Revised: October 2025

COLLEGE OF ATMOSPHERIC & GEOGRAPHIC SCIENCES
SCHOOL OF AVIATION
The UNIVERSITY *of* OKLAHOMA

SUPPLEMENTARY INFORMATION

FOR
FLIGHT STUDENTS

This pamphlet provides information to assist flight students in learning standardized procedures at the University of Oklahoma Aviation Department and guidance on performing procedures and maneuvers that are a part of flight training.

Revisions

May 2024

1. Removed references of Cessna Aerobat
2. Adapted procedures to include Piper 100i
3. Updated “references” sections to latest publications
4. Updated FRAT sheet
5. Updated diversion checklist
6. Removed procedures regarding old equipment in instrument flying sections
7. Added cover page and footer
8. Various spelling/grammatical errors fixed

July 2024

1. Clickable table of contents
2. Removed references of Crm 21

October 2025

1. Updated table of contents
2. Added second density altitude chart
3. Updated 'Practice Area Procedure and Identification' to include current procedures and updated boundaries with satellite geographical references
4. Removed references to "V_{REF}"
5. Added weight change formula equation to 'Other Calculations' page
6. Updated FRAT sheet
7. Updated 'Aircraft Operations - Pilot Preventive Maintenance' page to match current policies
8. Removed references to CFI assigned aircraft policies
9. Added briefing item to 'Pre-Takeoff Briefing' page (abnormalities during takeoff roll)
10. Fixed incorrect frequencies listed and updated frequencies to know list
11. Updated radio procures to include initial call to approach
12. Updated operating procedures at KOUN to match current policies
13. Updated 'Takeoffs' section to more accurately match fleet specific procedures
14. Added restriction to Power-Off 180 to be consistent with Fall 2020 PRF #2
15. Updated procedures to 'Emergency Approach and Landing' page
16. Updated procedures to 'Emergency Descent' page
17. Updated maneuvers and procedures to include power settings, airspeeds, and flaps settings as appropriate
18. Updated 'Time/Distance/Fuel to Descend' to include 100i parameters and overall clarity
19. Removed 'VFR and IFR Cross Country Flight Planning' pages from 'Cross Country Flight Planning' Section
20. Updated 'Instrument Cockpit Check' page to 100i specific items and added a separate page for the warriors
21. Updated configuration parameters for instrument approaches
22. Removed 'Terminal Approach' page
23. Adapted procedures to include Piper 100i and exclude warriors as appropriate
24. Updated verbiage to 'Multi-Engine Maneuvers' section
25. Added separate 'Accelerated Stall' page to 'Multi-Engine Maneuvers' section
26. Revised 'Short Field Approach and Landing' page in 'Multi-Engine Maneuvers' section
27. Changed Short Field Approach speed for Multi-Engine from 80kts to 75kts.
28. Updated simulate feather to be 12" MAP instead of 10" MAP
29. Updated 'End of Course Stage Check' section
30. Updated “References” sections to latest publications
31. Various minor verbiage change to policies and procedures to be more accurate and precise
32. Various spelling/grammatical/formatting/font errors fixed

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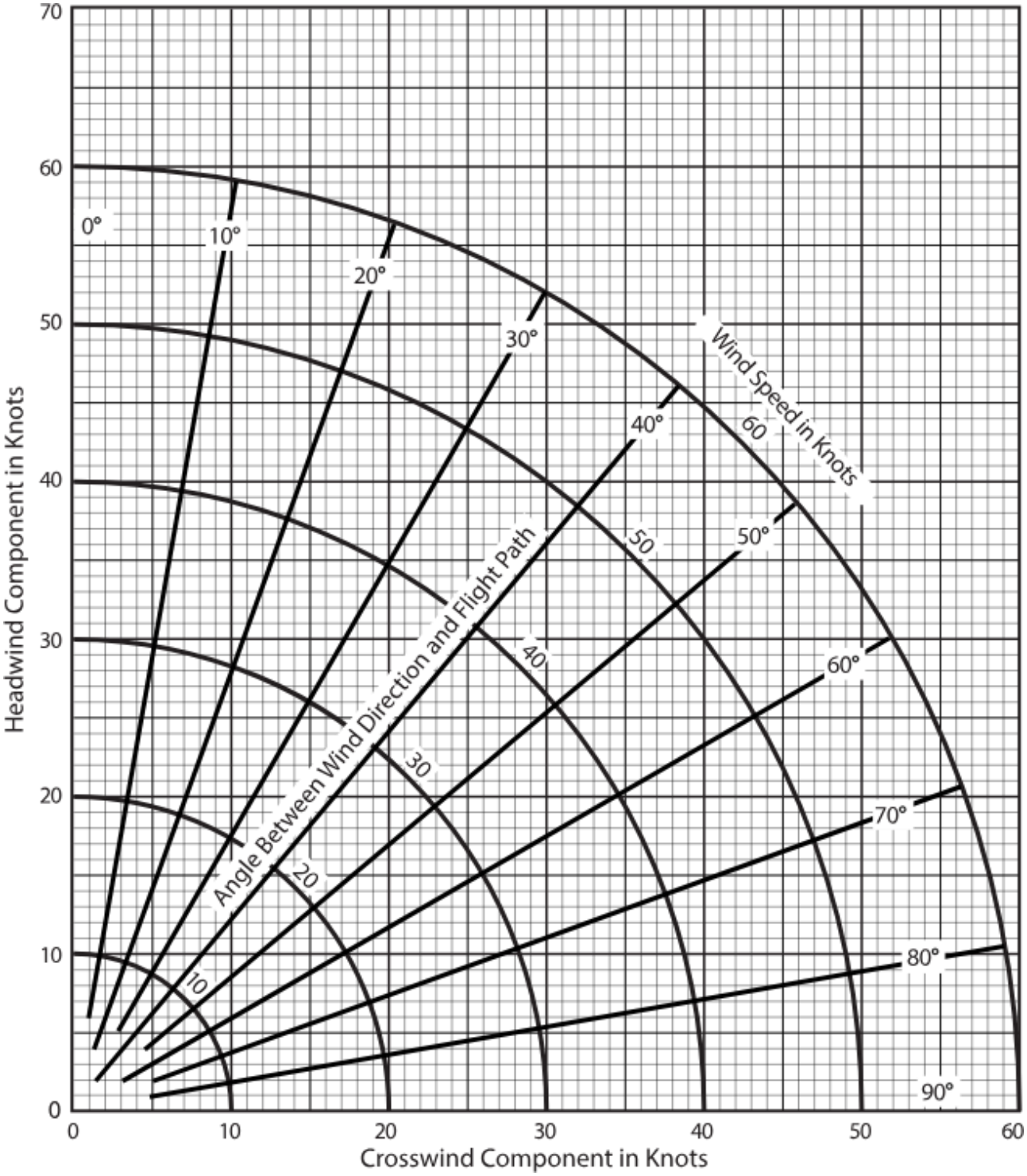
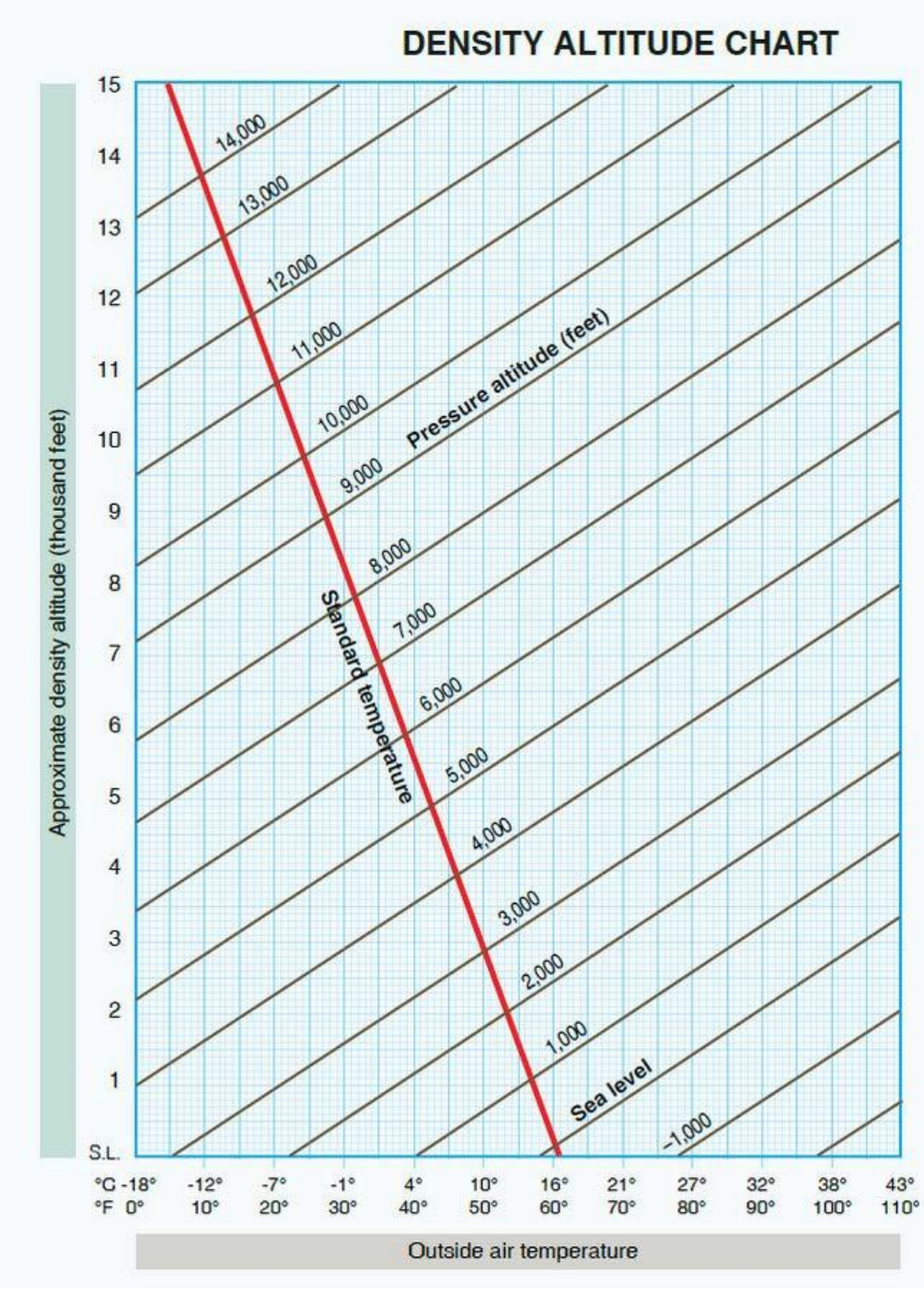
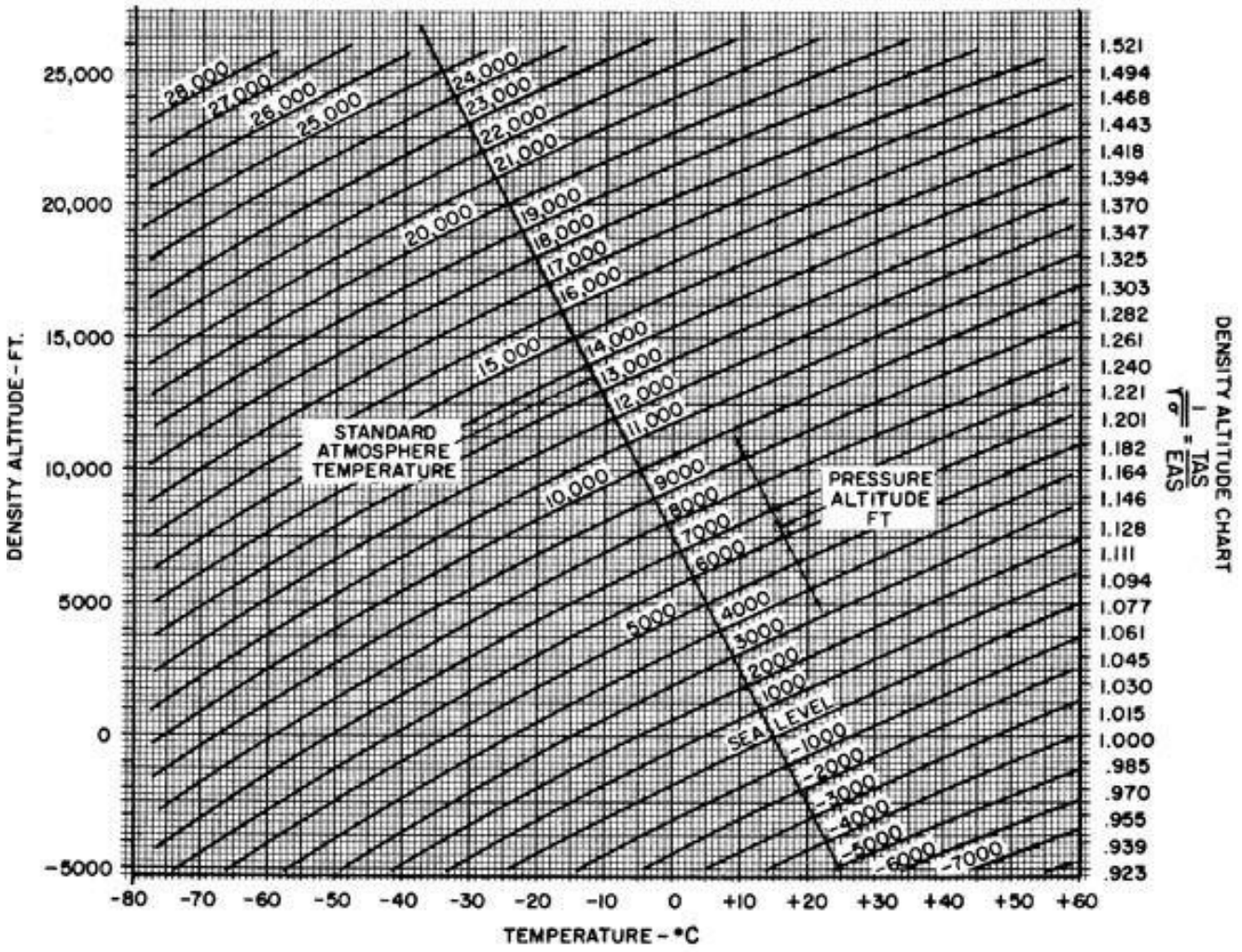
Crosswind Components Computer



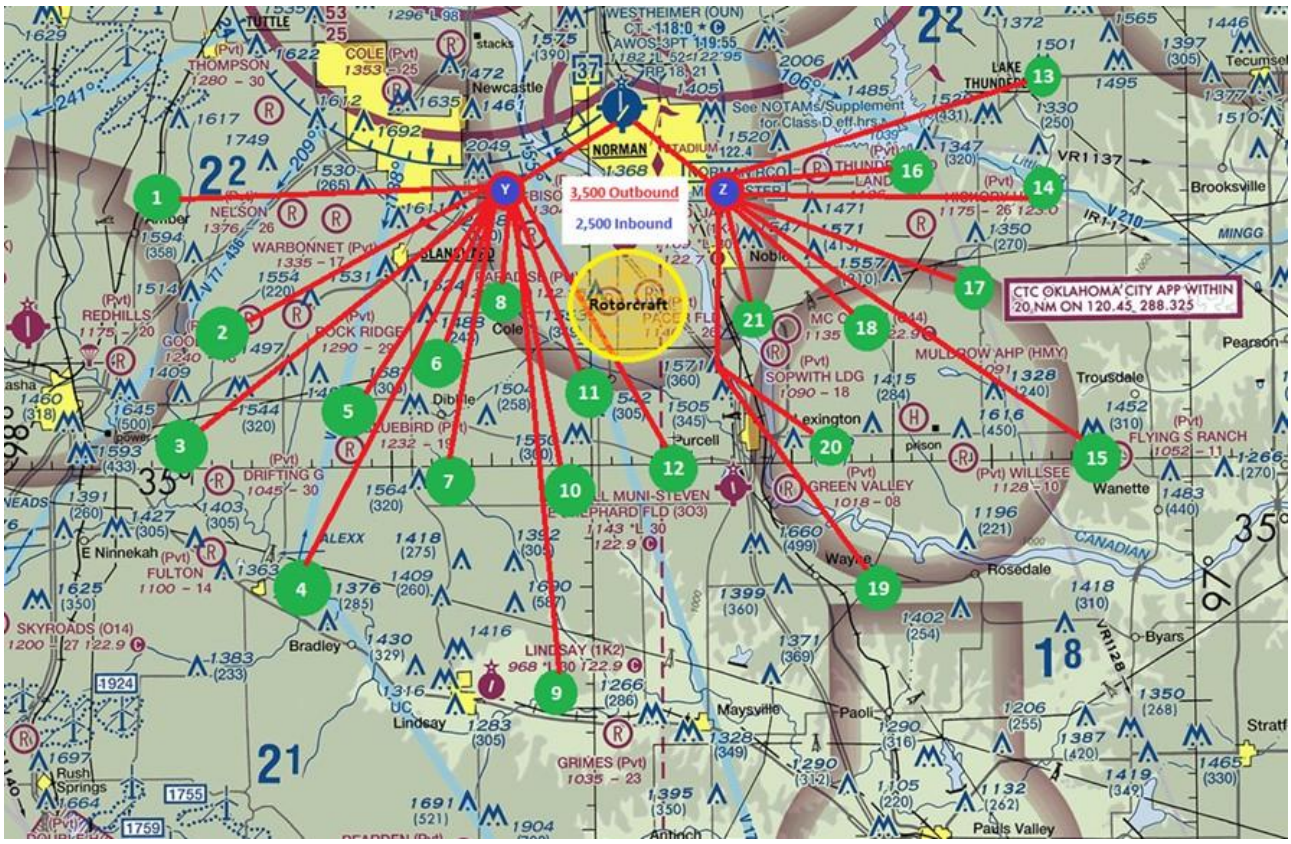
Density Altitude Chart



Density Altitude Chart



Practice Area Procedures and Identification



OU Departure / Arrival Procedures

- **<u>Outbound Traffic</u>**:
  - Contact tower and advise direction of flight (Southeast for checkpoints 13-21, Southwest for checkpoints 1-12)
  - After takeoff, fly to waypoint Y or Z, per your training checkpoint assignment. Tower will assign a departure turn appropriate for your direction of flight.
  - Request frequency change OKC approach at 2,500 MSL if tower has not handed you off already. (Southeast 124.2 Southwest 124.6)
  - Approach should give you a switch to Advisory frequency (123.3)
  - On departure, climb to 3,500 MSL and proceed from waypoint Y or Z directly to your assigned training area.
- **<u>Inbound Traffic</u>**:
  - Complete "In-Range Checklist" and contact OKC approach prior to leaving your assigned training area.
  - Initial contact should include aircraft identification, position relative to OUN, and intentions. (i.e. "inbound for landing")
  - proceed inbound to OUN at 2,500 MSL at this time and OKC approach will hand you off to OUN tower
  - This increases aircraft separation with departing traffic.

