

**NORTHERN CALIFORNIA
R/C
UNLIMITED FLYERS**



FLIGHT TRAINING COURSE



**NORTHERN CALIFORNIA
R/C
UNLIMITED FLYERS**

STUDENT PILOT FLIGHT LOG

Student Name: _____ AMA #: _____

Instructor: _____

GROUND CHECK: _____ **DATE:** _____ **INSTRUCTOR:** _____

PLANE: _____

COMMENTS: _____

PRE-FLIGHT CHECK: _____ **DATE:** _____ **INSTRUCTOR:** _____

PLANE: _____

COMMENTS: _____

STUDENT PILOT FLIGHT LOG

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

STUDENT PILOT FLIGHT LOG

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

STUDENT PILOT FLIGHT LOG

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

STUDENT PILOT FLIGHT LOG

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____

FLIGHT NUMBER: _____ DATE: _____ INSTRUCTOR: _____

PLANE: _____

COMMENTS: _____



NORTHERN CALIFORNIA R/C UNLIMITED FLYERS

FLIGHT TRAINING COURSE

This Flight Training Course is to be used as a guide by both the Student pilot and Instructor to help assure that the basics of Radio Controlled flight are covered during each practice and learning session. We urge that you bring this guide to each session so that your progress can be properly monitored.

The goal of this Flight Training Course is to teach the fundamentals of Radio Controlled flight, good flying habits, and a better understanding of the Radio Controlled Hobby as it relates to airplanes. Northern California R/C Unlimited Flyers (NCR/CUF) and Instructors assume no responsibility for damage to either the Student's plane, equipment, personal or real property during any training session. Every effort will be made to avoid any such damage.

All Students are required to join the national organization known as The *Academy of Model Aeronautics (AMA)*. The **AMA** provides liability insurance and sets forth safety regulations that each Student must be familiar with, and strictly adhere to, during their flight training sessions. Proof of current membership is required before each flight session.

An outline detailing the subjects covered in this course is found in the following pages. The areas covered will include:

- GROUND CHECK
- PRE-FLIGHT
- BASIC FLIGHT SKILL
- SOLO TEST

This Flight Training Course is arranged in such a manner that each section must be passed or mastered before moving on to the following section.

Good Luck!

GROUND CHECK

Date _____ Instructor _____

Airplane is airworthy as of this date.

Before the Instructor flies the Student's airplane for the first time, they should perform a ground check to confirm that the airplane is airworthy. This ground check will also serve as a training aide for the Student, showing proper construction and installation of the various equipment necessary for a good flying R/C airplane.

The Ground Check should be an inspection of all components of the Student's airplane to include construction, motor installation, static trim, and center of gravity (balance). As each section is inspected and passed, the instructor will sign it off by checking the box and initialing next to it. Once all of the sections are completed, the Instructor will sign off this subject by filling out the information above.

Note: This section does not have to be repeated unless the airplane suffers damage that might result in a loss of the airplane's airworthiness, or at the discretion of the Instructor.

SAFETY AND REGULATIONS:

- A. AMA Safety Code, general regulations and is a member
- B. Northern California R/C Unlimited Flyers club and field rules

AERODYNAMIC THEORY:

- A. Aerodynamic forces
 - 1. Thrust
 - 2. Lift
 - 3. Pitch
 - 4. Roll
 - 5. Yaw

- B. Control surface functions
 - 1. Thrust Throttle
 - 2. Pitch Elevator
 - 3. Roll Aileron
 - 4. Yaw Rudder

- C. Trim
 - 1. Static trim
 - 2. Flight trim

RADIO: (cont.)

2. Throttle
 - a. Transmitter stick movement – Forward open, Back closed
 - b. Idle is set and engine will shut off
3. Ailerons
 - a. Right – right aileron moves up, left aileron moves down
 - b. Left – left aileron moves up, right aileron moves down
 - c. Amount of travel, differential
4. Elevator
 - a. Back on stick – surface moves up
 - b. Forward on stick – surface moves down
 - c. Amount of travel
5. Range check – PRIOR TO FIRST FLIGHT OF EACH DAY



CONGRATULATIONS!

Your airplane has just earned it's airworthiness certificate and is ready for it's first flight. You and your Instructor may now proceed to the next section and begin your flight training. Good luck!

PRE-FLIGHT CHECK

Date _____ Instructor _____
Airplane is airworthy as of this date.

Prior to the Student and Instructor beginning flight instruction, the Instructor will review the following with the Student and perform a Check-Out flight of the Student's airplane. As each section is completed, the Instructor is to check it off and initial by the box.

