maintain ground track by crabbing helicopter into wind as needed. Upon reaching a predetermined point on ground begin the turn into downwind. Climb should be maintained in Crosswind Leg until 500’ AGL.
3. Downwind Leg – Be prepared for airspeed decrease while groundspeed maintains, adjust accordingly. Increase airspeed to 70 KIAS, and maintain 500’ AGL. Upon reaching a point abeam your selected landing spot begin reducing airspeed to 60 KIAS and reduce collective to avoid climbing.
4. Base Leg – Maintain or reduce altitude as required for preselected approach. 500’ AGL = Steep, 300’ AGL = Normal, & 200’ AGL = Shallow.
5. Final – Maintain Airspeed until required, capturing sight picture for appropriate airspeed and aiming point per approach.

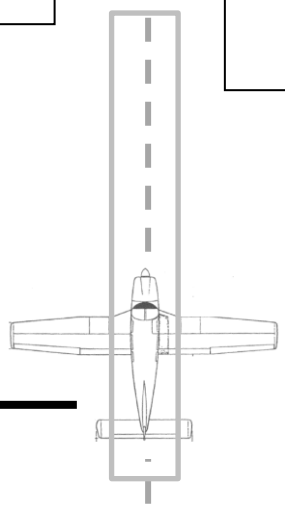
Objective:

For training purposes, traffic pattern operations are used for the practice of continual takeoff and landings. Using traffic patterns effectively will highlight the coordination of cyclic, collective, pedal, and throttle inputs.

Notes:

Always be mindful of trim indications. While performing turns, power must be adjusted to compensate for shift in Vertical Lift Component, as such a tendency to lack trim coordination is prevalent and should be avoided as much as possible.

Performance Standards:	Private	Commercial
Airspeed	+/- 10 KTS	+/- 5 KTS
Altitude	+/- 100’	+/- 50’



Crosswind

1 > Maintain 60 until reaching 500’
2 > Call Visual Clear in all directions

Upwind

1 > 60 KIAS
2 > Climb 300’ Minimum

MID-FIELD DOWNWIND

1 > 70 KIAS
2 > 500’ AGL

ABEAM TOUCHDOWN

1 > Reduce to 60 KIA
2 > Begin to adjust Altitude for selected approach

FINAL

1 > Reduce airspeed as required
2 > Walking (Normal)
3 > Slow Walk (Steep)
4 > Fast Walk (Shallow)

BASE LEG

1 > 60 KIAS
2 > Altitude as Required

Acceleration and Deceleration

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Through a variation of airspeeds the pilot will maintain level attitude and altitude. Airspeed changes should be practiced in large increments to better facilitate concept.

Objective:

To increase pilot control coordination.

Procedure:

1 > From a level un-accelerated flight at 60 KIAS
2 > Apply Forward Cyclic smoothly
3 > Increase Collective to maintain altitude
4 > Correct Yaw with required pedal
5 > Maintain Airspeed approx. 80 KIAS and Altitude until instructed
6 > From 80 KIAS begin smooth AFT Cyclic
7 > Lower Collective, to avoid positive rate climb.
8 > Correct Yaw with correct pedal
9 > Set power for new airspeed, showing a zero trend on VSI.

Notes:

Throughout the maneuver, a constant crosscheck of Airspeed, Altitude, RPM, and Trim must be maintained.

Performance Standards:	Private	Commercial
Airspeed	+/- 10 KTS	+/- 5 KTS
Altitude	+/- 100’	+/- 50’
Heading	+/- 10^{o}	+/- 5^{o}

Take-Off to a Hover

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Prior to any takeoff a scan should be performed ensuring no obstacles are impeding a safe takeoff. The Pilot will begin with the Collective down, Cyclic centered, and Pedals Neutral. With slow applications of the collective in increments until light on the skids. Pilot will neutralize any helicopter drift with both the Cyclic and Pedals. Continue to maintain heading and zero drift while raising the Collective until aircraft is in a stabile Hover approx. 3-5 feet.