Checkpoint Identification

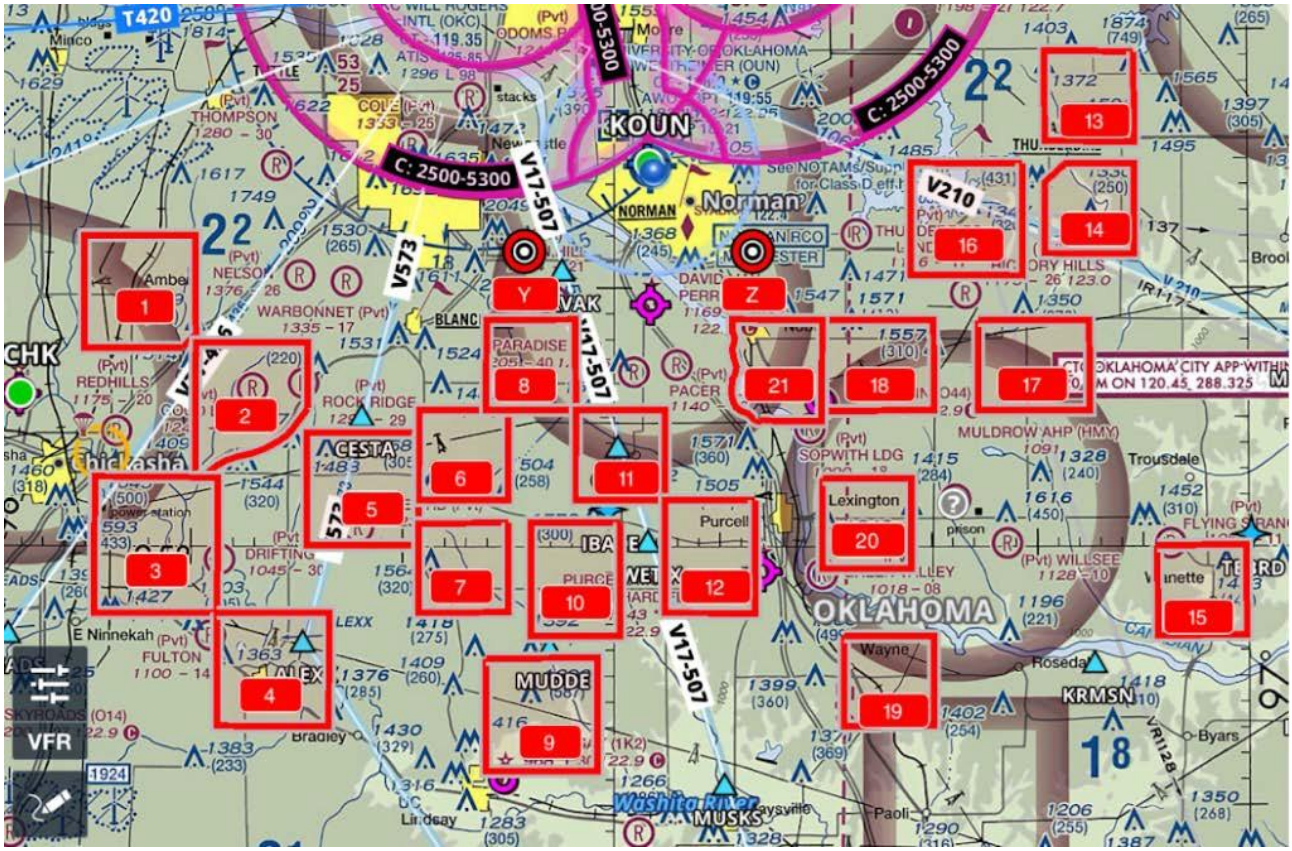
- Routing Checkpoints:
- - Y = Highway 9 and May Ave (White Water Tower)

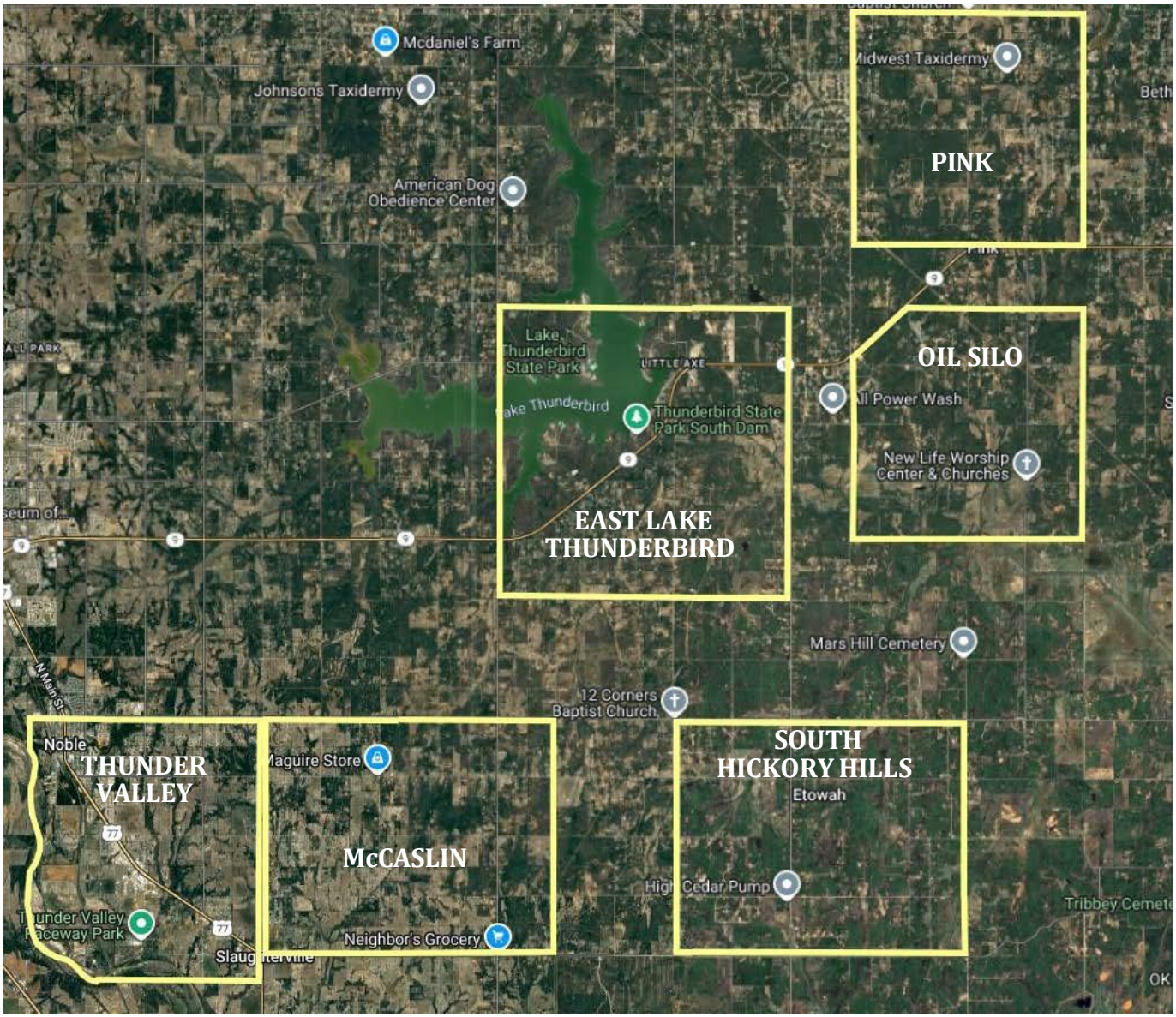
- - Z = “Postal Training Center”

Training Checkpoints

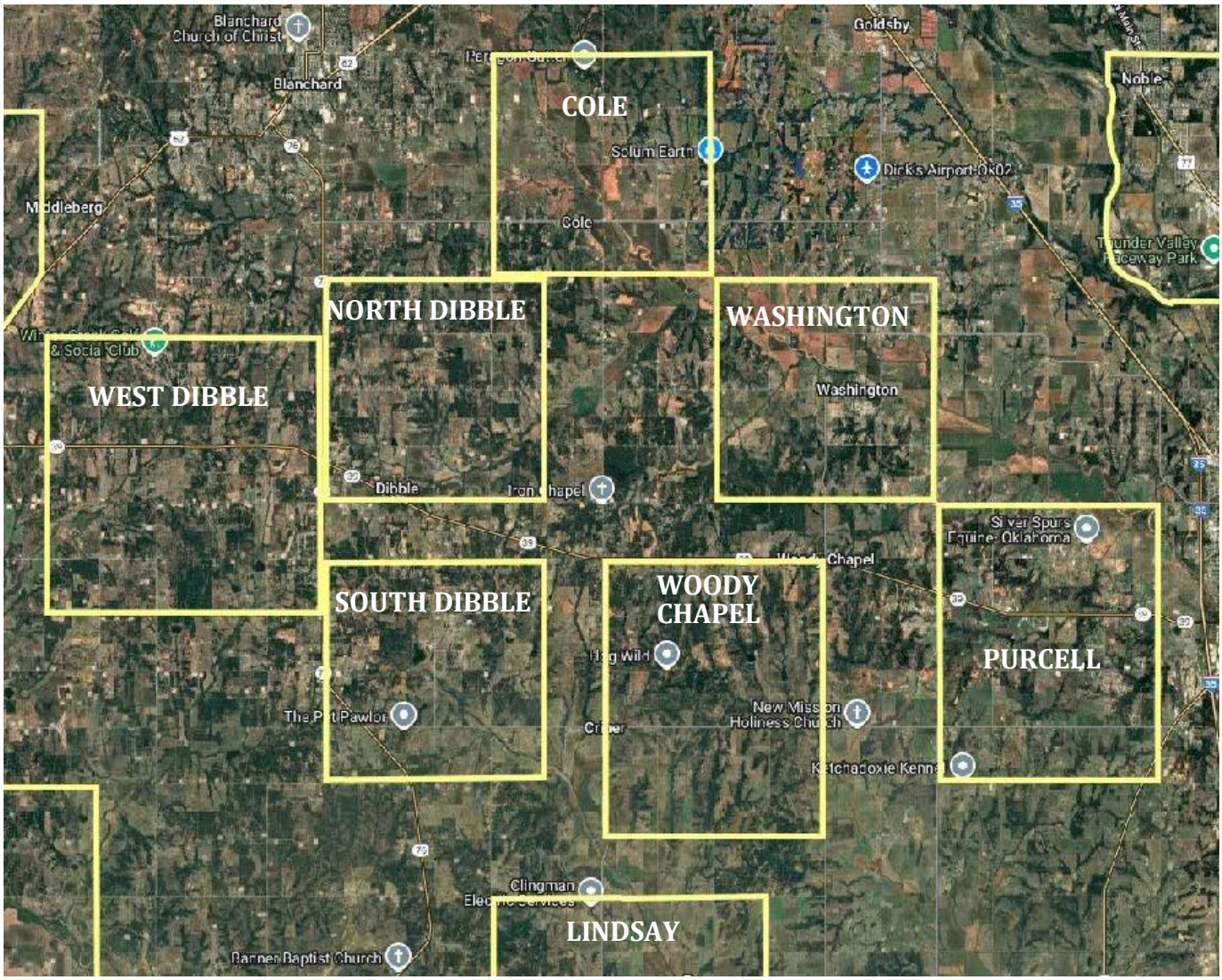
- - 1 = Amber
- - 2 = Good Life (170K) 18 DME off the IRW 203 radial
- - 3 = East Chickasha (watch for active parachute jumping area*)
- - 4 = Alexx
- - 5 = West Dibble – 20 DME off the IRW 186 Radial
- - 6 = North Dibble (assign last on north flow days)
- - 7 = South Dibble
- - 8 = Cole
- - 9 = Lindsay
- - 10 = Woody Chapel
- - 11 = Washington
- - 12 = Purcell* Always check NOTAM for possible sUAS activity up to 5,000 MSL
- - 13 = Pink
- - 14 = Oil Silo
- - 15 = Wanette
- - 16 = East Lake Thunderbird
- - 17 = South Hickory Hills
- - 18 = McCaslin
- - 19 = Wayne
- - 20 = Lexington * Always check Lexington NOTAM (possible sUAS activity)
- - 21 = Thunder Valley (assign last on north flow days)

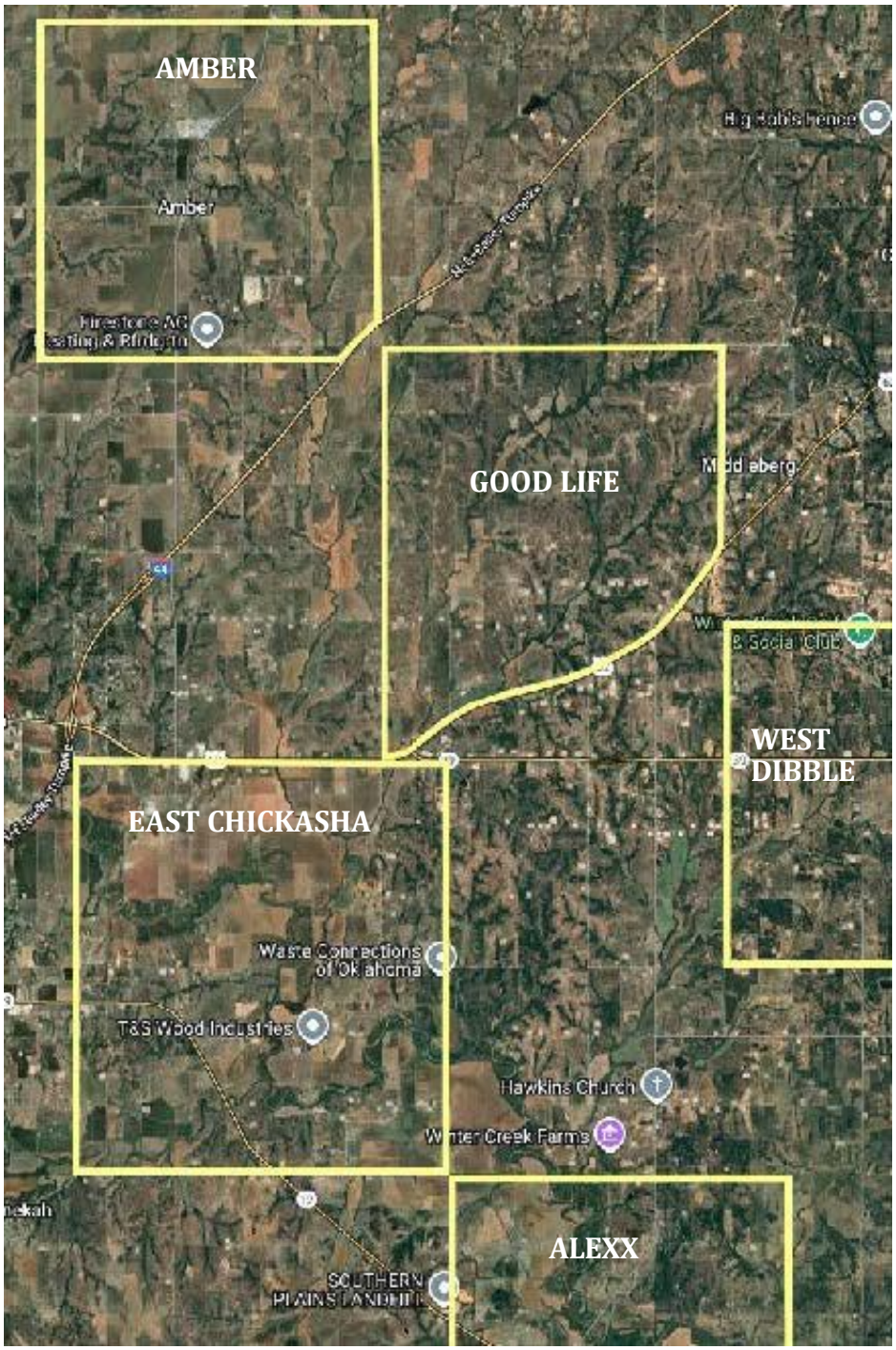
Practice Area Identification and Boundaries




Mcdaniel's Farm
Johnsons Taxidermy
American Dog Obedience Center
Midwest Taxidermy
PINK
OIL SILO
Power Wash
New Life Worship Center & Churches
Lake Thunderbird State Park
Thunderbird State Park South Dam
EAST LAKE THUNDERBIRD
Mars Hill Cemetery
12 Corners Baptist Church
Noble
THUNDER VALLEY
Thunder Valley Raceway Park
Maguire Store
McCASLIN
Neighbor's Grocery
SOUTH HICKORY HILLS
Etowah
Cedar Pump
Tribbey Cemet
OK


LEXINGTON
WANETTE
WAYNE
Lexington Wildlife Management Area
Lexington WMA Shooting Range
Church of the Cross
A&Z Grocery and Feed
Purcell
Lexington
Beginning Church Corbett
Dox Cemetery
Safari Steyz
Wanette
Madden Crew Offroad Park
Railroad Bridge Road Bridge
Rosedale
Wayne
Red Rock Church
Byars
National Reining Breeders Classic

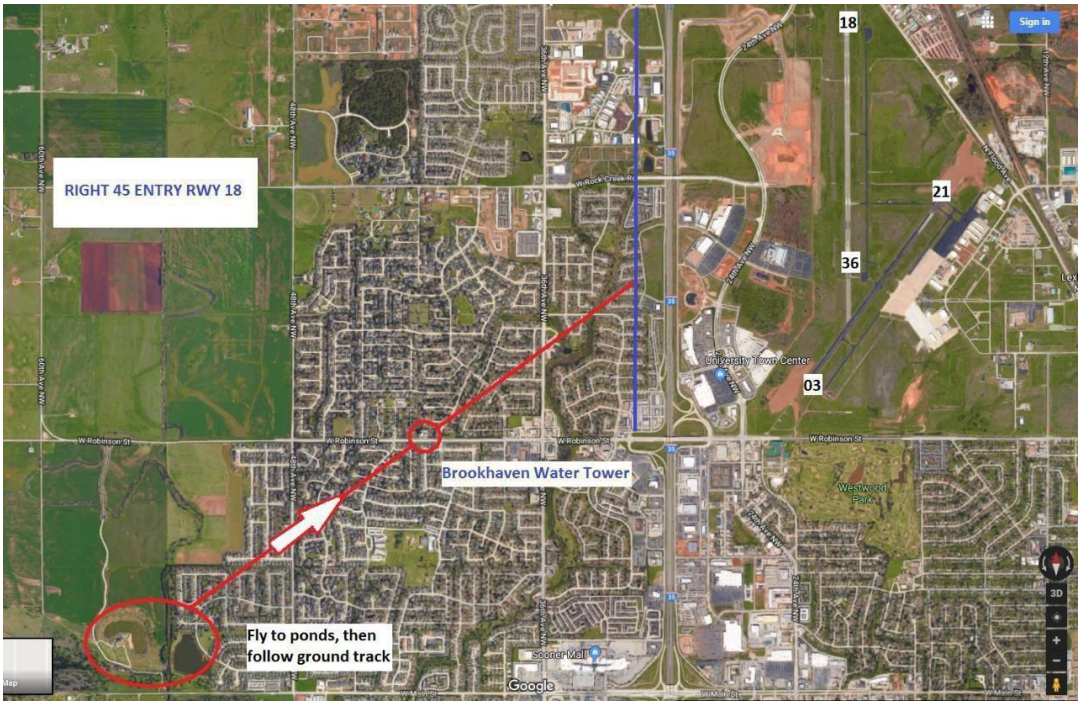

COLE
NORTH DIBBLE
WASHINGTON
WEST DIBBLE
SOUTH DIBBLE
WOODY CHAPEL
PURCELL
LINDSAY
Blanchard Church of Christ
Blanchard
Goldsby
Noble
Middleberg
Cole
Washington
Dibble
Clingman


AMBER
Amber
GOOD LIFE
Middleberg
WEST DIBBLE
EAST CHICKASHA
Waste Connections of Oklahoma
T&S Wood Industries
Hawkins Church
Winter Creek Farms
ALEXX
SOUTHERN PLAINS LANDFILL

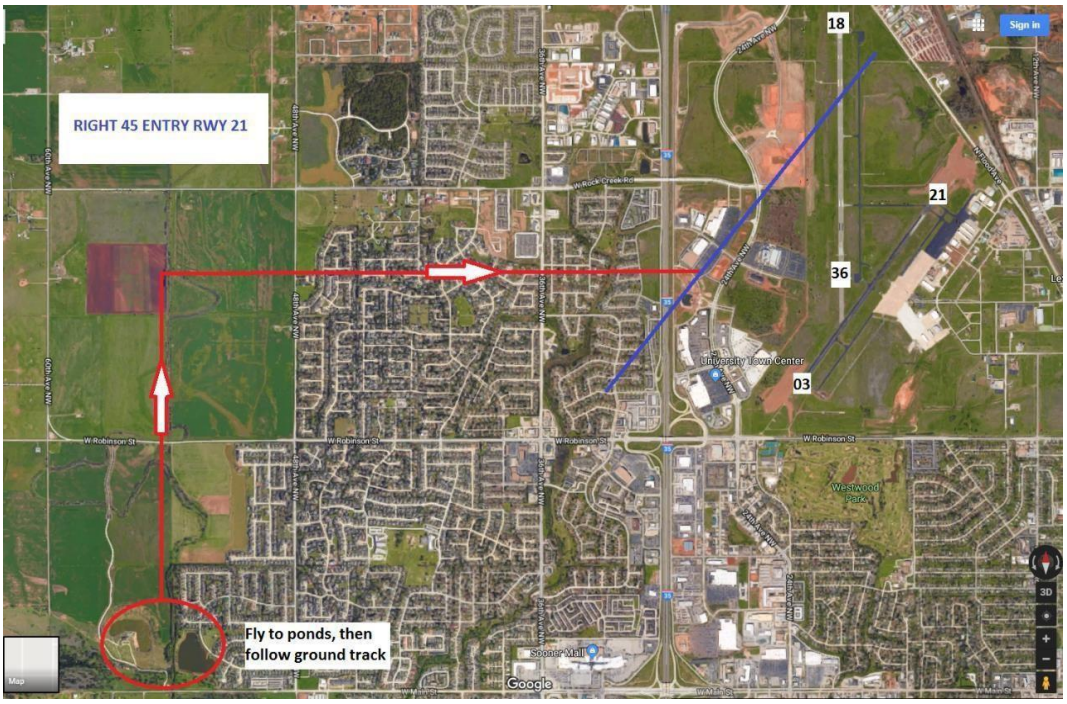
(1) Amber: Stay Northwest of Turnpike
(2) Good Life (170K): Stay North of Highway 62, Southeast of Turnpike
(3) East Chickasha: Stay South of Highway 39&62, East of Town of Chickasha
(4) Alexx: Stay around town of Alex
(5) West Dibble: Stay West of Highway 76
(6) North Dibble: Stay East of Highway 76, North of Town of Dibble
(7) South Dibble: Stay East of Highway 76, South of Town of Dibble and Highway 39
(8) Cole: Stay over and North of town of Cole
(9) Lindsay: Stay South of Woody Chapel and South Dibble
(10) Woody Chapel: South of Highway 39, West of Highway 24, East of Highway 59
(11) Washington: Stay around town of Washington, Do not got South of the double white water towers
(12) Purcell: West of Purcell Airport
(13) Pink: Stay North of Highway 9
(14) Oil Silo: Stay South of Highway 9
(15) Wanette: Stay around town of Wanette
(16) East Lake Thunderbird: Stay around the dam
(17) South Hickory Hills: Stay Southeast of Hickory Hills Airport
(18) McCaslin: Stay Northeast of McCaslin Airport
(19) Wayne: Stay South of River
(20) Lexington: Stay East of Highway 77, North of the River
(21) Thunder Valley: Stay East of the river, West of McCaslin Airport, South of town of Nobel

45 Degree Entry Procedures

Runway 18



Runway 21



Dispatch and Solo Sign out procedures

When students arrive for their flight, they shall meet with their CFI and review weight and balance, syllabus ticket, and homework for the flight. Once complete, they will be assigned an aircraft, assigned a practice area if applicable, and issued the aircraft key.