Although each item is very important, this section does not need to be checked off each time the Student and Instructor fly. It is assumed that the Student realized these procedures must be followed each time he readies his airplane for flight and that failure to follow these procedures will jeopardize his safety and that of others, as well as his continued fight to fly at the club field!

START-UP PROCEDURE:

- A. Frequency clear, frequency board use
- B. Engine start
 - 1. Fuel up
 - 2. Transmitter and receiver ON
 - 3. Review Safety procedures, start engine
- C. Pre-flight final check
 - 1. Check engine tune in run-up box and adjust as necessary
 - 2. Check all control functions with engine running

CHECK-OUT FLIGHT BY INSTRUCTOR:

- A. Engine
 - 1. Tuned properly, reliable idle
 - 2. Will shut off by transmitter
- B. Flight test
 - 1. Airplane is trimmed properly
 - 2. Check for poor flight characteristics
 - 3. Landing
- C. Post flight review
 - 1. Discuss any problems with Student
 - 2. Confirm changes or repairs that need to be made

CHECK-OUT FLIGHT BY INSTRUCTOR: (CONT.)

D. Trim for Dual Instruction

1. Set both slave and master transmitters
2. Explain dual instruction training. "Buddy Box"



CONGRATULATIONS!!

You and your Instructor have worked very hard to reach this point. You are now ready to begin your flight instruction and your first flight. The next section will cover primary flight maneuvers. Remember that practice makes perfect. We all had to start somewhere and learning the basics is the best way to begin. Enough talk, lets go FLY!

BASIC FLIGHT SKILLS

Date _____ Instructor _____

Airplane is airworthy as of this date.

The first step in mastering a new skill is learning the fundamentals involved in that skill. In flying, this requires a thorough understanding of, and high level of proficiency in, straight and level flight, climbs, descents, and turns. All other flight maneuvers are combinations of these four fundamentals. The following sections will introduce the Student to the primary flight maneuvers used in flying an airplane.

This section is desired to be used by the Student as a study guide prior to attempting each flight training session, as well as by the Instructor during each lesson. As each section is passed, the Instructor should check off the box by that section and initial next to it as in previous sections.

PRIMARY MANEUVERS:



A. STRAIGHT AND LEVEL FLIGHT



Flight instruction normally begins with instruction in the techniques of straight and level flight. The objective of this lesson is to teach the Student to fly the airplane at a constant altitude while maintaining a constant heading.

B. CLIMBS AND DESCENTS



1. Climbs – From straight and level flight, a climb is initiated by applying back pressure on the elevator control stick to bring the nose up. This must be done smoothly and while maintaining a level flight attitude. To return to straight and level flight, the nose should be smoothly lowered to the level flight attitude by releasing back pressure on the elevator.
2. Descents – A descent **is not** a dive. It is a controlled loss of altitude without gaining excessive airspeed. Beginning in a straight and level flight attitude, power is reduced and back pressure is applied to the elevator to slow the airplane until the desired rate of descent is reached. Then, the nose of the airplane is lowered to maintain that rate of descent. To return to straight and level flight, adjust the nose position to level flight and at the same time increase power to maintain altitude.

PRIMARY MANEUVERS: (CONT.)

C. TURNS □

The objective of this section is to introduce the Student to the concept and skills needed to effectively turn an airplane in flight. Many factors come into play when turning as airplane. Direction, speed, attitude and lift all change and have effects on one another during a turning maneuver.

Turns are made by directing a portion of the lift force of the wings to one side or the other. In order to maintain altitude during a turn, it is necessary to increase the back pressure on the elevator control to overcome the lift that is lost.

To enter a turn, aileron control is applied in the direction of the desired turn. When executing a left turn, the control inputs place the left aileron up, spoiling lift, and the right aileron down, increasing lift, causing the airplane to roll to the left. When the airplane reaches the desired angle of bank, the aileron is neutralized. This also reduces the total amount of lift, causing the airplane to begin to lose altitude. This is compensated by the addition of slight back pressure on the elevator to bring the nose up to a slightly higher level than when begun.

To perform a fully coordinated turn, application of rudder is also needed to counteract the effects of adverse yaw introduced during the banking. To do this, slight rudder pressure is applied in the same direction as the ailerons, thus keeping the airplane tracking in a smooth arc.

To roll out of a turn, it is necessary to apply both aileron and rudder pressure in the opposite direction, simultaneously releasing back pressure on the elevator until all controls are back to neutral and straight and level flight is regained.

The following skills should be practiced until the Student is proficient at each before moving on.

1. Right and Left 90°
 2. Right and Left 180°
 3. Right and Left 360°
 4. Turns away and towards Student
 - a. Proper control when inputs are reversed (toward Student)
- □
□
□
□

Remember that these skills are the basics of flight and must be mastered before you can progress to more advanced maneuvers that are discussed in the next section. Don't become discouraged if it takes a considerable length of time to master these skills. Practice makes perfect! It's your airplane that will suffer if you try to "run before learning to walk". This completes this section of Primary Maneuvers.