Objective:

To transition from the ground to stabilized Hover.

Procedure:

1 > Complete a Pre-Takeoff Check.
   a. Rotor in green arc
   b. Clear left and right visually
   c. Cyclic Neutral, Collective Down, Pedal Neutral
2 > Raise Collective until light on skids
3 > Correct for any drift with cyclic, yaw with pedals
4 > Shift Focus to horizon
5 > Slowly raise collective while maintaining heading
6 > Sustain a zero drift vertical pickup
7 > Maintain un-accelerated Hover.
8 > Perform Hover Check
   a. Rotor/Engine – RPM
   b. Instruments – Green
   c. Power required %

Notes: Attention to left or right lateral drift should be quickly resolved as any drift while in contact with surface could cause dynamic rollover.

Performance Standards:	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}
Altitude	+/- 2’	+/- 1’
Position	+/- 10’	+/- 5’

Landing from a Hover

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

From a stabilized hover, pilot will reduce collective power until ground contact has been achieved in a safe and desirable means.

Objective:

Safely Land Helicopter from Hover with minimal drift or heading change.

Procedure:

1 > From a stabilized Hover, pointed in direction of wind, lower collective slowly
2 > Maintain heading with pedals
3 > Focus on Horizon to minimize over-controlling
4 > Reduce Collective in small increments, helicopter should lightly come to rest
5 > Control yaw with pedals
6 > Control drift with Cyclic.

Notes:

DO NOT ALLOW AIRCRAFT TO DRIFT WITH ANY REARWARD OR LATTERAL MOVEMENT!

Performance Standards:	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}
Drift	+/- 4’	+/- 2’

Hovering Flight

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Forward, Sideward, and Rearward Flight – While in a stabilized hover, pointed into the wind, pilot will smoothly input cyclic input in direction of flight. Heading will be maintained by the use of the anti-torque pedals. Groundspeed should be the equivalent speed of a walk or less. To stop the hover movement, cyclic input must be negated by opposite cyclic direction input. Minimize control inputs to reduce the likelihood of over controlling or pendular action.

Hovering Turns – Accomplished through the use of the pedals. Pedal turns in the Cabri should be closely guarded as the Fenestron Tail Rotor is much more susceptible to weathervane. Inexperience with this style tail rotor can be detrimental. Direction of Yaw must be emphasized! A right pedal turn is the most desirable, a rate of yaw should always be controlled to allow counter control. Cyclic is used to control ground track and maintain location.

Objective:

To safely maneuver the Helicopter in forward, sideward, rearward, and turn the aircraft while in flight

Performance Standard:

	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}
Altitude	+/- 2’	+/- 1’
Ground Track	+/- 5’	+/- 3’

NOTES:

Uncontrolled Nose Left Yaw may not be recoverable even after full right pedal has been implemented. Full right pedal will also cause aircraft to sink increasing chance of dynamic rollover. Left Pedal turns must be closely guarded in this system!

Normal Takeoff from a Hover

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

From an established 3-5' Hover, select a point of reference for ground track. Verify aircraft is clear of obstacles. Begin takeoff with small increments of forward cyclic, slowly accelerating, if helicopter begins to settle apply a small amount of collective as necessary, maintain heading with pedals. As aircraft transitions into forward flight Transverse Flow Effect will be noticed with a substantial nose up pitch, and left roll. Input must be made forward and right to maintain forward airspeed and ground track. Soon after you will go through Effective Translational Lift, resulting in nose right yaw, corrected with left pedal input. Continue to smoothly accelerate until 50 KIAS has been reached, reducing forward pressure on Cyclic will allow aircraft to begin climbing. Once climb is initiated, accelerate to 60 KIAS and raise collective for a 500' fpm positive rate climb.