Aircraft V-Speeds

PA-28-161 (KIAS)	
V_{S0}	**44**
1.1 V_{S0}	**48**
1.2 V_{S0}	**53**
1.3 V_{S0}	**57**
V_{S1}	**50**
V_X	**63**
V_Y	**79**
V_{FE}	**103**
V_A (@ max. gross)	**111**
V_{NO}	**126**
V_{NE}	**160**
Best Glide	**73**
Cruise Climb	**87**
Max Crosswind	**17**

PA-28-181 (KIAS)	
V_{S0}	**45**
1.1 V_{S0}	**49**
1.2 V_{S0}	**54**
1.3 V_{S0}	**59**
V_{S1}	**50**
V_X	**64**
V_Y	**76**
V_{FE}	**102**
V_O (@ max. gross)	**113**
V_{NO}	**125**
V_{NE}	**154**
Best Glide	**76**
Cruise Climb	**87**
Max Crosswind	**17**

Definitions:

V_{S0} – Stall (Landing Configuration)
V_{S1} – Stall (Specified Configuration)
V_X – Best Angle of Climb
V_Y – Best Rate of Climb
V_{FE} – Maximum Flap Extension
V_A – Maneuvering Speed
V_O – Maximum Operating Speed
V_{NO} – Maximum Structural Cruise
V_{NE} – Never Exceed Speed

Other Calculations:

V_A/V_O:

$$V_A \text{ or } V_O = V_{A/O} \text{ at Max Gross Weight} \times \sqrt{\frac{\text{Landing Weight}}{\text{Max Gross Weight}}}$$

Weight Shift Formula:

$$\frac{\textbf{Weight Shifted}}{\textbf{Total Aircraft Weight}} = \frac{\Delta \textbf{ in CG}}{\textbf{Distance Moved}}$$

Weight Change Formula:

$$\frac{\text{Weight Changed}}{\text{New Aircraft Weight}} = \frac{\Delta \text{ in CG}}{\text{Station Changed} - \text{Old CG}}$$

Pivotal Altitude:

$$\textbf{Pivotal Altitude} = \frac{\textbf{Groundspeed}^2}{\textbf{11.3}^*} + \textbf{Elevation}$$

*Groundspeed in knots. For miles-per-hour, divide by 15

OU Flight Risk Assessment Tool (FRAT)

Each OU Flight (dual or solo) MUST have a FRAT tool filled out and analyzed by the PIC and their CFI. The FRAT will be provided to the dispatcher upon dispatch and the dispatcher will review “before” handing the pilot the aircraft key.

The current OU FRAT is available on the OU Student Resources website as a “Risk Management & Weight Balance” under "Weight and Balance Instruction".

A paper combo form is also available by dispatch.

The OU FRAT allows each PIC and CFI to assess key aspects of RISK before flight and then to seek ways to reduce risk before the flight.

The FRAT should be started the “day before the flight” – much of the FRAT can be completed BEFORE showing up at the airport (and should be) and then “updated as necessary” upon show at airport with final review of preflight items.

OU pilots should be familiar with aspects of Risk Management/FRAT out of the FAA Risk Management Handbook pages 4-2 through 4-4.

OU Flight Risk Assessment Tool -- RISK FORM (FRAT) **Fly Like A Champion!**

15-Oct-2025

Points to apply-->	1	2	3	4	5	RATING
Risk Area						
Crew	Dual w/CFI	Two Pilots	Solo			
Rest in last 24 Hours	>8 hours	6.1 to 8 hours	5.1 to 6 hours	4.1 to 5 hours	<4 hours	
Sleep was Restful	Yes		Partially		No	
Health	No Issues		Recovering		Health Issues	
Last use of Medicine	>48 hours		25 to 48		12 to 24	
8-12 hrs Alcohol	None		Some 9-12		Some 8-9	
	NO ALCOHOL 8 hours prior!					
Heat Index	<95	95 to 99	100 to 104		>105	
External Stressors	Few		Several		Many	
Flight Type	VFR	MVFR	IFR		LIFR	
Day or Night	Day		Night Full Moon		No Moon	
Visibility	>5 Miles	3-5 Miles	<3 Miles		<1 Mile	
Ceiling	>10,000	5K - 9K	3K - 4K	1K - 2K	<1K	
Winds	<10 kts	10-15 kts	>15 kts	>20 kts	>30 kts	
X Wind Actual	0-5 kts		6-10 kts		>16 kts	
X Wind Fcst	* If increasing with time beyond 15 kts must talk with CFI					
WX Stability	Stable		Slow Deter		Possible Rapid	
Destination	Familiar			Unfamiliar		
	* If Unfamiliar - Solo - must discuss with CFI					
OU Variant Acft	Crm 1-11, 13	TAA, 75	Crm 37, 38, 39, 40			
Aircraft Mx Status	Clean		Recent Write Up			
Hours in Type	>200	151-200	100-150	50-99	<50	
Flight hrs last 90 days	>20	15 to 20	10 to 14	5 to 9	<5	
Total Flight Time	>500	251-500	100-250	20-99	<20	
Read NOTAMS and PRF	Yes				No	

TOTAL RISK SCORE ---------->	
No unusual hazards. Use normal flight planning & establish personal mins & operating procedures.	22 - 45
Some Additional Risk - Talk to Your CFI and Dispatcher about Risk areas. Conduct flight planning with extra care. Review personal mins and operations procedures - mitigate risk areas if possible. (change airport/change planes/etc) YELLOW AREA	46 - 51 Or 5 in any row
Higher Risk. Must get approval of Sup. of Ops/fleet for flight. Conduct flight planning w/extra care. Review elements to ID those that could be modified to reduce risk. Develop contingency plans before takeoff for items. Decide before flight on alt. and consider special precautions to take. Consider delaying flight until risk conditions are reduced. RED AREA	>51 Or two 5's

Reference FAA.Gov Risk Management Handbook

PIC Signature: _____ **If Yel or Red: Assistant Chief Sign:** _____

CFI Name (Print): _____ **PRF#** _____

Fuel Procedures

OU Single Engine Aircraft

- During the summer months for local flights when daytime highs routinely climb into the 90s – ramp fuel will be filled to "aircraft fuel tank TABS". Once high temps are not climbing into the 90s – ramp fuel loads will be "FULL"
- A PRF will be posted to inform when the change occurs.
- PICs should properly accomplish their weight and balance.
- During transition for a few days it is possible that you may find a different fuel load on an airplane – be flexible and be safe and conservative in airworthiness decisions.

Fuel Leaning Procedures

- OU checklists require fuel mixture to be set FULL RICH for takeoffs and landings.
  Except for exceptions found in the POH (high density altitude above 5,000 Density)
- Inflight leaning: when operating at cruise for extended periods may be accomplished after the procedure has been taught by your CFI.
- Lycoming prescribes inflight leaning by utilizing the "rich of peak" method.
  - This will be accomplished in accordance with the associated aircrafts POH under normal procedures.

This leaning is NOT NECESSARY for normal operations in the practice area for a nominal one-hour flight. Leaning should not be performed by students in cross country flights unless they have had thorough prior instruction on this procedure by their flight instructor.
Understanding the "why's and how's" is essential to proper leaning.

ALTERNATE CRUISE REFUELING PROCEDURES if Cruise Fueling Truck is BROKE
If OU aircraft require fuel - …..

1. Dispatch will coordinate with the CFI of the flight to have the aircraft towed to the fuel farm(tanks) (west side of the T hangar by field) and sight the orange chocks on the ramp by the fuel farm. Chocks will be lined up with the RIGHT SIDE MAIN. **DO NOT** taxi aircraft with engine(s) running on the rough pavement NOTE: Tow bar and/or power tower will be provided at the shut down area.
2. Tow straight towards the **3 orange cones in a line** the They will be several aircraft distance wise in front of the stopping position.
3. STOP when you are aligned with the LARGE ORANGE CONE **off your RIGHT WING.**
   - **Cruise will refuel the aircraft there.**
4. PILOT will stay by the aircraft.
5. Upon completion of refueling, tow aircraft to the far edge of the hanger.
6. Pilot starts engines and taxis off on mission.

EACH Aircraft CFI MUST call Cruise with the request when they need it.
Anticipate Cruise line staff meeting the aircraft within 10 min after the phone call. If they get other GA it could be longer, but hopefully not.
NOTE: If landing and YOU have time – please help out and fuel the aircraft on return – stop on the taxiway hammerhead (out of the way) and call Cruise and tell them you have landed and are taxiing to the fuel farm for top off.
NOTE: If fuel cards are available, CFIs are authorized to refuel at other FBOs that accept the OU fuel card in lieu of the above refueling procedures.

Aircraft Operations – Pilot Preventive Maintenance

When checking engine oil in the Warriors and Pilot 100Is, normal engine quantity is 6 to 8 quarts according to Lycoming and is marked inside the engine cowling.

Handling Oil, Lubricants information for CFI's/Students/Maintenance personnel:

As a student, you can not add oil to the aircraft. Oil must be added by either an OU Instructor, Maintenance Personnel, or Morning/Night Maintenance.

If you handle oil, cleaning lubricants etc. use common sense and be careful not to spill on your skin or in/on aircraft. Plastic /latex disposable gloves are always available to you in the CFI Hangar "supply cabinet" and at the MX Hangar (by King Air) supply table (where you find the oil and light bulbs). It is recommended you consider wearing gloves and wash your hands/skin that is exposed thoroughly following handling.
Always follow safety precautions on any packaging. Additionally, pilots will monitor aircraft refueling operations both on the OU ramp and at cross country refueling stops. Pilots will always sump their fuel after refueling. One should always use "basic common sense" if you handle such materials and spill fuel on your skin – and go wash your skin/hands. After handling lubricants/fuel - do not touch your eyes without washing your hands first.

Additionally, all materials Material Data Sheets (MDS info sheets) are filed in the Main Maintenance hangar and the MDS books are located on the King Air Supply Table for reference. Your CFI should take you on a tour of the maintenance shop each semester to look at the aircraft's maintenance logbooks.

STICKEY YOKES

Although the yokes are cleaned and lubed every 100 hour inspection, sometimes they can become dirty and slightly stick (when you check flight control movement). If the yoke is sticky, obtain a CFI and ask them to clean/lubricate the yoke.

Extra Aircraft Equipment Items:

If extra items are needed Dispatch will provide them Specifically,

- Yellow Maintenance Required Signs
- GATS Fuel Strainer Jars
- Tie Down Straps
- Instrument Hoods
- Sun Visors
- 100 Hour Sheets

Care of Aircraft:

There are several areas which with proper operation by the pilot will reduce wear and tear and thus reduce maintenance down time on the aircraft. CFI's will ensure each pilot is aware of these areas for all new flight students.

- How to open and close the top door latch
    - Use one hand to push inward on door before moving plastic latch with other hand.
    - From "inside" – ensure ample pulling in of door before moving latch.
- Engine Cowling Gascolator
    - Do NOT use the GATS JAR "on the metal" – gently push the valve in with your fingers to allow fuel to flow into the GATS JAR.
        - Using the GATS JAR puts undo torque stress on the gascolator unit causing the inside parts to start to leak excessively.
    - Place GATS JAR back in seat pouch to avoid melting in hot sun.
    - Always close the side window and place sun visor in window.
    - Fuel spills larger than the contents of a GATS JAR need to be reported to airport ops.
- Sun visors
    - Place sun visors in the windscreen when daily temperatures exceed 70°F.

Bird Strikes and or Wildlife Strikes

During Aircraft Preflight/Postflight Walk Around pay attention for any “strikes” and/or damage.

Any bird strike or other wildlife strike will be reported to the OU MOBILE and Dispatch immediately and the aircraft will be Squawked and downed for maintenance review.

A Safety report will be filled out and the FAA wildlife strike report also filled out.

FAA Bird Strike (https://wildlife.faa.gov/home)

Abnormal Events During Flight

sUAS Sightings or Interference

- If sighting occurs simply continue to fly your aircraft and avoid as necessary.
- Report ASAP to nearest ATC facility – approx. height/location/description if able.
- Upon landing call, the OU Mobile, complete an OU safety report & a FAA sUAS Sighting report.

Degradation of NAV AID or GPS (not for internal aircraft nav issues)

- If degradation occurs during flight report to nearest ATC facility when traffic allows.
- Upon landing – complete an OU safety report and complete an FAA NAVAID degradation form and / or a GPS degradation form.
- If unsure – do a complete maintenance write up of the situation and department will troubleshoot.

Laser Event toward Your Aircraft

- If you encounter a laser event – first and foremost DO NOT LOOK OUTSIDE OR AT IT – come inside and fly the airplane – attempt to fly away from the location.
- Contact the nearest ATC facility or tower and report your location and any other information you have.
- If your eyesight is degraded at all – inform ATC, declare an emergency, and ask for nearest airport to land at.
- Upon landing call OU Mobile (in all cases). Complete an OU Safety Report and complete an FAA Laser event online report. (https://www.faa.gov/aircraft/safety/report/laserinfo/report_incident)

Section II: Briefings

Passenger Briefing

PASSENGER BRIEFING

SAFETY BRIEF

(To be performed on every flight)

(A) SEATBELTS
- a. Fastened and secured until the engine is shutdown

(B) AIR FLOW
- a. For passenger comfort, on the instrument panel and floor
- b. Heater and Defrost
- c. Vent Blower (100i)

(C) FIRE ON START
- a. Continue to crank starter until fire is out (no more than 3 seconds)
- b. Lean the mixture
- c. Open the throttle
- d. Fuel pump off
- e. Fuel selector off
- f. Fire extinguisher

(D) EXITS
- a. Top door latch then bottom door latch
- b. Kick out side-door windows
- c. Crawl through baggage compartment (Warrior)

(E) Talking
- a. Positive exchange of controls (Three way)
- b. Sterile Cockpit during critical phases of flight (Taxi, Takeoff, and Landing)

(F) Your Questions
- a. Any questing before engine start

Pre-Takeoff Briefing

PRE-TAKEOFF BRIEF SINGLE ENGINE AIRCRAFT
(To be performed on every flight)

Make a final review of your aircraft performance sheet including V_R, takeoff distance, and landing distance. Then brief your crew members on the following scenarios:

*First, brief who will be the PIC in an actual emergency and who will back up the PIC with the appropriate checklists.

Emergency on takeoff roll:

- Explain that you will bring the power to idle and apply brakes as necessary.
  Emergencies including:
  - Wildlife, vehicles on the runway.
  - Abnormal engine indication.
  - Abnormal flight indication.

Engine failure on takeoff roll:

- Explain that you will bring the power to idle and apply brakes as necessary.
  - Follow up by shutting off mixture, ignition, and anything else associated with fuel.
  - Request assistance from tower (this will likely be in the form of towing as you DO NOT want to attempt restarting the aircraft to move it).
  - Complete Engine Secure checklist.

Engine failure on takeoff <u>with</u> runway remaining:

- Explain that you will pitch for best glide (_) kts and land on the remaining runway. Use flaps as necessary.
  - Follow up by shutting off mixture, ignition, and anything else associated with fuel.
  - Request assistance from tower (this will likely be in the form of towing as you DO NOT want to attempt restarting the aircraft to move it).
  - Complete Engine Secure checklist.

Engine failure on takeoff <u>without</u> runway remaining and without adequate altitude to turn back for the runway:

- Explain that you will pitch for best glide (_ kts) and land straight ahead within the windscreen. Prepare for an emergency landing. Attempt emergency restart procedures as time permits - see checklist. Use flaps as necessary once landing is assured.
  - Follow up by shutting off mixture, ignition, and anything else associated with fuel.
  - Complete Engine Secure checklist.
  - Request assistance from ATC unless contact is lost, then try 121.5, and call OU Mobile at (405) 919-6319

Engine failure on takeoff without runway remaining but possibly enough altitude to turn back for the airport:

- This is not a recommended procedure and requires judgment. The usual problem is you don't have enough altitude to make the turn back to the field, so you would have a plan of action ahead of time and have an idea where open areas are so you can land straight ahead, or with minimal maneuvering left or right.
- Should you be high enough (we won't say what high enough is), you should pitch for best glide, turn towards any runway, set up for an emergency landing, and naturally communicate your intentions on the radio to ATC.

Again, it is strongly emphasized that MANY PILOTS GET THEMSELVES KILLED BY THINKING THEY CAN MAKE THE TURN BACK TO THE AIRPORT AND LAND THE AIRPLANE AFTER LOSING AN ENGINE.

Section III: Radio Procedures

Frequencies to Know

Emergency	121.5
Max Westheimer AWOS	119.55
Max Westheimer Ground	121.6
Max Westheimer Tower	118.0
Max Westheimer Unicom (Cruise Aviation)	122.95
Dispatch & OU Traffic	123.3
Flight Service (Mc Alester Radio)	122.4

OTHER FREQUENCIES IN THE OKC AREA

OKC Approach (Southeast)	124.2
OKC Approach (Southwest)	124.6
Will Rogers ATIS	125.85
Will Rogers Tower	119.35
Will Rogers Ground	121.9
Will Rogers Clearance Delivery	124.35
Will Rogers VOT	112.15
IRW VOR	114.1
Wiley Post ATIS	128.72
Wiley Post Tower	126.9
Wiley Post Ground	121.7
Wiley Post Unicom	122.95
PWA VOR	113.4

General Radio Procedures

A. Basic radio calls contain (in order):
   a. Who you are calling
   b. Who you are
   c. Where you are
   d. Your intentions

B. Listen to what is said to you and respond appropriately.

C. If in doubt about what was said in whole, or in part, ask the controller to "Say again," or "Say again, (misunderstood item)."

D. Always use correct phraseology (Pilot/Controller Glossary). Read Chapter 4 Section 2 of the *AIM Radio Communications Phraseology and Techniques*

E. Be **ADAPTABLE,** be ready to respond as the situation dictates, and always listen for the controller's call. Respond promptly, accurately, and as tersely as possible.

F. Student pilots must in their radio call identify themselves as a student pilot during their initial call to an FAA radio facility.
   a. Ex. "Westheimer Tower, Crimson 5, Student Pilot, Midfield left downwind Runway 18, touch and go"

Radio Procedures at Max Westheimer Airport

Prior to taxi, monitor AWOS and note information.

TAXI CALL:
"Westheimer Ground"
"Crimson 5"
"At the South ramp (or North ramp)"
"With the numbers ready to taxi"
"Geographical direction of departure" (i.e. *North* departure, *Southwest* departure)

The controller will respond with a clearance to taxi to the active runway. Should the taxi path cross an active runway, you may be instructed to "hold short" of the runway.
Always read back your clearance including any "hold short" instructions.

TAKE-OFF CALL:
"Westheimer Tower"
"Crimson 5"
"Holding short of runway (enter appropriate runway number)
"Ready for *(Direction)* departure"

The controller will respond with a clearance to depart unless other traffic requires him/her to instruct you to "hold short."
After cleared for take-off, monitor the tower frequency until out of the Class D airspace or call tower to request a frequency change after reaching 2500' MSL.

INITIAL CALL TO APPROACH:

"Oke City Approach"
"Crimson 5"
"Number of miles, geographic direction." (i.e. 8 miles, southwest) - this information describes your position relative to the airport of intended landing
"With the numbers"
"Inbound to Westheimer"

INBOUND CALL TO WESTHEIMER:

"Westheimer Tower"
"Crimson 5"
"Number of miles, geographic direction." (i.e. 8 miles, southwest) - this information describes your position relative to the airport of intended landing
"With the numbers"
"Inbound (type of landing)" (i.e. full stop, touch and go)

This call should be made within 10 miles of the airport, but prior to reaching 5 miles. The controller will respond with directions to enter the traffic pattern for a specific runway, and advise of the current winds and altimeter.
He/she will also instruct you to report your position at a certain point during your approach to the airport.
Again, always read back your clearances, including reporting positions.

LANDING CALL:

"Westheimer Tower"
"Crimson 5"
"Your position." (in the traffic pattern - i.e. on the 45, left/right downwind, base - always report your actual position even if it differs from where you were told to report)
"Runway #" (the runway for which you were advised to report)
"Type of landing" (i.e. full stop, touch and go)

The controller will clear you for the type of landing requested, unless unable or misunderstood. Ensure you do not touch down without a clearance to do so!

AFTER - LANDING CALL:

"Westheimer Ground"
"Crimson 5"
"Clear of runway (runway #) at (taxiway location)"
"Taxi to Park" (Listen carefully for any hold-short instructions)

All approaches to an airport will be made so as to enter the downwind leg of the traffic pattern at a 45° angle to the midpoint of the downwind leg. Straight-in approaches will not be requested. Instructions from the air traffic controller on entering the airport traffic pattern will be obeyed. Question the controller if you believe he/she has misunderstood your radio call.

Ensure that you are aware of what the different clearance phraseology means:

- Cleared to land - you will land, roll straight ahead, and exit the runway on the first suitable taxiway.
- Cleared for touch and go - you will land, continue your roll, apply power and take off again.
- Cleared for stop and go - you will land, come to a full stop, apply power and take off again.
- Cleared low approach- you may approach to land but my not touchdown to land.
- Cleared for the option - you may do any of the above at your discretion.

It is highly recommended that you read Ch. 4, Sections 1, 2, and 3 in the Aeronautical Information Manual as well as the Pilot/Controller Glossary

Radio Procedures at Uncontrolled Airports

Prior to taxi, monitor AWOS or windsock and note information.

TAXI CALL:

"(Airport name) Traffic."
"Crimson 5."
"Taxiing to runway (insert appropriate number)."
"(Airport name)."

Example: "Purcell Traffic, Crimson 5, taxiing to runway one seven, Purcell."

TAKE-OFF CALL:

"(Airport name) Traffic."
"Crimson 5."
"Departing runway (insert appropriate number)."
"(Direction) departure."
"(Airport name)."

Listen to CTAF and visually scan the approach area for other traffic.
Make position reports on CTAF while in the traffic pattern and departing.

INBOUND CALL:

"(Airport name) Traffic."
"Crimson 5."
"Number of miles, geographic direction" (i.e. 8 miles, southwest) - this information describes your position relative to the airport of intended landing.
"Inbound for (type of landing)"
"(Airport name)."