ADVANCED MANEUVERS:



This section will introduce the Student to the necessary skills needed to perform advanced flight maneuvers including stalls, horizontal figure eights, traffic patterns, take offs, and landings. At the discretion of the Instructor, some basic aerobatic maneuvers may be introduced (loops, rolls, spins, etc.) based on the skill level of the Student.

A. GROUND HANDLING / HORIZONTAL FIGURE EIGHTS



This lesson will introduce the Student to taxiing the airplane from the run-up area, out onto the flight line, and back again after each flight. This will give the Student practice in ground handling and in turning, especially when the airplane is coming toward the Student. This will help in the future when the Student begins takeoffs. From this point on, the Student will handle all taxiing of the airplane.

The figure eights will be flown parallel to the runway in an elongated pattern with a short stretch of straight flight in the middle. The Instructor will first demonstrate the maneuver and then let the Student practice. The Instructor will offer necessary criticism, but let the Student decide when to turn, roll out, etc. Confine your remarks to generalities such as “stay a little higher”, “don’t get to far way” or “not so close”. The Student should have to plan and execute the turns so that he simulates the maneuver as you demonstrated for him.

1. Taxiing and ground handling
2. Horizontal figure eights



B. PROCEDURE TURNS / STRAIGHT FLIGHT OUT



In this lesson the Student will continue to sharpen his skills at turning the airplane a preplanned amount in both directions. The Student will also learn controlled straight flight directly away and toward him. This is an essential skill to be learned before successful landing approaches can be made.

Procedure turns are performed by turning the aircraft 90° from straight flight followed by another turn of 270° (opposite direction of the first turn) which will effectively return the aircraft to the same flight path, only in a reversed direction. This maneuver should be practiced by turning the aircraft through both right and left approaches.

Straight out flight should be practiced so the Student will learn to control the aircraft when the control inputs appear to be reversed when flying directly toward him. The Student must be able to make the proper control inputs before this section can be passed.

1. Procedure turns, both right and left approaches
2. Straight out flight



ADVANCED MANEUVERS: (CONT.)

C. STALLS



In this lesson the Student will learn what causes stalls, practice recovery from stalls, and maneuvering the airplane at slow speeds without stalling. Stalls are caused by an excessively high angle of attack and not excessively slow airspeed. The excessive angle of attack prevents enough lift from being generated and the airplane quits flying. A stall can occur at any speed or throttle setting!

The most common time a stall will occur is when turning from base to final on a landing approach. The airplane is flying at reduced throttle and a higher than normal angle of attack, thus slower. If the approach is a little too far out, the common mistake is to add more back pressure to s t r e t c h the glide. This only increases the angle of attack and induces a stall. The proper procedure is to add a little more power, not more back pressure.

As an airplane reaches stall speed it will become unstable and shudder, followed by the nose dropping and sometimes rolling to the right or left. To recover from a stall, the nose of the airplane is lowered and simultaneously power is added. If the airplane has rolled as well, then corrective control inputs should also be made to regain a straight and level flight attitude. The key to stall recovery is being able to recognize an impending stall and reacting quickly to recover with a minimum loss of altitude.

The Instructor will demonstrate each of the following and have the Student practice until he is proficient at each.

1. Stalls and recovery – straight flight
 - a. Slow speed
 - b. Moderate speed
 - c. High speed (optional based on skill level of Student)
2. Slow speed stalls and recovery – induced by turning
3. Flight at minimum controllable airspeed without stalling



D. TRAFFIC PATTERN



In preparation for learning to takeoff and land, this lesson will teach the Student the importance of flying a good traffic pattern, and expose him to descending base and final approach legs and takeoffs.

The traffic pattern is composed of several parts known as “legs”. These legs are referred to as takeoff, crosswind, downwind, base, and final. Their direction will be dictated by the wind and surrounding obstructions. At the NCR/CUF’s club field, all takeoffs will be to the North or South and all pattern legs will be to the East of the runway. Please refer to the diagram in this guide.

ADVANCED MANEUVERS: (CONT.)

D. TRAFFIC PATTERN (cont.)

When the Student is familiar with the traffic pattern, he is to fly the pattern at a constant altitude concentrating on following the proper pattern, executing gentle turns, and remaining in control at all times. This should be done for both right and left patterns.

When the Student is comfortable at this, he will be introduced to descending base and final approaches. The Student should practice flying the pattern and reducing power during the base leg to set up a descent that can be carried into the final approach to simulate a landing. Remind the Student of the dangers of inducing a stall. This should be practiced at an altitude that will allow for recovery in the event of a stall.