If crosswind is a consideration, Cyclic inputs will be required to maintain acceptable ground track. Below 50' pedal inputs should maintain heading corresponding to ground track, above 50' pedals shall allow crabbing for best coordination.

Objective:

Safely transition from a hover to a normal climb.

NOTES:

Absolutely, at no time shall a normal approach enter the shaded area of the Height Velocity Diagram.

Performance Standards:

	Private	Commercial
Drift Below 10' AGL	+/- 25'	+/- 10'
Drift Above 10' AGL	+/- 50'	+/- 25'

Normal Approach to a Hover

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Upon selecting the intended landing spot with the Helicopter pointed into the wind a speed should be slowed from 60 KIAS to an approximate "Walking Pace" when the desired angle has been intercepted. This angle is approximately 10^{o} or parallel the trim string. Approach will be initiated by slowly reducing collective, this collective control will control the angle of approach. The Cyclic will be used to control ground track and rate of closure.

Inversely to forward flight transition, we will lose ETL between 16-24 KIAS requiring an increase in collective power to mitigate settling. We will then transition through the last noticeable phase of Transverse Flow Effect, indicated by a nose up pitching action and reduction in airspeed, this must be compensated by keeping the ship level with forward cyclic. One last collective increase will stop the sink rate, and with correct cyclic input cease all forward movement.

Objective:

To safely and effectively transition from flight at altitude to a stabilized 3-5' Hover.

Notes:

Careful consideration and a close watch must be paid attention to indicated power applied. With a large increase in collective at the bottom of the approach can cause an immediate, and un-commanded nose left yaw. Exceeding more than 45% nose left may become unrecoverable at low altitudes.

Performance Standards:

	Private	Commercial
Drift Below 10' AGL	+/- 25'	+/- 10'
Drift Above 10' AGL	+/- 50'	+/- 25'

Maximum Performance Takeoff and Climb

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Before Collective is raised Pilot will perform a visual obstacle clearance, left, right, behind, and most importantly above. Once clear, verbal clearance will be issued and Pilot will select aiming point ahead for ground track reference. Collective will be raised into the Yellow Arc, 90-100% while maintaining less than 30 KIAS. Maximum Takeoff Power should not be applied more for than 5 Minutes. Cyclic will control direction, while Right Pedal will need to be applied to counter increased torque. Heading should be maintained with few corrections.

Once obstacle is cleared immediately transition into forward flight, reducing power out of the yellow Arc.

Objective:

To safely transition from the surface to a maximum performance climb, clearing simulated or actual obstacles.

Procedure:

1 > Visually Clear Left, Right, Back, and **ABOVE.**
2 > Verbally announce "CLEAR"
3 > Increase Collective in controlled increments.
4 > Apply appropriate Cyclic input to control drift
5 > Apply Right pedal as needed to maintain heading
6 > Upon Clearing obstacle, forward flight shall commence

Notes:

Right pedal will increase power % applied on Manifold Limit Indicator (MLI). Right pedal must be smoothly applied concurrently with Collective increases to avoid over-torque of transmission.

Must remain aware of the possibility of wind shear and/or wake turbulence.

Discuss difference of **Max vs. Required** Performance

Performance Standard:

	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}
Airspeed	+/- 10KIAS	+/- 5 KIAS

Steep Approach

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Upon selecting the intended landing spot with the Helicopter pointed into the wind a speed should be slowed from 60 KIAS to an approximate "Slow Walking Pace" when the desired angle has been intercepted. This angle is Maximum of 15^{o} per the PTS or visual que parallel the console. Approach will be initiated by slowly reducing collective, this collective control will control the angle of approach. The Cyclic will be used to control ground track and rate of closure.

Inversely to forward flight transition, we will lose ETL at a higher altitude, and between 16-24 KIAS requiring an increase in collective power to mitigate settling. We will then transition through the last noticeable phase of Transverse Flow Effect, indicated by a nose up pitching action and reduction in airspeed, this must be compensated by keeping the ship level with forward cyclic. One last collective increase will stop the sink rate, and with correct cyclic input cease all forward movement.