The inbound radio call should first be made when within 10 statute miles of the airport. If the airport is served by a "Unicom" facility, the pilot should address the inbound call to "Unicom" instead of "Traffic" and add the statement "request airport advisory" to the final line of the inbound radio call, after the word "Inbound."

TRAFFIC PATTERN AND LANDING CALLS:

"(Airport name) Traffic."
"Crimson 5."
"(Turn direction) (leg of traffic pattern) (runway number)."
"(Airport name)."

Example: "Purcell Traffic, Crimson 5, on the forty-five to a left downwind, runway, one seven, Purcell." (followed by a report on each leg of the pattern)

- When established on final approach, change the third line of the landing radio call to read: "(Distance from the runway) final, runway (number), (type of landing)."

Example: "Purcell Traffic, Crimson 5, one mile final, runway one seven, touch and go, Purcell."

AFTER - LANDING CALL:

"(Airport name) Traffic."
"Crimson 5."
"Clear of runway (insert appropriate number)"
"(Airport name)."

Radio Procedures at Major Airports

I. ATIS
- a. Before calling Tower or Approach Control,
- b. Listen for the following:
  - i. Ceiling & visibility: Do you need an IFR clearance?
  - ii. Winds: Visualize crosswind and landing runway
  - iii. Altimeter setting: Check and set
  - iv. Instrument approach: Review which runway and approach to expect
  - v. Frequencies: Set appropriate frequencies for comm and nav
  - vi. NOTAMs: Listen and determine how they will affect you
  - vii. Alphabetical code: Listen for broadcast name (information Bravo)

II. OKE CITY APPROACH
- a. Initial call:
  - i. "Oke city approach."
  - ii. "Crimson 5."
  - iii. "(Distance) miles (direction from airport) at (altitude)."
  - iv. "With (state ATIS broadcast name)."
    Example: "Oke City approach, Crimson 5, 15 miles northwest, four thousand, with *Bravo*."
  - v. The controller will acknowledge your call and assign you a transponder (squawk) code. Respond by repeating the code and your call sign.
- b. Follow-up call:
  - i. The controller will call and acknowledge that radar contact has been established. Give the controller your intentions, direction of flight, and altitude to which you are climbing or descending.
- c. On subsequent calls:
  - i. Answer or acknowledge any request from ATC, and end transmission with your call sign as ATC uses it.
  - ii. Example: "Right turn, three five zero, Crimson 1."

III. FINAL CONTROLLER
- a. ATC will initiate hand off to the final controller
  - i. Example: "Crimson 5, contact Oke City approach on 124.6."
  - ii. The proper response is "one two four six, Crimson 5."
- b. Switch to the assigned frequency.
- c. "Oke City approach."
- d. "Crimson 5."
- e. "3,500 (state altitude and change, if any)."

IV. WILL ROGERS TOWER
- a. ATC will initiate the hand off:
  - i. "Crimson 5, contact Rogers Tower on 119.35."
  - ii. The proper response is "one, one, niner, three, five, Crimson 5"
- b. To call tower, use a standard inbound radio call:
  - i. "Roger's tower."
  - ii. "Crimson 5."
  - iii. "Inbound."
  - iv. "(State type) landing."
- c. When the tower responds, or makes requests, the pilot should respond and acknowledge with the aircraft call sign.

V. GROUND CONTROL

a. Do not contact ground control until advised by tower and you are clear of the active runway (past the hold line).
b. Make a taxi call to the ground controller:
    i. "Rogers ground."
    ii. "Crimson 5."
    iii. "Clear of runway (insert appropriate number).” (i.e. three five right)
    iv. "Taxi to (state desired location on airport, such as name of FBO)."
c. Follow the controller's instructions in his response. Acknowledge your understanding by repeating and hold short instructions and your call sign.

VI. CLEARANCE DELIVERY

a. Listen to ATIS first, and be ready to write down information and clearance. If VFR, know your departure direction (heading) and altitude.
    i. "Rogers Clearance Delivery."
    ii. "Crimson 5."
    iii. "VFR/IFR to (state destination), with (ATIS broadcast name)."
b. Clearance Delivery will provide your IFR clearance or departure instructions for
a VFR departure, including a transponder code and departure frequency.
c. Read back your clearance and get affirmation from controller that your read-back was correct. Then switch to ground control for taxi instructions.

VII. DEPARTURE CONTROL

a. After take-off, the tower will advise when to contact departure control and the appropriate frequency. Do not change frequencies without being instructed to do so. However, if you believe your hand off may have been forgotten, query the tower controller.
b. Initial call:
    i. "Oke City approach."
    ii. "Crimson 5."
    iii. 3,500, (state current altitude and what you're climbing to per your clearance)."

    Example: "Oke City approach, Crimson 5, two thousand two hundred, climbing three thousand."

OU FLIGHT OPERATIONS ARE NOT ALLOWED AFTER DISPATCH IS SECURED.

The Following are OU Department of Aviation Operating Hours for local airports:

OU Airport:

Solo:

5 AM to 11 PM	no restrictions.
11 PM - Midnight	one touch and go/stop and go or full stop termination.
Midnight	no operations - all solos must be landed by midnight.

Dual:

5 AM to 11 PM	no restrictions.
11 PM to Midnight	one touch and go/stop and go or full stop termination.
Midnight – 2AM	no operations.

No KOUN local flights will take off after 11 PM

All dual aircraft should plan to be back by midnight, but can land as late as 2 AM if necessary.

All Solo cross countries should return no later than midnight.

Student Pilots on solo flights must be on the ground by sunset.

CFI's may ask on a case by case bases for "exceptions/time extensions" to supervisor on call

(OU Mobile) by 9 PM.

Section IV: Cockpit Management

Cockpit Management

DESCRIPTION:	A systematic method for organizing materials and equipment so they are ready, available, and adequate for ensuring crew coordination and briefing of passengers.
OBJECTIVE:	To develop the ability to efficiently organize and manage the cockpit environment both prior to and during flight.
PROCEDURES:	1) Arriving at the airplane, verify that all equipment and materials needed for the flight are accounted for. This may include: operating manual, pen and paper, charts, cross-country materials, hood, survival kit, navigation equipment (radios), checklists, airplane certificates, flashlight, flight case, baggage, etc. 2) Verify that all required inspections (100 hour, Annual, IFR, VORs) as appropriate for the flight are current. 3) Organize and carefully secure all items, making sure they are readily available. 4) Brief all occupants on seat adjustment, seat belt use, airplane exits, emergency equipment, air vents and if appropriate oxygen. 5) Ensure that all occupants are properly seated and doors closed properly. 6) Carefully adjust your seat and seat belts so as to allow easy access to all controls and equipment. 7) If appropriate determine who will be PIC and what, if any, duties you expect the co-pilot to perform. 8) During the flight, remain well-organized and alert to the needs of the passengers.

Section V: Takeoffs

Normal and Crosswind Takeoff and Climb

Description:	The airplane will be aligned with the runway centerline and the ailerons held into the wind. Takeoff power will be applied and the airplane is allowed to accelerate to rotation speed at which time the pitch attitude is increased to establish a positive lift-off and a V_Y airspeed. Once airborne a crab angle will be established to maintain a ground track that is aligned with the runway centerline.
Objective:	To develop the student's ability to safely accomplish a takeoff and departure under normal and crosswind conditions.
Procedures:	1) Set the flaps to the manufacturer's recommended takeoff position, check for traffic (clear final and runway for obstructions) and taxi into position on the runway. 2) Align the airplane with the runway centerline and apply full aileron into the wind with the elevator in the neutral position. 3) Smoothly apply full power and check the engine instruments. 4) As the airplane accelerates, slowly roll out ailerons as necessary to control drift and maintain runway alignment with the rudder. 5) At manufacturer's recommended airspeed apply back elevator pressure to liftoff and then adjust the pitch altitude to establish the proper initial climb speed. 6) If a significant crosswind exists, the airplane should be kept on the ground slightly longer than normal and a firm and definite liftoff accomplished. 7) As the airplane leaves the runway, aileron deflection into the wind might result in the downwind wing and main gear lifting off first. 8) After liftoff in crosswind conditions initiate a crab angle into the wind. 9) During climb out, maintain a ground track aligned with the runway centerline.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Soft-Field Takeoff and Climb

Description:	A nose high pitch attitude is maintained during the takeoff roll in order to quickly transfer the airplane's weight to the wings and then lift off as soon as possible. After liftoff, the airplane is flown in ground effect until a safe climb out speed of V_x is attained.
Objective:	To develop the student's ability to obtain maximum performance from the airplane when taking off from a soft or rough field.
Procedure:	1) Extend the flaps to the recommended takeoff position. 2) Hold the elevator control full up and use aileron to correct for crosswind. 3) Check for traffic and keep the airplane moving at a brisk pace while taxiing onto the runway -- don't use brakes unless it is necessary. 4) Smoothly apply full power and check the engine instruments. Hold full up elevator until the nose begins to rise. As the pitch attitude approaches approximately V_X, adjust elevator control pressure to maintain this attitude. 5) Once airborne, adjust the pitch altitude as necessary in order to remain in ground effect while the airplane accelerates to a safe climb speed. 6) As the airplane speed approaches V_X, establish a V_X airspeed and achieve a positive rate of climb. 7) Maintain V_X until clear of obstacles. 8) After clearing obstacles, retract the flaps (one at a time) then pitch for V_Y.
Reference:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C PA-28-161 Warrior III POH

Short-Field Takeoff and Climb

Description:	The airplane is accelerated to liftoff speed in the shortest distance possible and established in a maximum angle climb until all obstacles are cleared.
Objective:	To develop the students ability to obtain maximum performance from the airplane while executing a short field takeoff and safely clearing all obstacles in the departure path.
Procedure:	1) Extend the flaps to the recommended take off position. 2) Check for traffic and taxi into position at the end of the runway so that maximum runway length is available for takeoff. Use appropriate control deflections to correct for crosswind conditions. 3) Hold the brakes and apply full power. 4) Check the engine instruments. 5) Release the brakes after obtaining full power indications. 6) Adjust the elevator control approximately neutral to maintain a level pitch attitude until just prior to rotation. 7) Accelerate to rotation speed (50 Warrior/55 100i) and rotate to a climb attitude that produces the obstacle clearance airspeed. 8) Maintain obstacle clearance airspeed until clear of obstacles. 9) After clearing obstacles, lower pitch attitude to initial climb airspeed of V_X. 10) Slowly retract the flaps (one at a time) then pitch for V_Y.
Reference:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C PA-28-161 Warrior III POH PA-28-181 Piper Pilot POH

SECTION VI: Landings

Forward Slips to Landing

Description:	During a forward slip, one wing on the airplane is lowered and the airplane is yawed in the opposite direction so that the airplane's longitudinal axis is at an angle to the airplane's flight path.
Objective:	To teach the student a method of steepening the final approach path without increasing airspeed.
Procedures:	**Note: CONSULT THE PILOT'S INFORMATION HANDBOOK FOR INFORMATION REGARDING USE OF FLAPS OR ANY OTHER LIMITATIONS WHILE PERFORMING SLIPS.** 1) One wing is lowered (normally the upwind wing when a crosswind exists) using aileron. 2) Use enough rudder to maintain the original ground track. 3) The airplane is now flying at an angle to the relative wind and is in a high drag situation. Therefore, an appropriate pitch attitude must be maintained so that an approach to a stall is avoided and sufficient control is available to make the round out and flare safely. 4) Prior to the flare, the forward slip must be discontinued, and the longitudinal axis must be aligned with the runway. 5) After discontinuing the forward slip, transition to a sideslip if necessary for crosswind, and execute the appropriate landing procedure.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Normal and Crosswind Approach and Landing

Description:

After entering the traffic pattern, the airplane is aligned with the runway centerline on final approach. The landing flap position is set, and a crab angle is established if necessary. A stabilized (airspeed, approach descent angle, and airplane configuration) final approach is established. At an appropriate altitude, a transition to landing pitch attitude is begun in a manner that will allow the airplane to touch down in the proper power off stall pitch attitude. After touchdown, the airplane is slowed to a normal taxi speed on the runway centerline and then taxied clear of the runway. Appropriate crosswind control is maintained throughout the final approach, landing, and rollout.

Objective:

To develop the student's ability to safely and accurately execute an approach, landing, and rollout in normal and crosswind conditions.

Procedures:

1) Complete the appropriate traffic pattern.
2) Achieve a stabilized, power on approach and the final flap position prior to descending below 300' AGL. Use normal approach speed (65 Warrior/66 100i) plus ½ the wind gust factor, if appropriate.
3) Make coordinated changes in pitch attitude and power so that a touchdown can be made at the appropriate point on the runway.

NOTE: Crosswind conditions may require a reduced flap setting for approach and landing. Care must be exercised to ensure adequate runway length.

4) Prior to beginning the round out and flare, correct for drift by using the wing-low method and establishing a sideslip. Use aileron to correct for drift and use rudder to keep the airplane's longitudinal axis aligned with the runway.
5) At the appropriate flare altitude, increase the pitch attitude and reduce power at a rate that will allow a slow decrease in rate of descent and airspeed so that touchdown occurs just as the power reaches idle and the pitch attitude reaches the power off stall attitude. Use of proper crosswind technique will result in touchdown on the upwind main gear first, followed by the downwind main gear, and then the nose gear.
6) Gusty wind conditions may require a touchdown at a slightly higher speed than normal (5-10 KIAS above power off stall speed) and a slightly lower than normal pitch attitude.

References:

FAA Private and Commercial Pilot Airplane Airmen Certification Standards
Airplane Flying Handbook FAA-H-8083-3C

Soft-Field Approach and Landing

Description:	An approach to, and landing on, a soft or rough runway. Power is used during the round out and flare to provide a high degree of control so that the touchdown is as gentle and slow as possible. The nose gear can be lowered gently to the runway surface after the main gear is on the runway.
Objective:	To develop the student's ability to obtain maximum performance from the airplane so that a soft touchdown at the slowest possible airspeed can be made.
Procedures:	1) Establish a stabilized power on approach and the final flap position prior to descending below 300' above runway elevation at normal approach speed (65 Warrior/66 100i) with flaps extended to the landing position. Add ½ the wind gust factor to the approach speed as appropriate. 2) Select the touchdown area on the runway. 3) Make adjustments in the power setting to remain on the proper glide path. 4) Make adjustments to the airplane pitch attitude to maintain the proper airspeed. 5) At the appropriate flare altitude, increase the pitch attitude to touchdown as descent is continued to a height of 1 to 2 feet above the runway. Use power throughout the flare so that a smooth and gentle touchdown on the main gear can be achieved at the slowest possible airspeed. 6) After touchdown, keep the weight off the nose gear as long as possible, and then gently lower the nose gear to the runway while maintaining back elevator pressure. 7) Use power as necessary to taxi. 8) Use brakes only as necessary. 9) Slow to normal taxi speed before clearing the runway. 10) Complete the after landing checklist when clear of the runway.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Short-Field Approach and Landing

Description:	An approach and landing is accomplished at an airport with a restricted runway length due to obstacles on the approach path, short runway, unfavorable runway gradient, required downwind landing, high density altitude, or a combination of these factors. The approach is stabilized no lower than 300' above runway elevation. The round out and flare is accomplished in a manner that allows the airplane to reach the power off stall pitch attitude as the main landing gear touches the runway with power reaching idle at the same time. The rollout is minimized by proper use of aerodynamic deceleration and airplane wheel brakes.
Objective:	To develop the student's ability to safely and accurately accomplish maximum performance approaches and landings.
Procedures:	1) Select and plan the appropriate flight path and touchdown point on the runway. 2) Establish a stabilized power on approach prior to descending below 300' above runway elevation at the manufacturer's recommended short field approach speed with flaps extended to the landing position. Add ½ the wind gust factor to the approach speed as appropriate. 3) Make adjustment in the power setting to remain on the proper glide path and to avoid obstacles. 4) Make adjustments to the airplane pitch attitude to maintain the proper airspeed. 5) At the appropriate flare altitude, increase the pitch attitude and reduce power to a setting that will allow a slow decrease in rate of descent and airspeed so that touchdown occurs just as the power reaches idle and the pitch attitude reaches the power off stall attitude. (NOTE: Touchdown point for a runway that has threshold markings should be the numbers. Touchdown point for a runway that does not have threshold markings should be the first centerline stripe beyond the numbers) 6) After touchdown, retract the flaps, apply full aft stabilator to achieve maximum aerodynamic braking, and apply maximum wheel braking without skidding the tires to minimize ground roll. 7) Slow to normal taxi speed before clearing the runway. 8) Complete the after landing checklist after the airplane clears the runway and comes to a complete stop.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Power-Off 180 Degree Accuracy Approach and Landing

Description:	In the landing configuration, with the power at idle, the airplane is maneuvered from downwind, abeam the touchdown point to a landing no more than 200 feet beyond a point specified by the examiner.
Objective:	To develop the student's ability to maneuver with the power at idle, from downwind, abeam the touchdown point to a landing no more than 200 feet beyond a point on the runway specified by the examiner. The landing point should be no shorter than the start of the 2nd centerline stripe after the runway numbers.
Procedures:	1) Enter the traffic pattern at a 45 degree to the downwind. 2) Make all appropriate radio calls. 3) Clear the base and final for any traffic. 4) Establish an altitude of 1000' AGL or TPA, whichever is higher. 5) Abeam touchdown point – Power idle. 6) Slow to best glide speed (76KIAS 100i). 7) Adjust glide path with flaps and/or by slipping and/or adjusting airspeed. 8) Short final slow to touchdown airspeed listed in POH. 9) Touch down no more than 200' beyond predetermined point. 10) After touchdown, take a deep breath, retract flaps and then begin applying brakes as necessary.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Go Around from a Rejected (Balked) Landing

Description:	The approach to landing is abandoned and the airplane is transitioned to a climb.
Objective:	To develop the student's ability to safely perform a go-around/rejected landing procedure.
Procedures:	1) Smoothly apply full power. 2) Adjust the pitch attitude to stop the descent and establish a V_X attitude. 3) Retract the 1st flap immediately. 4) Trim the aircraft to maintain V_X. 5) After clearing obstacles, retract each subsequnct flap as you transition to a V_Y climb. 6) Use appropriate collision avoidance techniques throughout the entire procedure. 7) Radio intentions as appropriate.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

SECTION VII: Traffic Patterns

Traffic Pattern Operations

Description: The traffic pattern is used to establish an orderly flow of traffic for airplanes arriving, departing, and operating in the vicinity of airports. The pattern consists of arrival to and departure from an airport while executing proper cockpit duties.

Objective: To develop the ability to conduct safe and efficient airport arrival and departure procedures.

Procedures:

1) Determine the active runway by an appropriate method. (wind direction or NOTAMs)
2) Establish the airplane on a 45° ground track toward the midpoint of the downwind leg unless otherwise directed by the control tower. Pattern altitude must be established 2 miles prior to reaching the downwind entry point. Slow to traffic pattern airspeed before turning downwind.
3) Maintain strict vigilance for other aircraft established in the pattern or in the vicinity of the airport.
4) Complete the before landing checklist.
5) Turn the airplane onto the downwind leg approximately ½ miles to 1 mile out from the active runway. Estimate wind direction and velocity by observing the windsock and make appropriate pattern adjustments. Maintain pattern altitude and airspeed unless traffic separation or ATC instructions dictate otherwise.
6) When abeam the point of intended landing check speed below V_{FE}, extend the flaps to an appropriate position and begin descent at an appropriate point considering traffic, terrain, obstacles, traffic pattern size, and ATC instructions. (90kts)
7) Clear for traffic and turn base leg when 45° from touchdown point. (80kts)
8) Coordinate the pitch and power to maintain the desired approach angle and base leg airspeed.
9) Visually clear the final approach path and turn on to final approach with the airplane aligned with the runway.
10) Extend flaps to the landing position (normally full down). Make coordinated pitch attitude and power adjustments to maintain the desired approach angle and final approach airspeed.
11) Adjust the final approach airspeed by adding ½ the gust factor if appropriate.
12) Achieve a stabilized final approach no lower than 300’ AGL.
13) Execute the appropriate landing procedure.
14) After liftoff, maintain runway alignment and appropriate climb airspeed. (V_X if obstacle or V_Y if no obstacle)

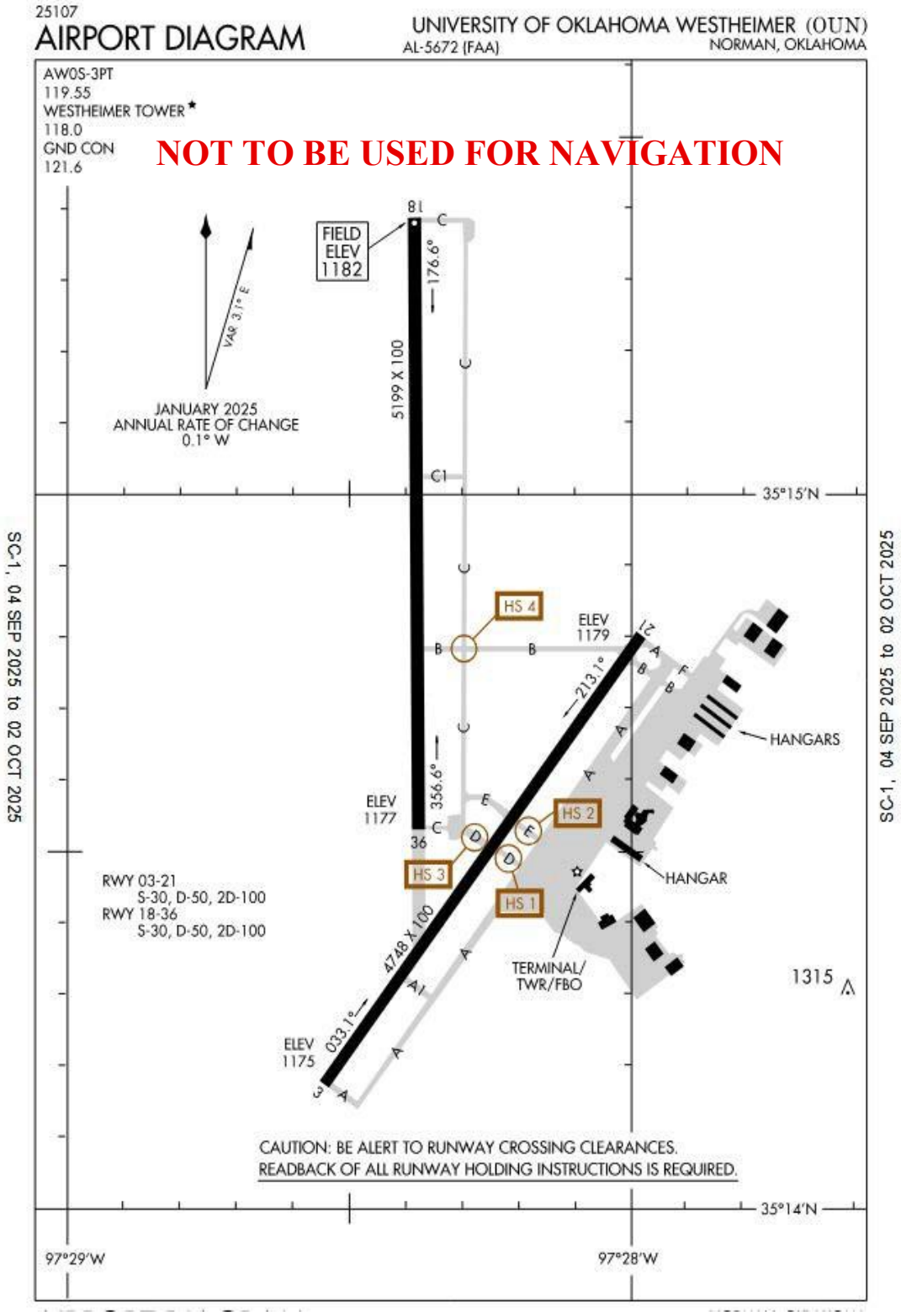
15) Continue straight out or exit with a 45° turn in the direction of the traffic pattern when beyond the departure end of the runway and at or above traffic pattern altitude.
16) Continue climb to appropriate altitude and proceed on course when clear of the airport and traffic
17) Closed pattern operation: clear for traffic and begin the turn to the crosswind leg beyond the departure end of the runway and within 500 feet of pattern altitude.
18) Upon reaching traffic pattern altitude, accelerate to traffic pattern airspeed and set power
19) Complete the before landing checklist after completing the turn to the downwind leg.