Next, the Student will practice climbing out of the final leg to simulate a takeoff. This should be repeated watching for constant control and control inputs to correct unusual flight attitudes without left/right mistakes.

Finally, the Student should be ready for his first takeoff. After having practiced taxiing, powering up, climbing, turning, and straight flight, the Student should have very few problems. Discuss any problems that might be encountered, such as directional control during roll out (right rudder input due to torque from the engine).

1. Traffic pattern familiarization
2. Traffic pattern flight at constant altitude
 - a. Right
 - b. Left
3. Descending base and final with climb out
 - a. Right
 - b. Left
4. Takeoff

E. LANDING

The final phase of Primary Flight Instruction is teaching the Student to land. By now the Student should have mastered all of the previous skills taught so that by combining them he is able to execute landing with little problems. Prior to the first attempt at landing, the Student and Instructor should have an extensive pre-flight briefing to review all aspects of previous lessons learned. It is also recommended that the first landing attempt follow a refresher flight covering the above sections. The actual landing is a natural continuation of these skills and if the Student is feeling confident with these skills, a successful landing should result.



ADVANCED MANEUVERS: (CONT.)

E. LANDING (cont.)

To execute a landing, the Student should enter the traffic pattern as taught and follow a descending base leg and final approach. As the airplane continues to descend, the Student must remember to try to remain calm and not over control the aircraft. A proper final approach will almost allow the airplane to land by itself!

As the airplane reaches the touchdown point, the Student should apply a small amount of back pressure to the elevator to flair the airplane for touchdown. Ideally, the main landing gear should touchdown first followed by the nose of tailwheel. This skill can be worked on until perfected.

The Instructor should not let the Student force a bad landing. Likewise, the Student should be willing to abort, if told to do so by the Instructor, and perform a go around. Use the following checklist to prepare for landing.

1. Proper entry into traffic pattern
2. Proper altitude when entering downwind leg
3. Power and speed reduction during downwind leg
4. Stall caution when turning base leg and final approach
5. Distance to runway
 - a. Too close, execute a go around
 - b. Too far, apply more power **NOT** elevator back pressure
6. Lined up on center of runway
7. Flair for touchdown
8. Roll out and taxi



Hopefully by now the Student has shown a good deal of skill and proficiency in executing the maneuvers that have been learned throughout this guide. If so, the next step is to prepare the Student for their SOLO test.

HAPPY FLYING!



NORTHERN CALIFORNIA R/C UNLIMITED FLYERS

COMMONLY USED R/C TERMS

1. BACK PRESSURE – increase up-elevator to prevent loss of altitude
2. BAD COMMAND – incorrect stick movement, i.e.: left instead of right
3. DEAD STICK – forced landing due to engine failure
4. OVER CONTROL – too much control stick movement
5. POWER BACK – decrease engine speed
6. POWER UP – increase engine speed
7. RELAX CONTROLS – return stick to neutral
8. ROLL OUT – return to level flight from a turn
9. SINK – wings level attitude, decreasing altitude
10. STALL – insufficient airspeed to maintain lift and controlled flight
11. TRAFFIC PATTERN – procedure for proper take off and landing with respect to wind direction
12. TRIM – mechanical and in-flight adjustment of flight surfaces to attain straight and level flight.



**NORTHERN CALIFORNIA
R/C
UNLIMITED FLYERS**

**SOLO PILOT
CERTIFICATE OF COMPLETION**

To attain qualified Solo Pilot status, each candidate must demonstrate the following maneuvers in the presence of his Instructor. The Instructor should check each maneuver as it is completed. Maneuvers may be demonstrated in any order at the candidates discretion.

This completed form will be retained by the club Secretary as proof of completion and qualification.

- | | |
|---|--------------------------|
| 1. Knowledge of Club and AMA rules | <input type="checkbox"/> |
| 2. Aircraft pre-flight check | <input type="checkbox"/> |
| 3. Engine starting procedure | <input type="checkbox"/> |
| 4. Taxi and observation procedures | <input type="checkbox"/> |
| 5. Takeoff procedure | <input type="checkbox"/> |
| 6. Rectangular pattern | <input type="checkbox"/> |
| 7. Horizontal figure 8 | <input type="checkbox"/> |
| 8. Touch and go | <input type="checkbox"/> |
| 9. Approach and landing procedure | <input type="checkbox"/> |
| 10. Aircraft return to pit area and shut down | <input type="checkbox"/> |

The above maneuvers were performed in a manner generally considered to be safe and acceptable. Solo flight is therefore approved.

CHIEF INSTRUCTOR _____

DATE _____

CANDIDATE _____

DATE _____