Objective:

To safely transition from flight at altitude to a hover using steeper than normal approach angle

Notes:

Avoid rate of descent greater than 300 FPM under 16-24 KIAS/ETL. This is a concern of Vortex Ring State. A VRS discussion shall take place prior to maneuver.

Performance Standard:

	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}
Approach Angle Max	15^{o}	15^{o}
Hover Termination	+/- 4'	+/- 2'

Straight-In Autorotation with Power Recovery

References:
Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:
Entry – From a level un-accelerated flight of 60 KIAS, approx. 500-700' AGL, headed into wind. With eyes on horizon to avoid over controlling, lower the collective smoothly until the Collective is fully lowered. Reduce airspeed initially to ensure rotor build, adjust airspeed as needed, 30-50 KIAS is recommended. The Autorotative principles of the Guimbal are largely different than most other helicopters in regards to Rotor RPM, a collective check is only required if rotor builds greater than 590 NR RPM.
Glide – Once established in Glide, Throttle should be rolled off to separate needles. Careful watch of Engine RPM and firm grip of throttle should be ensured to sustain needle separation. Governor **MUST** stay on! Governor will protect inadvertent engine over speed. Verbal Cue as necessary shall contain, "Rotors, Airspeed, Trim, Landing Spot". After 200' loss of altitude has occurred it is recommended to roll throttle back on. It is recommended to apply a small rise in Collective to aid in needle synchronization.

WARNING

Prior to Helicopter descending through 200' AGL, the Instructor should make an immediate power recovery if,

A. Rotor is below 515 NR RPM
B. Airspeed is 30 KIAS or Less
C. Centerline has not been Maintained

Flare – At about 60' AGL an initial Flare will be implemented to reduce rate of descent and "feel" the air. Aft Cyclic will be maintained while Airspeed decreases and rate of descent is mitigated. Upon reaching approx. 20' AGL a large Aft Cyclic input should be applied to reduce remaining Airspeed. Excessive Flare may cause aircraft to balloon and should be avoided.
Recovery – At 10' Aircraft must be leveled with a large forward Cyclic Input. As Helicopter is leveled remaining Hover power shall be applied to avoid contact with ground. Maneuver is terminated when aircraft is no longer moving in any direction

Objective:
To develop pilot understanding of safe operations during Complete Power Loss.

Notes:
Aircraft may kick with a noticeable adverse yaw when throttle is rolled back on and MR RPM is below 530. Exercise CAUTION!

Performance Standards:	Private	Commercial
Spot	+/- 200'	+/- 100'
Airspeed	+/- 10KIAS	+/- 5 KIAS

180^{o} Autorotation with Power Recovery

References:
Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:
Entry – From a level un-accelerated flight of 60 KIAS, approx. 500-700' AGL, headed down wind. With eyes on horizon to avoid over controlling, lower the collective smoothly until the Collective is fully lowered. Reduce airspeed initially to ensure rotor build, adjust airspeed as needed, 50 KIAS is recommended. The Autorotative principles of the Guimbal are largely different than most other helicopters in regards to Rotor RPM, a collective check is only required if rotor builds greater than 590 NR RPM, which is most likely mid-turn.
Glide/Turn – Once established in Glide, Throttle should be rolled off to separate needles. Maintain a consistent 60 KIAS attitude while beginning a 45^{o} turn in direction desired to identify spot, continue a gradual turn in either direction, excessive bank angle will increase rate of descent. Careful watch of Engine RPM and firm grip of throttle should be ensured to sustain needle separation. Governor **MUST** stay on! Governor will protect inadvertent engine over speed. Verbal Cue as necessary shall contain, "Rotors, Airspeed, Trim, Landing Spot". After 200' loss of altitude has occurred it is recommended to roll throttle back on. It is recommended to apply a small rise in Collective to aid in needle synchronization. A cross check of Rotor RPM and Trim must be maintained.