Note: The above procedures assume an ideal traffic pattern situation. Additional traffic, ATC, local pattern restrictions, noise abatement procedures, obstacles, etc., may dictate modification of these procedures. In all cases the pilot shall exercise good judgment and maintain positive control of aircraft at all times.

References:

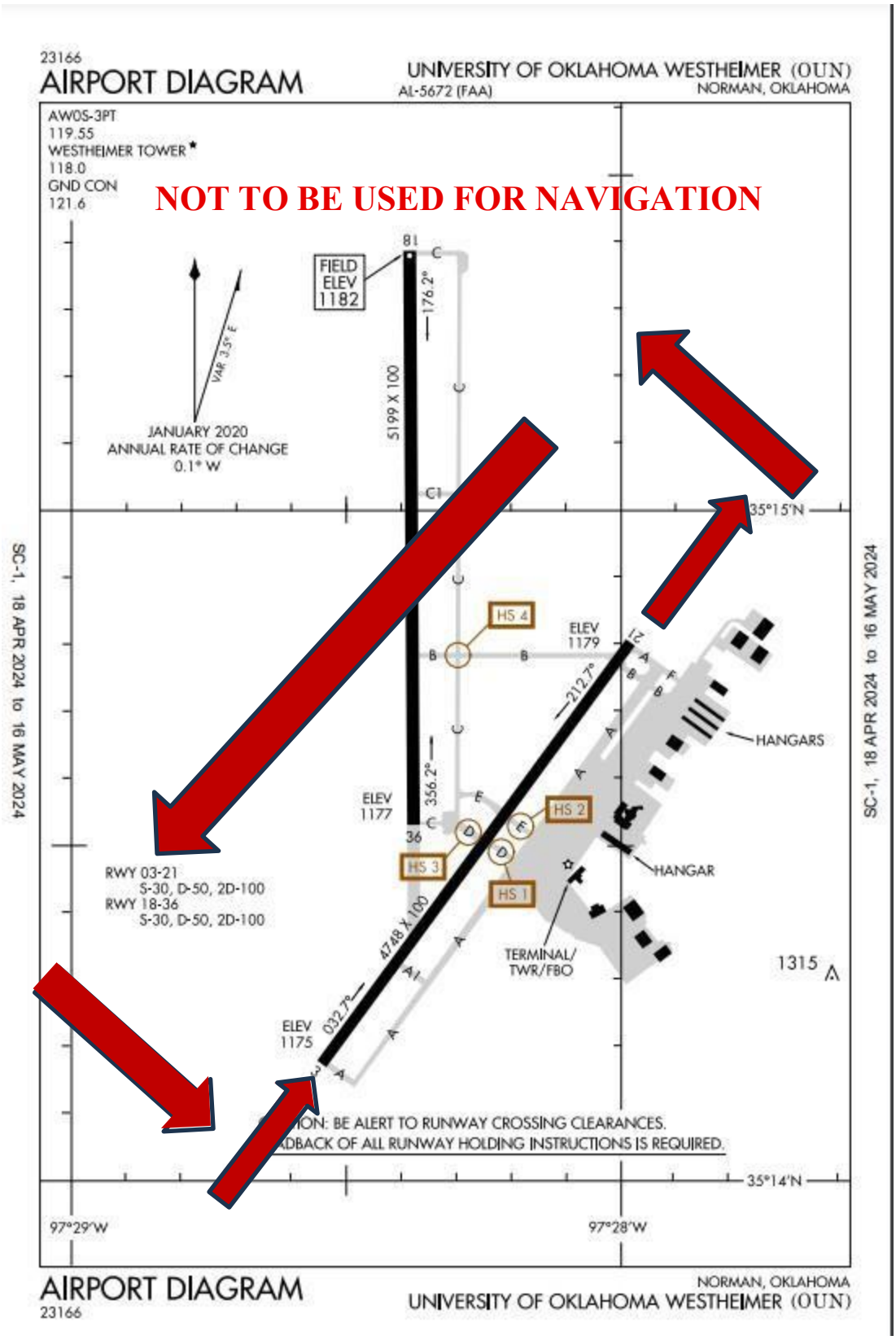
FAA Private and Commercial Pilot Airplane Airmen Certification Standards
Airplane Flying Handbook FAA-H-8083-3C
Aeronautical Information Manual Chapter 4 Section 3 *Airport Operations*

Max Westheimer Airport Diagram



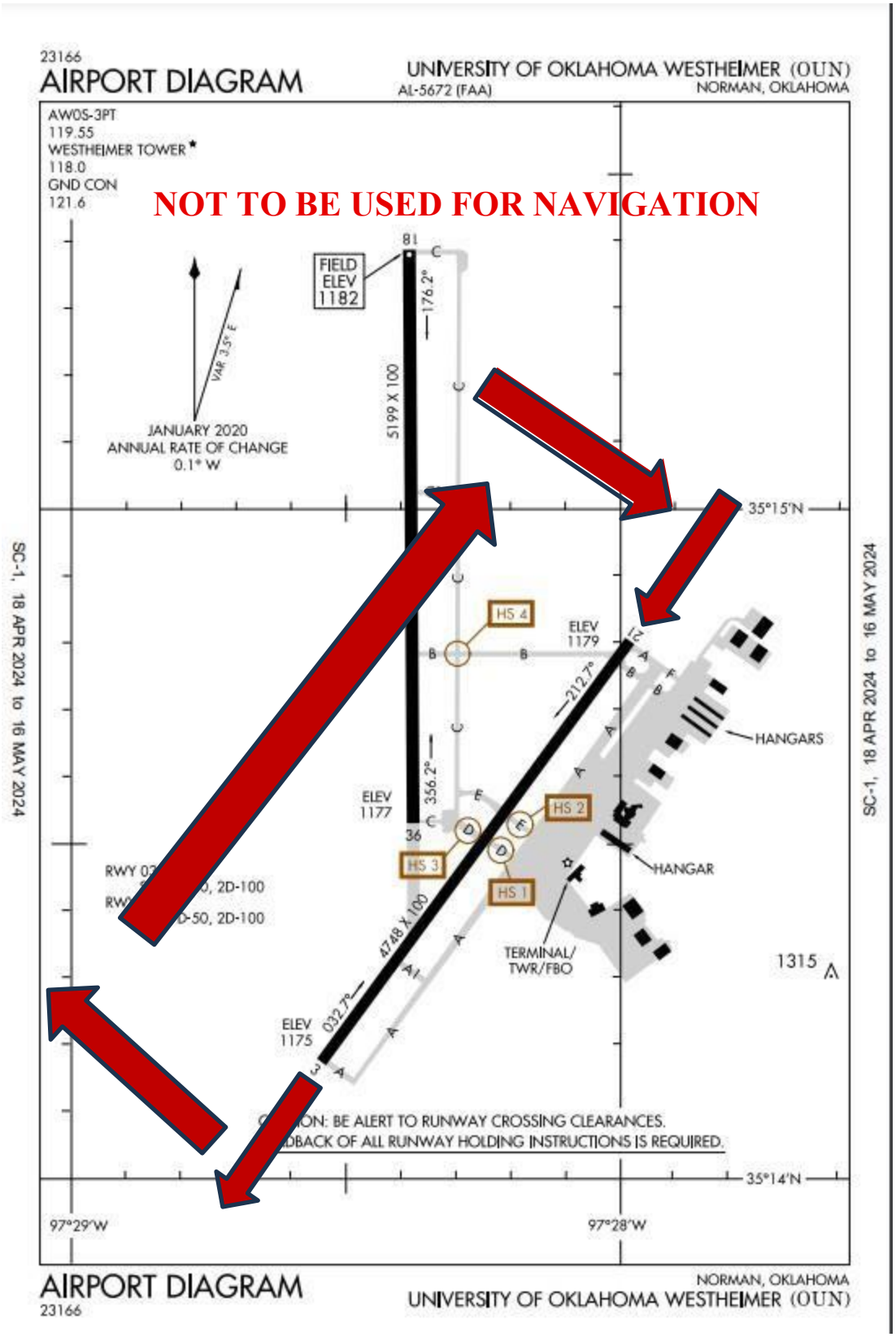
Max Westheimer Runway 03 Traffic Pattern

NOT TO SCALE



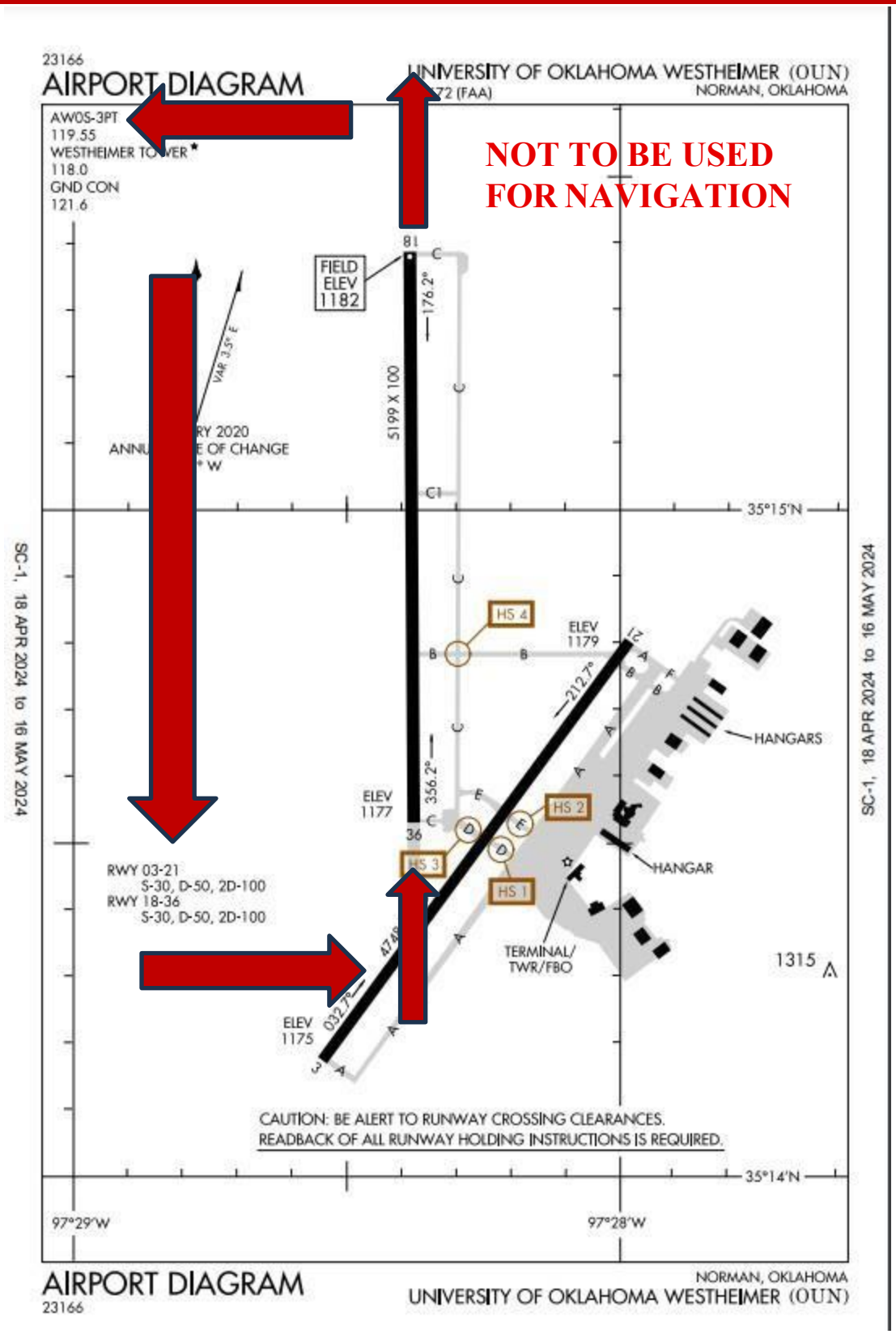
Max Westheimer Runway 21 Traffic Pattern

NOT TO SCALE



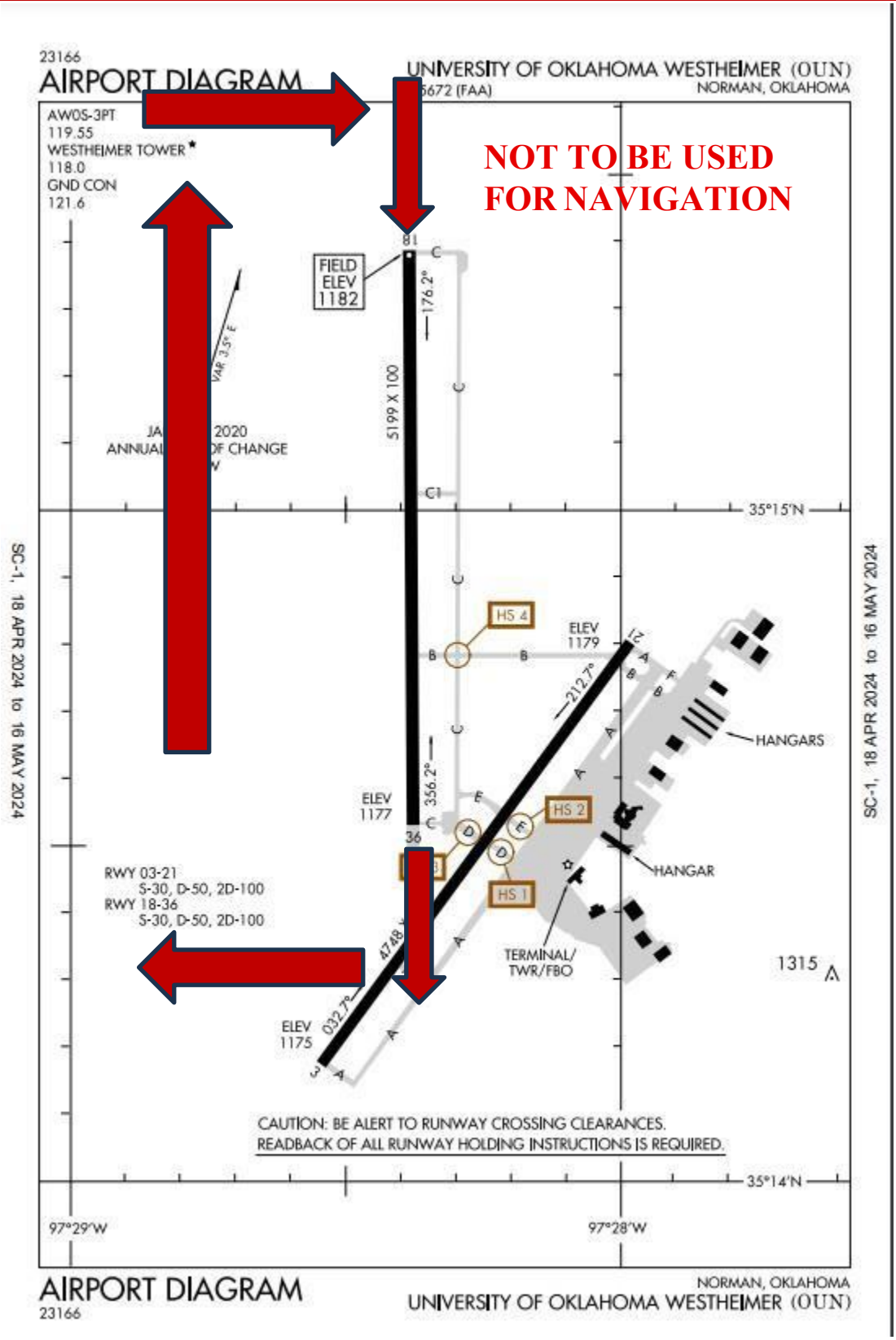
Max Westheimer Runway 36 Traffic Pattern

NOT TO SCALE



Max Westheimer Runway 18 Traffic Pattern

NOT TO SCALE



SECTION VIII: Emergencies

Emergency Approach and Landing

Description: The airplane is maneuvered, power-off, to the best available landing site. Time and altitude permitting, cockpit procedures are completed.

Objective: To develop the skill and proficiency necessary to accomplish a power-off emergency approach and landing to the best available site.

Procedures: Note: Steps marked **[Simulated]** are simulated unless it is an actual emergency.

1) Establish and trim for best glide speed.
2) Select best available landing site within glide range.

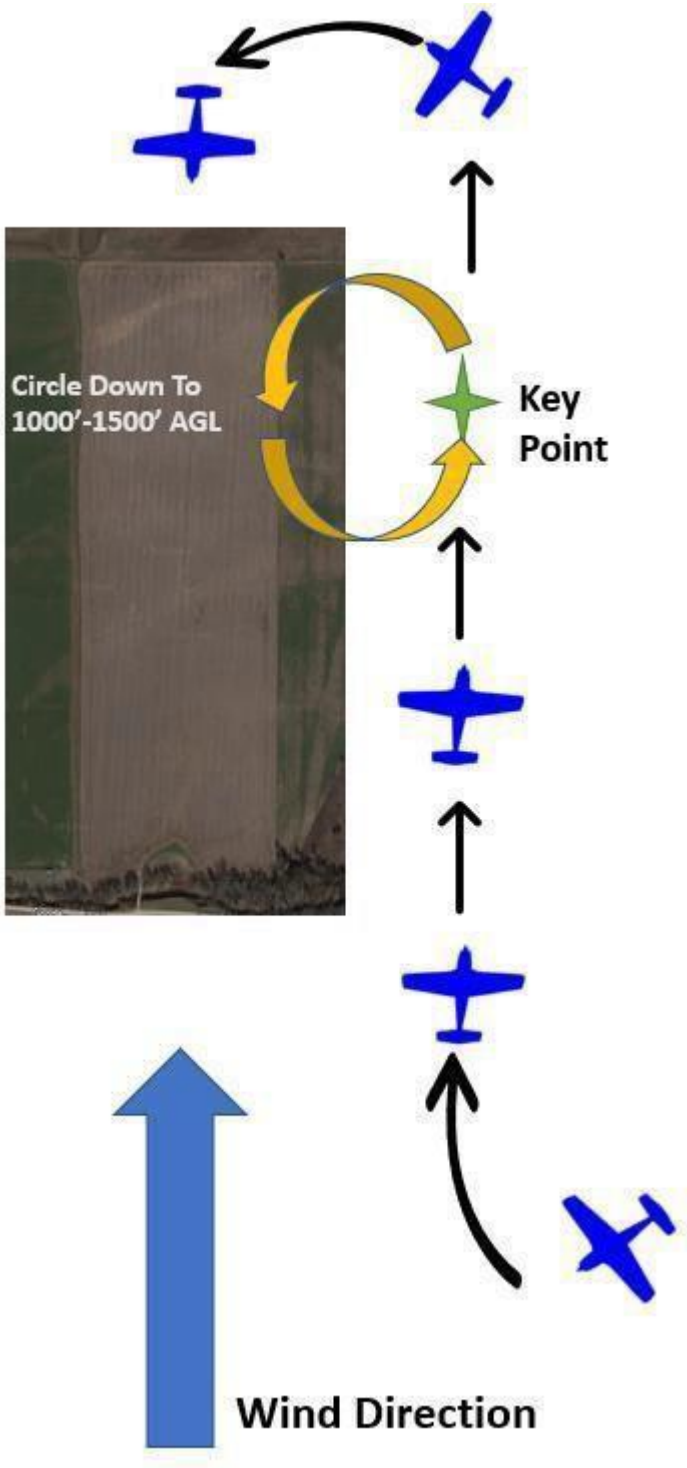
--Look first for a site downwind—this will extend your glide range.