WARNING

Prior to Helicopter descending through 200' AGL, the Instructor should make an immediate power recovery if,

A. Rotor is below 515 NR RPM
B. Airspeed is 30 KIAS or Less
C. Centerline has not been Over/Under Shot

Flare – At about 60' AGL an initial Flare will be implemented to reduce rate of descent and "feel" the air. Aft Cyclic will be maintained while Airspeed decreases and rate of descent is mitigated. Upon reaching approx. 20' AGL a large Aft Cyclic input should be applied to reduce remaining Airspeed. Excessive Flare may cause aircraft to balloon and should be avoided.
Recovery – Same as Straight-In Autorotation.

Objective:
To develop pilot understanding of safe operations during Complete Power Loss requiring a turn in opposite direction.

Notes:
Aircraft may kick with a noticeable adverse yaw when throttle is rolled back on and MR RPM is below 530. Exercise CAUTION!

Performance Standards:	Private	Commercial
Spot	+/- 200'	+/- 100'
Airspeed	+/- 5 KIAS	+/- 5 KIAS

Hovering Autorotation

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Maneuver will be conducted from a 3-5' Hover with Rotor RPM in the Green Arc, into the wind. Left hand should be repositioned so an inadvertent throttle increase causing over speed cannot be input, thus rotate hand down until fingernails are toward the sky. Governor shall remain on. With a smooth application, throttle shall be reduced. A left pedal input will closely follow maintaining the desired heading. Without the tail rotor thrust the Helicopter will immediately drift to the right unless otherwise commanded with left cyclic. A steady and effective increase in collective will be used to cushion landing. It is recommended to raise collective continuously until ground contact it 100% assured. The immense Rotor Inertia in this helicopter will easily aid in a safe and smooth touchdown, caution shall be used in excessive collective application as the helicopter will climb, further adding distance from ground. Once firmly on ground, lower collective full down, re-center pedals, and cyclic.

Objective:

Safely simulate complete power loss while in a Hover.

Notes:

ALL Hover Autorotation Practice will take place on hard surface. Runway, taxi-way, or other predetermined Concrete.

Procedure:

1 > 3-5' Hover, Engine Green Arc 515-540 NR RPM
2 > Left Hand Repositioned
3 > Announce "Hover Auto in 3-2-1"
4 > Smoothly reduce throttle
5 > Pedal As Required
6 > Allow Aircraft to settle
7 > Cushion landing with applied collective
8 > Lower Collective – Ground Assured

Performance Standards:

	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}

Power Failure at Altitude – Forced Landing

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

During a cruise flight at 1000’ AGL or above, a normal autorotation will be entered however the throttle shall not be rolled off (See Straight/180 Autorotation). A suitable landing area should be selected and input shall commence to maneuver to selected location. Prior to 500’ not in airport environment, 200’ in airport environment, maneuver shall be terminated by rejoining engine and rotor, a transition to climb shall happen immediately.

Objective:

To recognize an engine failure, properly enter autorotation and maneuver while immersed in Scenario Based training.

Notes:

This will quickly demonstrate effective landing location selection and aircraft maneuverability.

Performance Standard:

	Private	Commercial
Area Selection	Suitable	Suitable
Airspeed	+/-10 KIAS	+/- 5 KIAS

Rapid Deceleration (Quick Stop)

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Performing a normal takeoff into the wind. With a small climb to minimum of 25' and approx. 40 KIAS aircraft should then be leveled and stabilized. Maneuver is initiated by reducing airspeed with aft cyclic, maintain altitude with collective, and hold heading with Left Pedal as needed. The Guimbal will balloon easily if Aft Cyclic is not smoothly applied. It is recommended to pitch the nose up until trim string is on the horizon. As airspeed is lost aircraft will begin to settle, collective will be raised to arrest descent. Once a slow walking pace has been achieved, forward cyclic must be input to level aircraft. Collective shall be applied to avoid descent, pedal as required to mitigate yaw.

Objective:

To simulate a condition when a rapid decrease in airspeed is required. I.e. Aborted Takeoff.

Notes:

Avoid terminating into a high hover, or a low hover. Be mindful of aircraft length and protect tail, settling with tail down shall not be allowed. If at any time stinger contacts ground, flight is immediately terminated.

Performance Standards:	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}
Altitude	+/- 10'	+/- 5'
Termination Point	+/- 50'	+/- 25'

Shallow Approach and Running Landing

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

On final approach, the helicopter shall be positioned into the wind at 60 KIAS until within power off range of Runway. Approach will commence from 200' AGL, once a 5^{o} approach angle is intercepted the collective will be lowered to allow aircraft to descend. Begin a smooth deceleration with a gentle Aft Cyclic application. At about 3' AGL a continued smooth reduction in airspeed shall be maintained until just below ETL, level skids as needed, allow aircraft to settle. Once ground contact has been made, heading shall be maintained with pedals and drift with cyclic. Slowly lower collective to allow skids to "brake" the aircraft.

Objective:

To simulate an approach and landing when sufficient power for hovering is not available.

Notes:

If a crosswind is noticed a cyclic input will be required to combat additional drift. Run on landings should not be performed any faster than ETL. Excessive speed causes excessive wear and increase risk of dynamic rollover if drift and yaw are not correctly compensated for.

Performance Standards:	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}
Touchdown Point	+/- 50'	+/- 25'
MLI %	> 75%	>60%
Speed	ETL or Less	>ETL

Slope Operations

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Prior to conducting Slope Operations, the pilot must be thoroughly familiar with Dynamic Rollover Characteristics and Risks.

Landing – Helicopter will be positioned into wind in a sustained 5' Hover for training purposes and safety. With a designated point forward of the helicopter, pilot will maneuver intercepting point with forward cyclic approaching from a 45^{o} angle while maintaining skids parallel to intended surface. Upon reaching designated landing point a collective reduction will allow helicopter to settle until uphill skid contacts surface in a controlled manner. Heading will be maintained with pedal inputs as required. Lateral cyclic will be applied in direction of slope, maintaining a level rotor disk while lowering collective until ground contact is 100% assured. Before collective is lowered full down a surface check shall be conducted to ensure suitable landing surface.
Takeoff – An exact reverse procedure to the landing shall take place. Cyclic will be laterally input to "level" rotor disk, collective will be slowly applied ensuring drift is controlled and pedals maintain heading. Once aircraft is free of surface, pilot will maintain skids parallel to hill while departing forward and away at a 45^{o} angle to protect tail from inadvertent ground or obstacle contact.

CAUTION!

If at any point a dynamic rollover risk is evident, maneuver will **IMMEDIATLEY** be terminated and reset!

Objective:

To land and depart safely from a sloped surface that would otherwise prevent a normal touchdown landing.

Performance Standard:

	Private	Commercial
Heading	+/- 10^{o}	+/- 5^{o}
Drift on contact	None	None

Recognition and Recovery from Low Rotor RPM

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

1 > Cruise Flight, Takeoff, and Approach –

a. Entry and Recognition – During cruise flight, takeoff and approaches, while NR RPM indicates 530, the Instructor will first announce and then slowly reduce throttle decreasing MR RPM. The Cabri Governor is very strong, and will be left on for protective purposes. The decrease will be noticed by:
    i. Noticeable decrease in Engine Noise as well as Rotor.
    ii. NR backup will indicate RPM below 515.
b. Recovery Technique – Once Low Rotor RPM is noticed, student shall first verify they are not over controlling throttle. If manual throttle is the cause, a reduction in manual pressure will allow governor to re-center. If manual control was not the issue, student shall smoothly roll throttle to increase RPM while simultaneously reducing collective to reduce AOA and its resultant Torque effect. Collective inputs should be carefully input as correlator can reduce effectiveness of previous throttle increase.