-- Pick a site as close as possible (preferably plowed in the direction of landing).

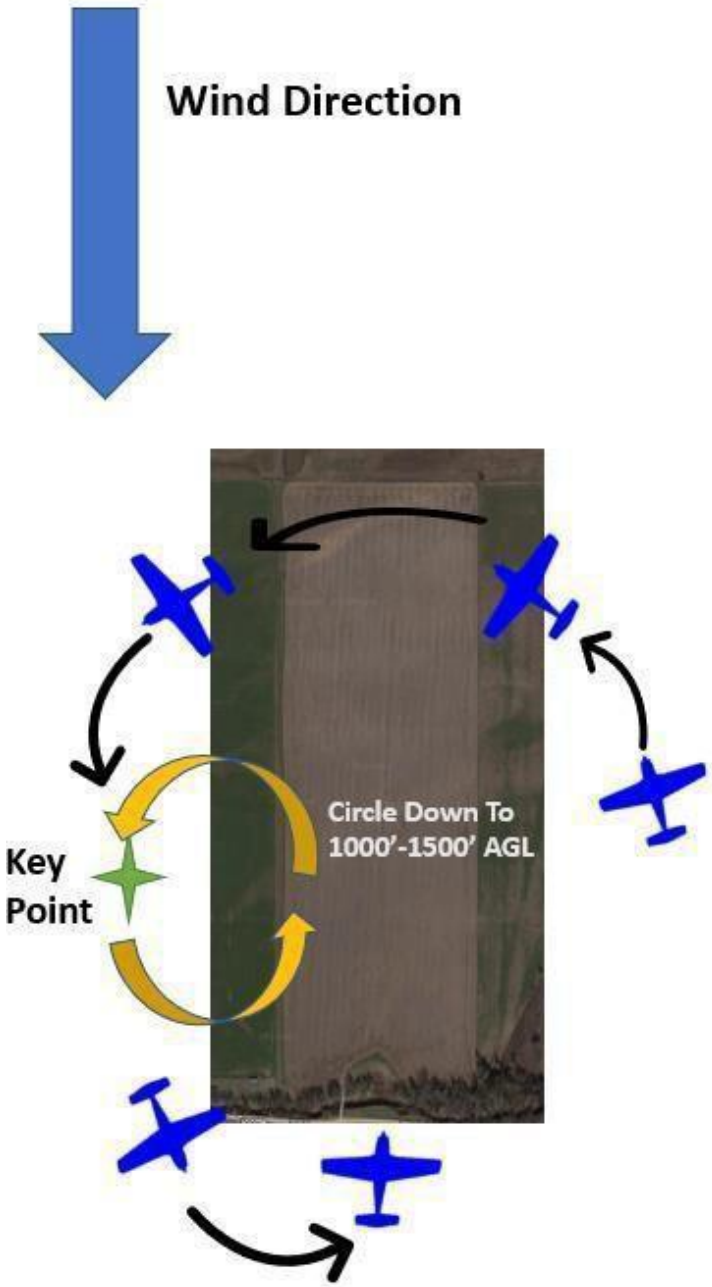
3) Maneuver the airplane to the "key point" left or right downwind, abeam the touchdown point.
4) **[Simulated]** Complete the engine failure/partial power loss checklist **TIME AND ALTITUDE PERMITTING.**
5) Upon arrival at the "key point" execute 360° turns at 30° of bank until reaching an altitude of 1000-1500' AGL.
6) **[Simulated]** Fuel selector off, ignition off, mixture lean.
7) **[Simulated]** Squawk 7700 and declare an emergency on frequency 121.5 (or to ATC if in contact with ATC).
8) **[Simulated]** Unlatch door.
9) **[Simulated]** Master switch off when radio communication is no longer required.
10) From the "key point" fly an abbreviated downwind base and final to the field.
11) When landing is assured, extend flaps and touch down at the slowest possible airspeed using a nose high attitude in the flare.
12) *Initiate recovery no lower than 500' AGL unless over an approved landing point (i.e. runway).

References: Airplane Flying Handbook FAA-A-8083-3C

Emergency Approach (Downwind Approach to Field)



Emergency Approach (Upwind Approach to Field)



Unusual Flight Attitudes

Description:	The instructor or student will place the airplane in an unexpected attitude. When told to recover, the student will assume control, stabilize the airplane, and return it to its original flight path by reference to available flight instruments.
Objective:	To learn to recognize and properly recover from unusual attitudes by reference to both full and partial instrument panels.
Procedures:	1) The student is instructed to take his/her hands and feet off the controls and close his/her eyes. 2) The instructor clears the area for other airplane traffic and ensures that the altitude is adequate for the safe conduct of the maneuvers. 3) The instructor then puts the airplane into a critical flight attitude. 4) Then, the instructor will clearly say, "open your eyes and recover." 5) The student will look at the flight instruments to determine what kind of critical attitude the airplane is in, and how best to recover. 6) Recovery is initiated and the airplane is stabilized. 7) Return to original flight path and altitude as rapidly as practicable. **Note: while space does not allow for a discussion of all possible situations, two common situations and their respective recovery procedures are:** Nose High – airspeed low, trend decreasing: 1) Lower the nose and simultaneously apply full power while leveling the wings. 2) Establish straight and level flight at cruise power on original flight path and altitude. Nose Low – airspeed high, trend increasing: 1) Reduce power. 2) Level the wings. 3) Smoothly raise the nose to level flight altitude. 4) Establish straight and level flight at cruise power on original flight path and altitude.
References:	FAA Private Pilot Airplane Airmen Certification Standards FAA Instrument Rating – Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C Instrument Flying Handbook FAA-H-8083-15B

Emergency Descent (PA-28-161 Warrior)

Description:	A descent from a higher altitude in the case of an emergency such as: incapacitated passenger, smoke filling the cockpit, or fire.
Objective:	To descend from a higher altitude in the shortest amount of time as safely as possible.
Procedures:	1) Perform clearing turns. 2) Position report including: location, altitude, and intentions. 3) Power idle and slow below V_{FE}. 4) Pitch for flap operation speed 103KIAS. 5) Configure flaps full (airspeed will decrease further, continue pitching for 103kts). 6) Establish bang angle between 30°-45°. 7) Allow for maximum descent. **Note: Airspeed not to exceed 103KIAS** 8) Execute applicable checklist as appropriate (engine fire, electrical fire etc.) Recover no lower than 500' AGL 1) Roll wings level. 2) Pitch for the horizon. 3) Add full power and retract 1st flap immediately. 4) Initiate a climb at V_X to desired altitude. 5) Retract flaps (one by one as necessary). 6) Return to cruise operations. **Note: Transition to emergency approach and landing procedures if required.** **Note: Steps 1-3 are designed to maximize safety and avoid collisions with aircraft at lower altitudes. In a real world situation requiring an emergency descent, the priority is to initiate the descent as soon as possible while still practicing anti-collision precautions to maximum extent possible.**
References:	Airplane Flying Handbook FAA-H-8033-3C PA-28-161 Warrior III POH

Emergency Descent (PA-28-181 Pilot 100i)

Description:	A descent from a higher altitude in the case of an emergency such as: incapacitated passenger, smoke filling the cockpit, or fire.
Objective:	To descend from a higher altitude in the shortest amount of time as safely as possible.
Procedures:	1) Perform clearing turns. 2) Position report including: location, altitude, and intentions. 3) Power idle and slow below V_{FE}. 4) Pitch for flap operation speed 102KIAS. 5) Configure flaps full (airspeed will decrease further, continue pitching for 102kts). 6) Establish bang angle between 30°-45°. 7) Allow for maximum descent. **Note: Airspeed not to exceed 102KIAS** 8) Execute applicable checklist as appropriate (engine fire, electrical fire etc.) Recover no lower than 500' AGL 1) Roll wings level. 2) Pitch for the horizon. 3) Add full power and retract 1st flap immediately. 4) Initiate a climb at V_X to desired altitude. 5) Retract flaps (one by one as necessary). 6) Return to cruise operations. **Note: Transition to emergency approach and landing procedures if required.** **Note: Steps 1-3 are designed to maximize safety and avoid collisions with aircraft at lower altitudes. In a real world situation requiring an emergency descent, the priority is to initiate the descent as soon as possible while still practicing anti-collision precautions to maximum extent possible.**
References:	Airplane Flying Handbook FAA-H-8033-3C PA-28-181 Piper Pilot POH

SECTION IX: Slow Flight, Stalls, and Spins

Maneuvering During Slow Flight

Description:	After clearing turns are completed, the airplane is maneuvered at an airspeed such that controllability is minimized to the point where the aircraft is operated in the area of reverse command, typically 5-10 knots above 1G stall speed. The maneuver should be accomplished in straight flight, turns, climbs, and descents using various flap configurations.
Objective:	To teach the student to recognize changes in airplane flight characteristics and control effectiveness at critically slow airspeeds in various configurations while maintaining positive airplane control at all times.
Procedures:	1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver. 2) Reduce power to 1500-1700 RPM; maintain heading and altitude while slowing to the critically slow airspeed. 3) Extend flaps below V_{FE}. 4) As airspeed approaches V_{S0} +5-10, power is adjusted to control altitude and pitch is adjusted to maintain airspeed. 5) Turn, climbs, and descents using bank angles of no greater than standard rate are performed as directed by the instructor while maintaining a critically slow airspeed. 6) Recovery is initiated by applying takeoff power and adjusting pitch attitude to maintain altitude while retracting flaps. 7) Resume normal cruise or as directed. **<u>Note:</u> Flight with continued or repeated stall horn/annunciator alerts will be avoided. Upon stall horn/annunciator activation, stall recovery procedures will be implemented.**
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Power-Off Stalls

Description:	The airplane is maneuvered to a critically slow airspeed in straight flight or turning flight in a power-off configuration. A descent is established, and the angle of attack is then increased until an imminent stall or the full stall occurs.
Objective:	To develop the student's ability to recognize the indications leading to an imminent or full stall while making an approach to landing and to make prompt, positive, and effective recoveries with a minimum loss of altitude.
Procedures:	1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver. 2) Reduce power to 1700 RPM (Landing/Approach Power), maintain heading and altitude while slowing to normal approach speed. 3) Extend flaps to the landing position below V_{FE}. 4) Upon reaching normal approach speed (65 Warrior/66 100i), establish stabilized descent (about 500fpm) and reduce the power to idle.. 5) Smoothly adjust the pitch to an attitude that will induce an imminent stall. 6) Maintain coordinated flight. 7) Maintain a pitch attitude that will induce an imminent or full stall (as directed). For imminent stalls, maintain pitch attitude until the first indication of a stall such as activation of audible stall warning devise, initial buffet, or a rapid decay of control effectiveness is experienced. For full stalls, maintain pitch attitude until a sudden loss of control effectiveness, excessive sink rate with full up elevator, or uncontrollable pitch down occurs. 8) Recover by decreasing the angle of attack, leveling the wings with coordinated use of aileron and rudder, applying full power, and retracting the 1st flap. 9) Retract the flaps (one by one as necessary) while adjusting the pitch attitude to V_X to minimize altitude loss. 10) After recovery is complete, accelerate to normal cruise or climb as necessary to an appropriate altitude.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Power-On Stalls

Description:	The airplane is maneuvering to a critically slow airspeed in straight flight or turning flight in a power-on configuration. The angle of attack is then increased until an imminent stall or the full stall occurs.
Objective:	To develop the student's ability to recognize the indications leading to an imminent or full stall in power on situations and to make prompt, positive, and effective recoveries with a minimum loss of altitude.
Procedures:	1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver. 2) Reduce power to 1500-1700 RPM and maintain heading and altitude while establishing a takeoff or climb configuration and airspeed as directed. 3) At V_R, simultaneously increase the pitch attitude to a stall attitude and apply full power. **<u>Note:</u> Avoid excessively high pitch attitudes.** 4) Maintain coordinated flight. 5) Maintain a pitch attitude that will induce an imminent or full stall (as directed). For imminent stalls, maintain pitch attitude until the first indication of a stall such as activation of audible stall warning devise, initial buffet, or a rapid decay of control effectiveness is experienced. For full stalls, maintain pitch attitude until a sudden loss of control effectiveness, excessive sink rate with full up elevator, or uncontrollable pitch down occurs. 6) Recover by decreasing the angle of attack, leveling the wings with coordinated use of aileron and rudder, and applying full power. 7) After recovery is complete, accelerate to normal cruise or climb as necessary to an appropriate altitude.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Spins

Note: This maneuver is only authorized in the C-152.

Description:	The airplane is maneuvered into an aggravated stall condition during which uncoordinated control use is accomplished in a manner that produces a spin entry.
Objective:	To develop the student's ability to recognize flight situations that lead to spin entries and to recover from spin entries and spins.
Procedures:	Entry Procedures: 1) Climb to at least 5000' AGL and clear the area by performing clearing turns. 2) Set up a power off stall entry with no flaps (power on stall entry may also be used). 3) As the airspeed and pitch attitude approach stall conditions, smoothly apply full aft elevator control with ailerons neutral. 4) Just prior to stall "break", apply full rudder in desired direction of spin. 5) A slight burst of power may assist spin entry. 6) Hold the rudder and elevator fully deflected until initiating recovery. 7) Initiate recovery after one to three turns. **Note: Recovery must be completed no lower than 4000' AGL** Recovery Procedures: 1) Retard power to idle. 2) Neutralized ailerons. 3) Apply and hold full opposite rudder. 4) Briskly apply positive forward-elevator movement to break the stall. 5) Hold these control inputs until rotation stops. 6) As rotation stops, neutralize the rudder. 7) Smoothly return to level flight from the resulting dive.
References:	FAA CFI Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Accelerated Stalls

Description:	The airplane is maneuvered to an airspeed that is below V_A/V_O. A constant bank is established and angle of attack is adjusted to maintain altitude inducing an imminent stall.
Objective:	To develop the student's ability to determine the stall characteristics of the airplane and develop the ability to instinctively recover at the onset of a stall at other-than-normal stall speeds or flight attitudes.
Procedure:	1) Select altitude that allows maneuver to be completed no lower than 3000' AGL. 2) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver. 3) Reduce power to 2000RPM and slow down to 85kts. 4) Upon reaching entry speed, establish a 45° bank either direction. 5) Smoothly and firmly adjust pitch to maintain altitude and induce stall. 6) Maintain coordinated flight. 7) Maintain stall pitch attitude until the first indication of a stall such as activation of audible stall warning devise, initial buffet, or a rapid decay of control effectiveness is experienced. 8) Recover by simultaneously applying forward pressure, leveling the wings, and increasing power. 9) After recovery is complete, accelerate to normal cruise or climb as necessary to an appropriate altitude.
Reference:	FAA Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

SECTION X: Performance Maneuvers

Steep Turns

Description:	360° turns are performed in both directions using a steep bank angle.
Objective:	To develop the student's smoothness, coordination, orientation, division of attention, and control techniques while executing high performance turns.
Procedures:	1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver. 2) Establish an appropriate altitude and airspeed below V_A/V_O (recommend 10kts below V_A/V_O) utilizing a power setting of 2100-2300 RPM. 3) Roll into a steep bank angle (45°PVT/50°COM). 4) As the bank angle steepens, adjust back elevator pressure to maintain a level altitude and adjust power to maintain airspeed. 5) Maintain bank angle, altitude, and airspeed during the turn. 6) Be constantly alert for other traffic while performing this maneuver. 7) Plan to lead the rollout ½ the bank angle of rollout heading so the turn is stopped after 360° of heading change and immediately initiate a 360°turn in the opposite direction. 8) After completion of the second turn, return to straight and level flight at cruise airspeed.
References:	FAA Private and Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Chandelles

Description:	A 180° maximum performance climbing turn.
Objective:	To develop the student's control techniques at varying airspeeds and attitudes while remaining oriented and coordinated.
Procedures:	1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver. 2) Establish an appropriate airspeed at or below V_O. 3) Select a prominent reference point off the wing tip. Consider wind direction. 4) Enter a coordinated 30° bank turn into the direction of the reference point and wind. 5) Once a 30° bank is established, apply back pressure while simulataneisly increaing engine power. 6) Simultaneously increase pitch attitude at a constant rate so as to obtain a maximum pitch attitude at the 90° point which, when maintained, will result in the airplane slowing to just above stalling speed at the completion of 180° turn. 7) Maintain coordinated control inputs throughout maneuver. 8) Maintain a constant 30° bank angle during the first 90° of the turn. 9) After passing the 90°point, begin a slow, constant rate rollout in order to arrive at the wings-level position just as the 180° turn is completed. 10) After the 90° point, back pressure should be added as required to maintain a constant pitch attitude until reaching the 180° point. 11) Upon reaching the 180° point, the airplane should be held momentarily just above the stall speed (within 5 knots) of stalling speed with the wings level. 12) Maintain altitude and accelerate to cruise by decreasing pitch attitude to the horizon. **<u>Note:</u> This maneuver should be done into the wind to avoid drifting away from the reference point and/or the practice area.**
References:	FAA Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Lazy Eights

Description:	Two 180° turns are completed in opposite directions. Each turn includes a climb and a descent in a symmetrical pattern; the nose of the airplane scribing a horizontal eight on the horizon.
Objective:	To develop the proper coordination of the flight controls across a wide range of airspeed and attitudes.
Procedures:	1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver. 2) Establish an appropriate attitude at or below V_O. 3) Select reference points and consider wind direction. 4) Begin a gradual climbing turn in the direction of the 45° reference point and wind. Plan a climbing turn so that at the 45° point, the airplane is at its maximum pitch attitude and a 15° bank angle is rolled in with the bank slowly and steadily increasing. 5) The bank angle should continue to increase until it reaches a 30° bank angle at the 90° visual reference point. The pitch attitude should be slowly decreasing. 6) As the airplane passes through the 90° reference point on the horizon. The bank angle should be at 30° and the airspeed should be 5-10 KIAS above stall. 7) Both the pitch attitude and the bank angle continue to decrease so that, at the 135° point, the pitch attitude reaches its lowest point and approximately 15° bank angle remains. 8) As the airplane passes through the 135° point, the rollout is continued and the pitch attitude is slowly increased so that the airplane returns to straight and level flight at the entry altitude and airspeed at the 180° point. 9) Continue immediately into a similar turn in the opposite direction. **<u>Note:</u> This maneuver should be done into the wind to avoid drifting away from the reference point and/or the practice area.**
References:	FAA Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Steep Spirals

Description:	The airplane is maneuvered in a descending turn, around a point on the ground that causes the ground track to be a circle.
Objective:	To develop the student's ability to make a descending turn maneuvering the airplane around a point on the ground in a manner that causes the ground track to be a circle.
Procedures:	1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver. 2) Establish an altitude that will allow you to complete the maneuver by 1500' AGL (for OU procedures, start maneuver no higher than 6000' MSL). 3) Determine wind direction and set-up for downwind entry. 4) Select a small but prominent reference in a sparsely populated area (preferably a 3 or 4-way intersection). 5) Crossing reference point, reduce power to idle, slow to best glide speed and roll into bank angle not to exceed 60°. 6) Vary bank angle to maintain constant ground track of about 1/8-mile radius from your center point. 7) Make at least three turns recovering on the entry heading. 8) During each up-wind turn clear the engine by briefly advancing the throttle to at least 1700 RPM. 9) Be constantly on the alert for traffic while performing this maneuver. 10) Depart on entry heading unless otherwise instructed.
References:	FAA Commercial Pilot Airplane Airman Certification Standards Airplane Flying Handbook FAA-H-8083-3C

SECTION XI: Ground Reference Maneuvers

Eights-On-Pylons

Description:	The airplane is maneuvered between and then around two prominent reference points (pylons) in the form of a figure "8". During the turn portion the pylon is kept in the same position relative to the airplane's lateral axis by adjusting both altitude and bank angle.
Objective:	To develop the student's ability to maneuver the airplane accurately while dividing his/her attention between the flight path and the selected points on the ground.
Procedures:	**Note: Consideration must be given to the possibility of a low altitude engine failure while performing this maneuver. Select an area with an adequate landing site.**

1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver.
2) Establish pivotal altitude and airspeed below V_O.
3) Determine the wind direction.
4) Select two prominent reference points (pylons). They should be on a line perpendicular to the wind and far enough apart to allow 3-5 seconds of straight-and-level flight between turns.
5) Enter the "8" at the pivotal altitude by flying diagonally downwind between the pylons. The first turn is made into the wind.
6) As the line of sight reference approaches the pylon enter a bank as necessary to properly position the reference line on the pylon.
7) As the turn is continued, hold the line of sight reference on the pylon by adjusting bank and altitude (lower altitude upwind and higher altitude downwind).
8) Begin rolling out from the left when diagonally downwind to the right.
9) Once wings level, fly 3-5 seconds until reference line crosses right wing.
10) Complete maneuver to the right.
11) Be constantly alert for other traffic and obstacles while performing this maneuver.
12) To complete the maneuver, exit on 45 degrees downwind to the left.

Note: Pivotal altitude may be approximated by squaring ground speed, then dividing by 11.3 for Knots, or 15 for MPH.