2 > Hover –

a. Entry and Recognition will be similar.
b. Recovery is same as forward flight. Be aware that a negative transfer of learning may have occurred from Hover Auto-rotations. A large increase in Collective to “cushion” landing may further decay the Rotor RPM.

Objective:

To become thoroughly familiar with the recognition of low rotor RPM and the techniques of recovery.

Notes:

This is an optimal time to practice Governor Failure in all phases of flight with student. While Governor Failure is rare, it can be a challenging procedure as the Governor constantly maintains throttle throughout standard flying.

Performance Standard:

Pilot must begin recovery prior to reaching 505 MR RPM.

Vortex Ring State

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2, Private PTS & Commercial PTS

Description:

Vortex Ring state can only occur with the collaboration of 3 things at the exact same time. This will be practiced above 1500' AGL and recovery must take place prior to 1000' AGL per PTS.

Enter VRS - The Guimbal has proven its ability to resist this maneuver often. Prior to maneuver, practice a clearing turn must be performed and a location announcement must be performed on the company traffic frequency, 121.95. Once clearing turn has yielded no hazards, pilot will begin a reduction of airspeed into wind while lowering collective power to approx. 55%. Pedal input will be required to maintain heading. Once the aircraft has come to a near zero airspeed the aircraft will be leveled with forward cyclic. The aircraft should begin to "shudder" with a noticeable shake caused by rotating vortices around the rotor disk. Pedal input will lack authority. Vertical descent can easily exceed 1500 fpm.

Recovery – Shall be initiated at first sign of VRS. The FAA recommended recovery is to increase airspeed while simultaneously reducing collective. Once airspeed exceeds ETL power shall be re-applied until normal climb has been initiated. Recovery must be done prior to 1000' AGL and only complete when VSI reads 0!

The Guimbal recommended recovery allows for less altitude to be sacrificed. First, apply forward cyclic to increase airspeed while simultaneously increasing power to 90%. You shall not exceed 90% past 30 KIAS. With power applied and airspeed increasing minimal altitude will be sacrificed. VSI must show 0, for maneuver to be completed.

Objective:

To demonstrate the danger of Slow flight (Less than ETL), Power Applied, and High Sink Rate

Notes:

A though understanding of Vortex Ring State must be understood prior to maneuver.

Performance Standard:

Pilot must understand and recognize VRS conditions and be able to safely recover.

Enhanced Autorotation Procedures

References:

Helicopter Flying Handbook, POH Guimbal Cabri G2

Description:

For enhanced autorotation's the pilot will demonstrate ability to maneuver helicopter in a number of ways individually and together to guarantee suitable landing to desired location.

TURNS- Use of turns will be used to potentially locate a more suitable landing area as well as reduction in altitude.

AIRSPEED – The normal straight-in/180 entry speed is 60 KIAS with a reduction to 50 KIAS. Airspeed will be demonstrated from every range of Cruise flight to ETL. Demonstration and practice will identify proper Rotor RPM recovery and added challenges throughout airspeed range. Maximum Glide Ratio will be implemented per the Guimbal POH. Confined Area landing should be covered in depth as well, per Guimbal POH. Minimum Rate of descent as well, corresponding with Vy.

PEDALS – Use of pedals and the effect of the resultant drag. How pedals may also control MR RPM

SIDEWARD FLIGHT – Controlling the aircraft in a full side flight configuration to maintain visual of landing spot.

CAUTION

Airspeed must recovered prior to 200' AGL, Engine and Rotor Tachometer shall be rejoined as well.

Full Touchdown Autorotation's will only be practiced with the **Chief or Asst. Chief Pilot,** absolutely no exceptions will be made to this rule!

Objective:

To understand the different elements that can be used to maneuver the helicopter in Autorotation. This will be covered primarily during Commercial Pilot training but Private Pilot students will be aware of available options.