References:	FAA Commercial Pilot Airplane Airman Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Rectangular Course

Description:	The airplane is maneuvered over a predetermined rectangular ground path. The pilot will maneuver the airplane utilizing necessary wind corrections so as to parallel the sides of the rectangle at a uniform distance. Turns at the corners of the rectangle are constant radius turns.
Objective:	To develop the student's ability to maneuver the airplane over a predetermined ground path while dividing attention inside and outside the airplane.
Procedures:	**Note: Consideration must be given to the possibility of a low altitude engine failure while performing this maneuver. Select an area with adequate landing site available.**

1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver.
2) Establish an altitude between 600' and 1000' AGL that is at least 500' above obstacles and establish cruise power and airspeed at or below V_A/V_O whichever is lower.
3) Select a prominent rectangular field bound by four section lines whose sides are approximately equal to a typical traffic pattern.
4) The field should be in a sparsely populated area.
5) Enter the maneuver on the 45° to the downwind.
6) Establish the proper crab angle to maintain a uniform distance from the field boundaries (about ½ - ¾ mile).
7) Be constantly alert for other traffic while performing this maneuver.
8) Vary the bank angle to maintain a constant radius during the turns.
9) Exit maneuver as directed by instructor.

References:	FAA Private Pilot Airplane Airman Certification Standards Airplane Flying Handbook FAA-H-8083-3C

S-Turns Across a Road

Description:

The airplane is maneuvered through a series of 180° turns in opposite directions over a predetermined reference line. The ground path should be a series of half circles of equal size alternately executed on the upwind side and the downwind side of the reference line.

Objective:

To develop the student's ability to maneuver the airplane over a predetermined ground path while dividing attention inside and outside the airplane.

Procedures:

<u>Note:</u> Consideration must be given to the possibility of low altitude engine failure while performing this maneuver. Select an area with adequate landing site available.

1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver.
2) Establish an altitude between 600' and 1000' AGL that is at least 500' above obstacles and establish cruise power and airspeed at or below V_A/V_O whichever is lower.
3) Determine the wind direction.
4) Select a road or other straight reference line running approximately perpendicular to the wind in a sparsely populated area.
5) Enter the maneuver downwind on a ground track perpendicular to the reference line.
6) At a point directly over the reference line, start a 180°constant radius turn, modifying the bank angle as necessary to compensate for wind drift. At the completion of the turn, the airplane will be directly over and perpendicular to the reference line with wings level.
7) Immediately upon completion of the first turn, an identical turn is begun on the upwind side of the reference line in the opposite direction. (The airplane should roll through level flight as the reference line is passed).

Do not stop in the wings level position.

8) Be constantly alert for other traffic while performing this maneuver.
9) The bank angle should be adjusted as necessary throughout the maneuver to achieve two complete semicircles of equal radius. Bank angle should not exceed 45°.
10) Depart on the entry heading unless otherwise instructed.

References:

FAA Private Pilot Airplane Airman Certification Standards
Airplane Flying Handbook FAA-H-8083-3C

Turns Around a Point

Description:	The airplane is maneuvered around a point on the ground in a manner that causes the ground track to be a circle.
Objective:	To develop the student's ability to maneuver the airplane over a predetermined ground path while dividing attention inside and outside the airplane.
Procedures:	**Note: Consideration must be given to the possibility of low altitude engine failure while performing this maneuver. Select an area with an adequate landing site available.**

1) Perform clearing turns and make a radio call on OU traffic prior to starting the maneuver.
2) Establish an altitude between 600' and 1000' AGL that is at least 500' above obstacles and establish cruise power and airspeed at or below V_A/V_O whichever is lower.
3) Determine the wind direction.
4) Select a small but prominent reference point in a sparsely populated area.
5) Enter downwind and start a turn around the point.
6) Adjust the bank angle as necessary to correct for the effects of wind in order to maintain a constant radius.
7) Be constantly alert for other traffic while performing this maneuver.
8) Depart on the entry heading unless otherwise instructed.

References:	FAA Private Pilot Airplane Airman Certification Standards Airplane Flying Handbook FAA-H-8083-3C

SECTION XII: Cross Country Flight Planning

TIME/DISTANCE/FUEL TO DESCEND

Parameters:

Descent Rate: 500 FPM

Descent Speed: 90 KTS (Warrior) | 100KTS (100i)

Power Setting: 2000 RPM (Warrior) | 1900 RPM (100i)

Fuel Burn: 9.2GPH (Warrior) | 9.5GPH (100i)

Descent Time: (Cruise ALT – TPA*)/ 500

Distance: (Ground Speed x Descent Time)/60 + 2 **

Fuel Burn: GPH x Descent Time

*Consider if overflying airport is needed
**Allows traffic pattern entry 2 miles from airport

Warrior Example: Cruise ALT = 4500 feet |TPA = 2200 feet | NO WIND

Descent Time: (4500-2200) / 500 FPM = 4.6 min

Distance E6B : Set speed at 90, Above 4.6 read 7 NM, add 2 to get 9 NM

Fuel: Set Fuel to 9.2, Above 4.6 read .7 gallons

WHY this method?

The POH has you begin your descent fairly far out from the destination. The OU method has the pilot maintain cruise airspeed until closer to the destination and then descent at a slower airspeed. The OU method also keeps the aircraft at or under V_A/V_O for all phases of flight.

Lost Procedures

Description: The pilot becomes aware that the airplane is off course and in an unknown position. Procedures are initiated that will determine the new location and correct back on course.

Objective: To develop the skills and proficiency necessary to determine airplane position and the corrections needed to re-establish the airplane on the proper course.

Lost procedures:

- Confess
- Climb
- Conserve
- Communicate
- Comply

Procedures:

1) Maintain positive airplane control at all times.
2) Use topographical features and/or navaids to determine position:

Topographical features:

1) Reset the heading indicator.
2) Turn the sectional chart to match airplane heading.
3) Look outside the airplane for prominent landmarks.
4) Match the landmarks to the chart.

Navaids:

GPS:

1) Program GPS direct to KOUN (or desired alternate).

VOR:

1) Tune and identify available stations VOR.
2) Locate the airplane's current position using radials/bearings/DME.
3) In the event the above procedures fail to determine airplane position, contact the nearest FSS or ATC facility for radar assistance.

Note: Consideration must be given to alternatives other than continuing to the planned destination considering the amount of time that has elapsed and the distance off course. Remaining fuel available and weather conditions must also be considered when determining action to be taken.

References: FAA Private and Commercial Pilot Airplane Airmen Certification Standards
Airplane Flying Handbook FAA-H-8083-3C

Diversion Checklist

Diversion Checklist - Updated 1/24

- GPS - Direct new destination _____ TIME_____
- Turn to GPS Heading
  - Note DG heading for GPS course _____
- Advise ATC/FSS/NOTAMS?
- Adjust altitude for Hemispherical Rule

If Field in-sight Skip to Airport Info

- Distance _____ GS_____ ETA_____ Fuel_____
- Airport Info: From Sectional
  - CTAF_____
  - AWOS_____
  - Field Elevation_____
  - TPA_____
- ***Complete In Range Checklist***
- Determine best runway and pattern entry (DRAW)

SECTION XIII: Instrument Procedures

Instrument Cockpit Check (100i)

Description: The instrument cockpit check starts prior to taxi with a systematic check of all radios and navigation equipment. The magnetic compass and AHRS instruments are checked while taxiing to the active runway.

Objective: To ensure the proper operation of all instruments, avionics and navigation equipment prior to flight.

Procedures: **Avionics and Navigation Equipment Check**

1) Magnetic Compass
    a) Full of Fluid
    b) No Bubbles
    c) No Cracks
    d) Deviation Card
    e) Compass Card Moves Freely
2) PFD – No Red X's
    a) Airspeed – 0 or Known Headwind
    b) Attitude Indicator – Wings Level
    c) Altimeter – Set to Current Altimeter Setting and Reading ±75' of Airport Elevation
    d) Vertical Speed Indicator – Reading 0
    e) HSI Heading Matches Compass Heading
    f) Clock Operating, Verify Correct Time
    g) GPS set to External
3) Audio Panel
    a) Receiving Capabilities on COMM 1 and 2 and Volume Set
4) Standby – No Red X's
    a) Airspeed – 0 or Known Headwind
    b) Attitude Indicator – Wings Level
    c) Altimeter – Set to Current Altimeter Setting and Reading ±75' of Airport Elevation
    d) Vertical Speed Indicator – Reading 0
    e) HSI Heading Matches Compass Heading
5) GNX375
    a) RAIM Check
    b) WAAS Enabled
    c) Transponder – ALT Mode
6) VOR – Checked in Past 30 Days
7) Alternate Static Source – Normal Position
8) Verify on Taxi
    a) Attitude Indicator – Wings Level
    b) Rate of Turn Indicator – In Direction of Turn
    c) Slip/Skid Indicator (Ball) – Opposite Direction of Turn

References: Instrument Flying Handbook FAA-H-8083-15B

Instrument Cockpit Check (Warrior)

Description: The instrument cockpit check starts prior to taxi with a systematic check of all radios and navigation equipment. The magnetic compass and gyro instruments are checked while taxiing to the active runway.

Objective: To ensure the proper operation of all instruments, avionics and navigation equipment prior to flight.

Procedures:

Avionics and Navigation Equipment Check

1) Magnetic Compass
    a) Full of Fluid
    b) No Bubbles
    c) No Cracks
    d) Deviation Card
    e) Compass Card Moves Freely
2) Clock with sweeping second hand and set to correct time.
3) Airspeed Indicator reading 0 or known headwind.
4) Attitude Indicator stable and erect within 5 minutes.
5) Altimeter set to current setting and within 75' of field elevation.
6) Turn coordinator wings level ball centered
    a) Aircraft banks into taxi turn.
    b) Ball moves opposite direction of taxi turn.
7) Heading Indicator aligned with compass and does not precess more than 3° within 15 minutes.
8) Vertical Speed Indicator 0 or current reading is new 0.
9) VOR checked within past 30 days.

References: Instrument Flying Handbook FAA-H-8083-15B

Basic Attitude Instrument Flying

Description:	Straight and level flight climbs, descents, and turns are accomplished by establishing and maintaining appropriate control forces by reference to the control instruments and cross – checking the airplane's performance by reference to the performance instruments.
Objective:	To develop the student's ability to maintain airplane control solely by reference to instruments.
Procedures:	1) Properly cross-check the instruments. a. Consider control, performance, primary, and supporting instruments when cross-checking. b. Include engine and navigation instruments. c. Avoid fixation, omission, and emphasis. 2) Properly interpret the instruments that were cross-checked. a. Interpret instrument indications/trends/rates. b. Recognize malfunctioning instruments. c. Understand the instrument limitations and errors. 3) Effectively control the airplane. a. Set the control instruments using pitch, bank, power, and trim. b. Monitor the performance instruments. c. Make corrections/modifications as necessary by reference to the control instruments.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B

Constant Airspeed Climbs

Description:	A constant airspeed is maintained during a climb at a fixed power setting by establishing and maintaining the appropriate pitch attitude.
Objective:	To develop the student's proficiency in the basic skills required for instrument flight.
Procedures:	1) Simultaneously apply climb power and establish the approximate pitch attitude, which will result in the desired climb airspeed. 2) Maintain the climb attitude by reference to the attitude indicator and cross-check the airspeed indicator for the desired performance. 3) Adjust the pitch trim to neutralize control pressures. 4) Make small pitch adjustments by reference to the attitude indicator as necessary to achieve and maintain the desired airspeed. 5) Lead the level off by approximately 10% of the rate of climb, reducing the power to the cruise power setting when the airspeed increases to within 5 knots of the cruise airspeed.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B

Constant Airspeed Descents

Description:	A constant airspeed is maintained during a descent at a fixed power setting by establishing and maintaining the appropriate pitch attitude.
Objective:	To develop the student's proficiency in the basic skills required for instrument flying.
Procedures:	1) Simultaneously reduce the power and establish the approximate pitch attitude, which will result in desired airspeed during the descent. 2) Maintain the pitch attitude by reference to the attitude indicator and cross-check the airspeed indicator for the desired performance. 3) Adjust the pitch trim to neutralize control pressures. 4) Make small pitch adjustments by reference to the attitude indicator as necessary to achieve and maintain the desired airspeed. 5) Lead the level off by approximately 10% of the rate of descent, increasing the power to the cruise power setting as initiate the level off.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B

Constant Rate Climbs

Description:	A constant rate and a constant airspeed is maintained during a climb by establishing and maintaining the appropriate pitch attitude and power setting.
Objective:	To develop the student's proficiency in the basic skills required for instrument flight.
Procedures:	1) Simultaneously establish the appropriate climb attitude and power setting which will result in the desired climb rate and airspeed. 2) Maintain the climb attitude by reference to the attitude indicator and cross-check the airspeed indicator and the vertical speed indicator for the desired performance. 3) Adjust the pitch trim to relieve elevator control pressure. 4) Make small pitch adjustments by reference to the attitude indicator as necessary to achieve and maintain the desired climb rate. Make small power changes by reference to the tachometer to achieve and maintain the desired climb airspeed. 5) Lead the level off by approximately 10% of the rate of climb, reducing power to the cruise power setting when the airspeed increases to within 5 knots of cruise airspeed.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B

Constant Rate Descents

Description:	A constant rate and a constant airspeed are maintained during a descent by establishing and maintaining the appropriate pitch attitude and power setting.
Objective:	To develop the student's proficiency in the basic skills required for instrument flights
Procedures:	1) Simultaneously, establish the approximate attitude and power setting which will result in the desired descent rate and descent airspeed. 2) Maintain the descent attitude by reference to the attitude indicator and crosscheck the airspeed indicator and the vertical speed indicator for the desired performance. 3) Adjust the pitch trim to relieve elevator control pressure. 4) Make small pitch adjustments by reference to the attitude indicator as necessary to achieve and maintain the desired descent rate. Make small power adjustments by reference to the tachometer to achieve and maintain the desired airspeed. 5) Lead the level of by approximately 10% of the rate of descent, increasing power to the cruise power setting as level off is initiated.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B

Magnetic Compass Turns

Description:	Turns to specific headings are accomplished by reference to the magnetic compass.
Objective:	To develop the student's proficiency in making turns to specific headings by reference to the magnetic compass.
Procedures:	1) Determine the amount of turning error that is appropriate to your desired heading. The amount of error reaches a maximum on headings of north and south and is roughly equivalent to the airplane's latitude. The amount of error decreases to approximately zero on headings of east or west. 2) Establish a turn in the appropriate direction using a standard rate turn. 3) When turning to a northerly heading, lead the rollout by the amount of the turning error plus the lead needed to rollout of the bank. 4) When turning to a southerly heading, rollout past the desired heading by an amount equivalent to the turning error minus the lead needed to rollout of the bank. 5) Check the accuracy of the new heading and correct if necessary.
References:	Instrument Flying Handbook FAA-H-8083-15B

Timed Turns to Magnetic Compass Headings

Description:	Turns to specific magnetic compass headings will be accomplished by accurately timing standard or half-standard rate turns.
Objective:	To develop proficiency in making timed turns to specific compass headings with and without the use of altitude indicator or the heading indicator.
Procedures:	1) Determine the number of degrees to be turned. 2) Compute the time needed to accomplish the turned a standard rate (3 degrees per second) or half-standard rate (1 and ½ degrees per second). 3) Begin the timing as the roll is started. Establish the appropriate rate of turn. 4) Maintain a standard or half-standard rate of turn as appropriate. 5) When the appropriate time has elapsed, rollout at the same rate as the roll in. 6) Check the new heading and correct if necessary.
References:	Instrument Flying handbook FAA-H-8083-15B

IFR Departure Procedures

Description:	The airplane is maneuvered after takeoff to proceed on course as directed by ATC.
Objective:	To develop the skills and proficiency necessary to depart an airport under IFR conditions and transition to the en route phase of the flight.
Procedures:	1) Prior to takeoff, brief SID, set navigation, communication radios, altitude bug, and heading bug as needed to comply with the departure clearance. 2) Record the takeoff time. 3) After receiving takeoff clearance, follow the departure clearance and any special ATC instructions. If cleared for a "SID", refer to the chart for procedures. 4) When departing from an uncontrolled airport, adhere to the "clearance void time" and contact ATC as appropriate. 5) Maintain geographic orientation and verify navigation frequency identification as soon as possible. 6) Note the time passing designated checkpoints. 7) Intercept the appropriate en route course.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B Federal Aviation Regulations §91.175, §91.181, §97.20 Aeronautical Information Manual Chapter 5 Section 2 *Departure Procedures*

VOR Intercepts

Description:	The airplane is maneuvered to intercept and track a predetermined VOR radial either inbound or outbound.
Objective:	To develop proficiency in intercepting and tracking predetermined VOR radials inbound or outbound.
Procedures:	1) Reset the heading indicator by reference to the magnetic compass. 2) Tune and identify the VOR station. 3) Turn the airplane to a heading parallel to the desired course. 4) Center the CDI/HSI with a “TO "or “FROM” indication as appropriate and note the course “TO” or “FROM” the facility as indicated by the Omni Bearing Selector (OBS). 5) Set the OBS to the desired course. 6) To intercept a course 30° or less form the present course, turn 45° in the direction of CDI/HSI deflection. To intercept a course more than 30° from the present course turn 90°in the direction of the CDI/HSI deflection. 7) Maintain the intercept heading until the CDI/HSI starts to center. 8) As the CDI/HSI centers, turn on course and begin tracking procedures to correct for wind. **<u>Note:</u> As proficiency is gained and familiarity with the relationship between intercept angle, distance from the station, and the magnitude of off course deviation is developed, the course parallel orientation method may be omitted and intercept angles other than 45° and 90° should be used as appropriate.**
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B

VOR Tracking

Description:	The airplane is maneuvered along a VOR radial solely by reference to flight instruments. Heading adjustments will be made to correct for the effect of wind.
Objective:	To develop the student's proficiency in following a VOR radial while correcting for wind effect.
Procedures:	1) When the desired course has been intercepted, with the CDI/HSI centered, maintain a heading corresponding to the OBS setting. 2) When a definite off-course indication occurs, turn 20°in the direction of the CDI/HSI deflection. 3) Maintain the new track until the CDI/HSI begins to center. 4) As the CDI/HSI centers, turn 10° back toward the selected course. This establishes a wind correction angle of 10°. If the CDI/HSI remains centered, maintain the heading. The wind correction angle is correct. 5) If the CDI/HSI begins to show deflection in the direction opposite the initial deviation, the 10°wind correction was too great. Turn to a heading parallel to the course selected and allow the airplane to drift back onto the desired radial. When the CDI/HSI centers, establish a 5° wind correction angle. 6) 5° corrections are normally adequate to keep the CDI/HSI centered after the initial wind corrections. However, exact center needle accuracy may require corrections less than 5 °. **<u>NOTE:</u> If the first 20°of heading change fails to change the direction of the CDI/HSI movement within a reasonable period of time, an additional 20° heading change should be made (a strong crosswind is indicated). As the CDI/HSI re-centers, establish a 20° correction angle. Adjust this angle as necessary, using the bracketing technique described above.**
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B

DME Arc Procedures

Description:	The airplane will be maneuvered to intercept and follow a predetermined circular course at a set distance from a VORTAC/VOR-DME facility. The DME distance is maintained until intercepting the desired approach course.
Objective:	To develop the skill and proficiency necessary to maneuver the airplane along a DME arc and intercept final approach courses from DME arcs.
Procedures:	1) Fly inbound or outbound on the selected course/heading to intercept the arc. 2) Tune and identify the VORTAC/VOR-DME frequency in NAV2 and set the final approach course. 3) Use direct function on GPS to the station or use T/F soft key on GNC225A to see DME from the station. 4) Set bearing pointer 2 to NAV2. Use the bearing pointer feature to track your progress every 10°. 5) Determine the proper direction to turn when intercepting the arc. Use the 90° wing tip position on the OBS or HSI to determine the initial heading to fly after intercepting the arc. 6) Start the turn to fly the arc when the airplane is 0.5 DME from the arc intercept. 7) Wait until the tail end of the bearing pointer reaches 10° past the initial radial. 8) Turn the airplane 10° so that the next selected radial is crossed at a 90° angle. 9) When the tail of the bearing pointer reaches the next 10°, turn the airplane another 10°. 10) Wind correction for arc deviation is accomplished by: a. A wind causing the arc distance to increase requires a heading correction of approximately 10° for each 1 mile deviation. b. A wind causing the arc distance to decrease requires you to maintain the present heading until the arc is intercepted. 11) Approach course interception is accomplished by turning to an appropriate intercept heading upon crossing the depicted lead radial. For procedures not depicting a lead radial, lead the turn by approximately 5°.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B

Holding Procedures

Description:	The airplane is maneuvered to enter a standard or non-standard pattern using the AIM recommended entry procedure. Wind correction is applied to keep the airplane in protected airspace and on the inbound course. The straight and level legs are timed in order to establish the desired inbound leg length.
Objective:	To develop the skill and proficiency necessary to enter and become established in a published or non-published holding pattern.
Procedures:	1) Determine the type of entry to be used based on the airplane heading upon arrival over the holding fix. 2) Slow to the desired airspeed and establish the proper configuration when within 3 minutes of the holding fix. 3) Upon crossing the holding fix execute the appropriate entry procedure recommended by the AIM and report to ATC as appropriate. 4) Intercept the inbound course and establish the wind correction angle as soon as possible. 5) Start outbound timing when abeam the fix or at the completion of the outbound turn whichever occurs later. 6) Adjust the outbound heading (normally 3x the inbound wind correction angle) so that the course intercept occurs at the completion of the inbound turn. 7) Adjust outbound timing so that the inbound leg is one minute long. 8) Begin inbound timing at the completion of the inbound turn or course intercpet whichever occurs first. 9) Leave hold according to ATC instructions. **<u>Note:</u> DME holding- DME holding is the same as above except that the legs are measured in miles. Timing is not required but wind correction angles must still be used. If the inbound course is towards the NAVAID and the fix distance is 16NM and the leg length is specified as 4NM, then the end of the outbound leg will be reached when the DME reads 20NM. If the inbound course is away from the NAVAID, the end of the outbound leg will be reached when the DME reads 12NM.**
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B Federal Aviation Regulations Part §97 Aeronautical Information Manual Chapter 5 Section 3 En Route Procedures

ILS Approach

Description: The airplane is established on the final approach course and at glideslope intercept the airplane starts a descent to the DA or circling minimum. The approach is terminated either with a landing or missed approach as appropriate.

Objective: To develop the skills and proficiency necessary to execute ILS approaches.

Procedures:

1) Prior to reaching the IAF, select, tune, identify, and confirm the operational status of ground and airplane navigation equipment to be used for the approach.
2) Brief the approach plate and check frequencies, courses, altitudes and missed approach procedures.
3) Complete a procedure turn, if appropriate.
4) Intercept the final approach course at the proper altitude and airspeed.

Note: These are guidelines designed to get the airplane properly set up for the final approach. ATC requirements may dictate modification of these guidelines.

5) Complete the before landing checklist, slow to final approach course speed, and add 1 notch of flaps upon reaching 1 dot above the glideslope.
6) Upon intercepting the glideslope begin descent to the DA. To find the descent rate to maintain 3° glideslope, take the ground speed and multiply it by 5 (ex. 80kts GS = 400fpm)
7) Note the time crossing the FAF.
8) Use 5°-10° wind correction angles to track the localizer outside the FAF and 2°-5° after crossing the FAF inbound.
9) Adjust pitch attitude to maintain the glideslope and power to maintain the correct airspeed (1700 RPM, 80Kts).
10) Be alert for equipment malfunctions of localizer/glideslope deviations that may require executing a missed approach.
11) Upon reaching the DA or circling minimums as appropriate:
    a) Make a normal landing if the provisions of FAR §91.175 are met.
    b) Execute the missed approach.

Note: This procedure works for any ground based precision approaches such as LDA with Glideslope.

References:
FAA Instrument Rating – Airplane Airman Certification Standards
Instrument Flying Handbook FAA-H-8083-15B
Federal Aviation Regulations §91.175

VOR Approach

Description:	The airplane is established on the final approach course and at the final approach fix or the beginning of the final approach segment, the airplane starts a descent to the MDA or circling minimum. The approach is terminated either with a landing or a missed approach as appropriate.
Objective:	To develop the skill and proficiency necessary to execute VOR approaches.
Procedures:	1) Prior to reaching the IAF, select, tune, identify, and confirm the operational status of ground and airplane navigation equipment to be used for the approach. 2) Brief the approach plate and check frequencies, courses, altitudes and missed approach fix. 3) Complete a procedure turn, if appropriate. 4) Intercept the final approach course at the proper altitude and airspeed. **<u>Note:</u> These are guidelines designed to get the airplane properly set up for the final approach. ATC requirements may dictate modification of these guidelines.** 5) Complete the before landing checklist, slow to final approach course speed, and add 1 notch of flaps upon reaching 0.5 miles from the final approach fix. 6) At the final approach fix note the time and descent to the MDA or step-down fix as appropriate. 7) Adjust pitch attitude that allows you descend to your step down or MDA and power to maintain the correct airspeed (1400-1500 RPM, 80Kts). 8) Level off at step down fixes, as appropriate, by adjusting pitch attitude to maintain altitude and power to maintain airspeed (2000-2100 RPM, 80Kts). 9) Be alert for equipment malfunctions or course deviations that may require executing a missed approach. 10) Initiate a level-off to stay at or above the MDA until the requirements listed in FAR §91.175 are met and a normal landing can be made. 11) If the requirements of FAR §91.175 cannot be met upon crossing the MAP, execute the missed approach. Note: This procedure works for any ground based non-precision approaches such as Localizers, LDA, and SDF approaches.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B Federal Aviation Regulations §91.175

RNAV Approach – Precision (APV)

Description: The airplane is established on the final approach course and at glidepath intercept the airplane starts a descent to the DA or circling minimum. The approach is terminated either with a landing or missed approach as appropriate.

Objective: To develop the skills and proficiency necessary to execute RNAV approaches.

Procedures:

1) Prior to reaching the IAF, load the approach on the GPS through the procedures page, ensure the correct approach and initial fix (or vectors to final) are selected, finally activate the approach procedure. Ensure the HSI is set to GPS and set the final approach course on the HSI.
2) Ensure the GPS is in LPV or LNAV/VNAV mode on the HSI or the bottom left of the GNX375, if it is still in terminal mode monitor the screen to ensure the correct mode is displayed prior to the FAF.
3) Brief the approach plate and check courses, altitudes and missed approach procedures.
4) Complete a course reversal, if appropriate.
5) Intercept the final approach course at the proper altitude and airspeed.

<u>Note</u>: These are guidelines designed to get the airplane properly set up for the final approach. ATC requirements may dictate modification of these guidelines.

6) Complete the before landing checklist, slow to final approach course speed, and add 1 notch of flaps upon reaching 1 dot above the glidepath.
7) Upon intercepting the glidepath begin descent to the DA. To find the descent rate to maintain 3° glideslope, take the ground speed and multiply it by 5 (ex. 80kts GS = 400fpm)
8) Note the time crossing the FAF.
9) Use 5°-10° wind correction angles to track the final approach course outside the FAF and 2°-5° after crossing the FAF inbound.
10) Adjust pitch attitude to maintain the glidepath and power to maintain the correct airspeed (1700 RPM, 80Kts).
11) Be alert for equipment malfunctions or course/glidepath deviations that may require executing a missed approach.
12) Upon reaching the DA or circling minimums as appropriate:
    a) Make a normal landing if the provisions of FAR §91.175 are met.
    b) Execute the missed approach.

References: FAA Instrument Rating – Airplane Airman Certification Standards
Instrument Flying Handbook FAA-H-8083-15B
Federal Aviation Regulations §91.175

RNAV Approach – Non Precision (NPA)

Description: The airplane is established on the final approach course and at the final approach fix or the beginning of the final approach segment, the airplane starts a descent to the MDA or circling minimum. The approach is terminated either with a landing or a missed approach as appropriate.

Objective: To develop the skill and proficiency necessary to execute RNAV approaches.

Procedures:

1) Prior to reaching the IAF, load the approach on the GPS through the procedures page, ensure the correct approach and initial fix (or vectors to final) are selected, finally activate the approach procedure. Ensure the HSI is set to GPS and set the final approach course on the HSI.
2) Ensure the GPS is in LP or LNAV mode on the HSI or the bottom left of the GNX375, if it is still in terminal mode monitor the screen to ensure the correct mode is displayed prior to the FAF.
3) Brief the approach plate and check courses, altitudes and missed approach fix.
4) Complete a course reversal, if appropriate.
5) Intercept the final approach course at the proper altitude and airspeed.

Note: These are guidelines designed to get the airplane properly set up for the final approach. ATC requirements may dictate modification of these guidelines.

6) Complete the before landing checklist, slow to final approach course speed, and add 1 notch of flaps upon reaching 0.5 miles from the final approach fix.
7) At the final approach fix note the time and descent to the MDA or step-down fix as appropriate.
8) Adjust pitch attitude that allows you descend to your step down or MDA and power to maintain the correct airspeed (1400-1500 RPM, 80Kts).
9) Level off at step down fixes, as appropriate, by adjusting pitch attitude to maintain altitude and power to maintain airspeed (2000-2100 RPM, 80Kts).
10) Be alert for equipment malfunctions or course deviations that may require executing a missed approach.
11) Initiate a level-off to stay at or above the MDA until the requirements listed in FAR §91.175 are met and a normal landing can be made.
12) If the requirements of FAR §91.175 cannot be met upon crossing the MAP, execute the missed approach.

References:

FAA Instrument Rating – Airplane Airman Certification Standards
Instrument Flying Handbook FAA-H-8083-15B
Federal Aviation Regulations §91.175

No-Gyro Radar Vector Approach

Description:	The airplane is established on the final heading as assigned by ATC and at the desired approach speed. The descent to the MDA is begun when instructions are received from ATC. The approach is terminated either with a landing or a missed approach as appropriate.
Objective:	To develop the skill and proficiency necessary to execute radar instrument approach procedures during operations with an inoperative heading indicator.
Procedures:	1) Comply with turn, heading, and altitude instructions as assigned by ATC. 2) Complete the before landing checklist and slow to final approach course speed upon reaching ½ mile from the final descent point. 3) ATC will advise when to make heading changes by issuing turn instructions such as “turn left”, “stop turn”. 4) Upon receiving instructions from ATC to begin final descent, initiate a descent to the MDA. 5) Course guidance is provided by ATC in the form of heading and turn instructions. If executing a PAR approach, glideslope instructions are also provided by ATC. 6) Be alert for equipment malfunctions or course deviations that may require executing a missed approach. 7) Initiate a level-off to stay at or above the MDA until the requirements listed in FAR §91.175 are met and a normal landing can be made. 8) If the requirements of FAR §91.175 cannot be met, execute the missed approach.
References:	FAA Instrument Rating – Airplane Airman Certification Standards Instrument Flying Handbook FAA-H-8083-15B Federal Aviation Regulations §91.175 Aeronautical Information Manual 5-4-11 *Radar Approaches*

SECTION XIV: Multi-Engine Maneuvers

Slow Flight

Description: After clearing turns are completed the airplane is maneuvered at an airspeed such that controllability is minimized to the point just above the stall warning horn. The maneuver should be accomplished in straight flight, turns, climbs and descents using various flap configurations.

Objective: To teach the student to recognize changes in airplane flight characteristics and control effectiveness at critically slow airspeeds in various configurations while maintaining positive airplane control at all times.

Procedures:

1) Perform clearing turns.
2) Make radio call on OU traffic.
3) Set power to 13”-15” MP.
4) Extend landing gear below 140kts (V_{LE}).
5) Propellers full forward as appropriate.
6) Extend flaps to the landing position below V_{FE}.
7) Maintain 60kts of airspeed.
8) Set power to 20” MAP.
9) Pitch for airspeed/power for altitude.

Recovery (maintain altitude)

1) Set full power.
2) Retract 1st flap.
3) Retract the landing gear before reaching 109kts (V_{LO}).

Note: Landing gear cannot be retracted above 109kts.

4) Retract the remaining flaps.
5) Resume normal cruise operations.

References: FAA Commercial Pilot Airplane Airmen Certification Standards
Airplane Flying Handbook FAA-H-8083-3C

Power-Off Stall

Description:

The airplane is maneuvered to a critically slow airspeed in straight flight or turning flight in a power off configuration. A descent is established and the angle of attack is then increased until an imminent stall or the full stall occurs.

Objective:

To develop the student's ability to recognize the indications leading to an imminent or full stall while making an approach to landing and to make prompt, positive, and effective recoveries with a minimum loss of altitude.

Procedures:

1) Perform clearing turns.
2) Make radio call on OU traffic.
3) Set power to 13"-15" MP.
4) Extend landing gear below 140kts (V_{LE}).
5) Propellers full forward as appropriate.
6) Extend flaps to the landing position below V_{FE}.
7) Maintain 85kts of airspeed.
8) Set power to idle.
9) Maintain a stabilized descent at 85kts and 500fpm.
10) Pitch up to induce imminent stall.

Recovery

1) Set full power.
2) Pitch for 82kts (V_X).
3) Retract 1st flap.
4) Retract the landing gear before reaching 109kts (V_{LO}).

Note: Landing gear cannot be retracted above 109kts.

5) Retract remaining flaps.
6) Resume normal cruise operations.

References:

FAA Commercial Pilot Airplane Airmen Certification Standards
Airplane Flying Handbook FAA-H-8083-3C

Power-On Stall

Description:	The airplane is maneuvered to a critically slow airspeed in straight flight or turning flight in a power on configuration. The angle of attack is then increased until an imminent stall or the full stall occurs.
Objective:	To develop the student's ability to recognize the indications leading to an imminent or full stall in power-on situations and to make prompt, positive, and effective recoveries with a minimum loss of altitude.
Procedures:	1) Perform clearing turns. 2) Make radio call on OU traffic. 3) Set power to 13"-15" MP. 4) Propellers full forward as appropriate. 5) Maintain 75kts of airspeed. 6) Set power to 18" MAP (simulated T.O. power). 7) Pitch up to induce imminent stall. <u>Recovery</u> 1) Maintain power at 18" MAP (simulated T.O power). 2) Pitch for 82kts (V_X). 3) Resume normal cruise operations.
References:	FAA Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Accelerated Stall

Description:	The airplane is maneuvered to an airspeed that is below V_A/V_O. A constant bank is established and angle of attack is adjusted to maintain altitude inducing an imminent stall.
Objective:	To develop the student's ability to determine the stall characteristics of the airplane and develop the ability to instinctively recover at the onset of a stall at other-than-normal stall speeds or flight attitudes.
Procedures:	1) Perform clearing turns. 2) Make radio call on OU traffic. 3) Set power to 13"-15" MAP. 4) Propellers full forward as appropriate. 5) Airspeed 100kts. 6) Bank to 45°. 7) Pull until stall warning horn, while maintaining altitude. <u>Recovery</u> 1) Apply forward pressure as required to reduce the AOA. 2) Roll wings level. 3) Full power. 4) Resume normal cruise operations.
References:	FAA Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Steep Turn

Description:	360° turns are performed in both directions using a steep bank angle.
Objective:	To develop the student's smoothness, coordination, orientation, division of attention, and control techniques while executing high performance turns.
Procedures:	1) Perform clearing turns. 2) Make radio call on OU traffic. 3) Set power to 18" MAP. 4) Verify airspeed below V_A/V_O. 5) Establish a 50° bank. 6) Power 19"-20" MAP to maintain airspeed (recommend 120kts or 10kts below V_A/V_O whichever is lower). 7) Adjust pitch to maintain altitude during the turn. 8) Relax back pressure and reduce power as you transition from one turn to the other in order to maintain ACS standards. 9) Resume cruise operations after completing maneuver.
References:	FAA Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Emergency Descent

Description:	A descent from a higher altitude in the case of an emergency such as an incapacitated passenger, smoke filling the cockpit, or fire.
Objective:	To descend from a higher altitude in the shortest amount of time as safely as possible.
Procedures:	1) Perform clearing turns. 2) Make radio call on OU traffic. 3) Set power to idle. 4) Propellers full forward. 5) Extend landing gear below 140kts (V_{LE}). 6) Pitch for 140kts to maximize descent rate. 7) Recover at selected altitude by raising the nose. Lead off the level off by using 10% of vertical speed. 8) Retract landing gear below 109kts (V_{LO}). 9) Resume normal cruise operations.
References:	FAA Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C

Drag Demonstration

Description: The aircraft will be configured in different high and low drag configurations and the performance will be monitored.

Objective: For the student to know how different configurations affect aircraft performance during single engine operations.

Procedures:

Note: Zero thrust is considered to be 12" MAP.

1) Power between 13"-15" MAP.
2) Propellers full forward as appropriate.
3) Airspeed intercept V_{YSE}.
4) Right cowl flap open.
5) Left cowl flap closed.
6) Right throttle set to full power.
7) Left throttle set to 12" MAP.
8) Set up a 5° bank and use rudder as required to maintain directional control.
9) Airspeed V_{YSE}… note VSI.
10) Airspeed V_{YSE} -10kts… note VSI.
11) Airspeed V_{YSE} +10kts… note VSI.
12) Airspeed V_{YSE}.
13) Extend landing gear… note VSI.
14) Extend full laps… note VSI.
15) Retract landing gear… note VSI.
16) Retract flaps… note VSI.
17) Left throttle to idle… note VSI.

Recovery

18) Airspeed V_{YSE}.
19) Left throttle advance slowly to warm engine.
20) Right throttle decrease slowly.
21) Power set to 21" MAP 2400 RPM.
22) Right cowl flap closed.

References: FAA Flight Instructor Airplane Airmen Certification Standards
Airplane Flying Handbook FAA-H-8083-3C

V_{MC} Demonstration

Description: The aircraft will be maneuvered into an engine-out high angle of attack and low airspeed situation. Recovery will occur at the first sign of stall or V_{MC}, whichever occurs first.

Objective: For the student to recognize a stall or V_{MC} situation and recover properly.

Procedures:

Pre-Maneuver

1) Gear up .
2) Rudder trim neutral.
3) Flaps up.
4) Right cowl flap open.

Procedure

5) Set power 13”-15” MAP.
6) Propellers full forward as appropriate.
7) Airspeed intercept V_{YSE}.
8) Right throttle full power.
9) Left throttle set to idle.
10) Set up a 5° bank and use rudder as required to maintain directional control (Do not add more rudder after this step).
11) Increase pitch (airspeed reduction of 1 knot per second).
12) At first sign of stall or loss of directional control.
13) Lower pitch.
14) Reduce right throttle.
15) Lower pitch until above V_{MC}.
16) Right throttle full power immediately.
17) Establish airspeed at V_{YSE}

Recovery

18) Airspeed V_{YSE}.
19) Left throttle advance slowly to warm engine (CHT in green band before normal ops).
20) Right throttle decrease slowly.
21) Power set to 21” MAP 2400 RPM.
22) Right cowl flap closed.

References: FAA Commercial Pilot Airplane Airmen Certification Standards
Airplane Flying Handbook FAA-H-8083-3C

Short-Field Approach and Landing

Description:	An approach and landing is accomplished at an airport with a restricted runway length due to obstacles on the approach path, short runway, unfavorable runway gradient, required downwind landing, high density altitude, or a combination of these factors. The approach is stabilized no lower than 300' above runway elevation. The round out and flare is accomplished in a manner that allows the airplane to reach the power off stall pitch attitude as the main landing gear touches the runway with power reaching idle at the same time. The rollout is minimized by proper use of aerodynamic deceleration and airplane wheel brakes.
Objective:	To develop the student's ability to safely and accurately accomplish maximum performance approaches and landings.
Procedures:	1) Midfield downwind gear down below 140kts (V_{LE}). a) Verify 3 Green 1 in Mirror 2) When abeam the numbers Set power 13"-15" MAP. 3) Propellers full forward as appropriate. 4) One notch of flaps. 5) Pitch for 90 knots. 6) On base leg add a second notch of flaps and verify GUMPS. 7) On final leg 3 notches of flaps and establish 85 knots. 8) On short final (0.5 mile from runway) slow to 75 knots. 9) Round out and flare so that you touch down on selected point with the power idle. (NOTE: Touchdown point for a runway that has threshold markings should be the numbers. Touchdown point for a runway that does not have threshold markings should be the first centerline stripe beyond the numbers) 10) After touchdown, retract the flaps, apply full aft stabilator to achieve maximum aerodynamic braking, and apply maximum wheel braking without skidding the tires to minimize ground roll. 11) Slow to normal taxi speed before clearing the runway. 12) Complete the after landing checklist after the airplane clears the runway and comes to a complete stop.
References:	FAA Commercial Pilot Airplane Airmen Certification Standards Airplane Flying Handbook FAA-H-8083-3C PA-44-180 Seminole POH (G1000)

Approach Procedures

Precision Approach

1) One dot above glideslope
    i. Gear down (3 green, one in the mirror).
    ii. Props full.
    iii. Flaps one notch.
    iv. Approach speed 100 knots.
2) Short final
    i. Flaps as necessary.
    ii. Airspeed 90.

Precision Approach Single Engine

1) One dot above glideslope
    i. Gear down (3 green, one in the mirror).
    ii. Confirm prop on operating engine is full.
    iii. Flaps one notch.
    iv. Approach speed 100 knots.
    v. Monitor performance (raise flaps and gear if you cannot maintain glidepath).
2) Short final
    i. Gear down if previously raised for performance requirements.
    ii. Flaps as necessary (No more than 2 flaps when landing is assured).
    iii. Airspeed 90.

Non-Precision Approach

1) 1 mile prior to FAF
    i. Gear down (3 green, one in the mirror).
    ii. Props full.
    iii. Flaps one notch.
    iv. Approach speed 100 knots.
2) Short final
    i. Flaps as necessary.
    ii. Airspeed 90.

Non-Precision Approach Single Engine

1) 1 mile prior to FAF
    i. Gear down (3 green, one in the mirror).
    ii. Confirm prop on operating engine is full.
    iii. Flaps one notch.
    iv. Approach speed 100 knots.
    v. Monitor performance (raise flaps and gear if you cannot maintain altitudes).
2) Short final
    i. Gear down if previously raised for performance requirements.
    ii. Flaps necessary (No more than 2 flaps when landing is assured).
    iii. Airspeed 90.

SECTION XV: End of Course Stage Check

Flight Test Checklist

Bring to oral:

1) Pilot certificate
2) Medical certificate
3) Government issued photo ID
4) Demonstration of aircraft airworthiness sheet
5) Syllabus ticket
6) Current Aeronautical Chart
7) Airplane Information Manual/POH
8) Current FAR/AIM
9) E6B flight computer
10) Plotter
11) Calculator
12) Weight and Balance (completely filled out)
13) Standard weather brief
14) Cross-Country log (completely filled out)
15) Flight plan form (completely filled out)
16) Brief of Safety Corner Article
17) Brief of Current PRF

In the Aircraft:

23) IFR Hood
24) Ensure proper documents are in the airplane

Additional items for instrument applicants:

1) Current instrument departure charts
2) Current instrument en-route charts
3) Current instrument arrival charts
4) Current instrument approach charts

Additional items for CFI Applicants:

1) Flight Instructor's Handbook
2) Airplane Flying Handbook
3) Appropriate ACS guides
4) Flight instructor certificate for those pursuing an additional rating
5) Model airplane
6) Lesson plans
7) Any additional teaching aids deemed necessary