

Unit 1: Safety Considerations

Unit 1 Vocabulary
Unit 1 Concepts
Unit 1 Performance Objectives
1.1 – Safety First
1.2 – Your Safety Responsibility
1.3 – Establishing a Safety Culture
1.4 – Workshop Safety Issues
1.5 – Workshop Safety Rules
1.6 – Soldering Safety Rules
1.7 – Increase Your Drone Design Knowledge
1.8 – Increase Your Flight Skills
1.9 – Flight Safety Organizations
1.10 – Educational Regulations
1.11 – Drone Registration
1.12 – Definition of Recreational Use
1.13 – Safety Guidelines for sUAS Recreational Users
1.14 – Privacy Policy
1.15 – Safe Flying Locations
1.16 – No-Fly Zones
1.17 – Safe Weather Conditions
1.18 – Safe Flight Clearance
1.19 – Visual Line of Sight
1.20 – Start Out Slowly
1.21 – Propeller Dangers
1.22 – Pre-Flight Inspection
Unit 1 Summary

Unit 2: Overview of Drones

Unit 2 Vocabulary
Unit 2 Concepts
Unit 2 Performance Objectives
2.1 – What is a Drone?
2.2 – Drone Uses Besides Aerial
2.3 – Brief History of Aerial Drones
2.4 – Drone Reputation
2.5 – Development of Small UAVs
2.6 – What’s in a Name?
2.7 – Types of Small UAVs (sUAV)
2.8 – Choosing a Multicopter Configuration
2.9 – Drone Components
2.10 – Current Uses and Future Potential
Unit 2 Summary

Unit 3: Basics of Flight

Unit 3 Vocabulary
Unit 3 Concepts
Unit 3 Performance Objectives
3.1 – What is Aerodynamics?
3.2 – Brief History of Flight
3.3 – Newton’s Laws of Force and Motion
3.4 – Bernoulli’s Principle
3.5 – Airfoils
3.6 – Four Forces of Flight
3.7 – Mechanical Design of an Airplane
3.8 – Three Axes of Flight
3.9 – Airspace
3.10 – Traffic Patterns and Minimum Safe Altitudes
3.11 – Pilot-in-Command/Remote Pilot-in-Command
3.12 – How Multicopters Fly
Unit 3 Summary

Unit 4: Beginning Flight Skills

Unit 4 Vocabulary
Unit 4 Concepts
Unit 4 Performance Objectives
4.1 – First Things First
4.2 – Working with Lightweight Drones
4.3 – Recreational Use Laws Summarized
4.4 – Propeller Awareness
4.5 – Other Safety Issues
4.6 – Ground Effect & Prop Wash
4.7 – Controller Basics
4.8 – Ready, Set, Go ...!
4.9 – Beginning Flight Skills

- SKILL 1
- SKILL 2
- SKILL 3
- SKILL 4

Unit 4 Summary

Unit 5: Advanced Flight Skills

Unit 5 Concepts

Unit 5 Performance Objectives

5.1 – Advanced Flight Skills

- SKILL 5
- SKILL 6
- SKILL 7
- SKILL 8
- SKILL 9

Unit 5 Summary

Unit 6: Common Sense Flying

Unit 6 Vocabulary

Unit 6 Concepts

Unit 6 Performance Objectives

6.1 – Being Responsible

6.2 – “No-Fly” Zones vs. “Notify” Zones

6.3 – Be “Neighborly”

6.4 – Get It Registered!

6.5 – Revisiting Common Sense Safety

6.6 – Revisiting Educational and Recreational Use

6.7 – Determining Your Purpose

6.8 – Configuration Considerations

6.9 – Build or Buy?

Unit 6 Summary

Unit 7: Regulations & The FAA

Unit 7 Vocabulary

Unit 7 Concepts

Unit 7 Performance Objectives

7.1 – The Need to Regulate Airspace

7.2 – The NTSB (National Transportation Safety Board)

7.3 – The FAA (Federal Aviation Administration)

7.4 – UAS Incidents and FAA Response

7.5 – Regulation of UAS Operations

7.6 – Section 333 Exemptions

7.7 – Summary of Small Unmanned Aircraft Rule (Part 107)

7.8 – Future Challenges for Regulation

Unit 7 Summary

Unit 8: Maintenance & LiPo Battery Care

Unit 8 Vocabulary

Unit 8 Concepts

Unit 8 Performance Objectives

8.1 – The Commonality of Drones

8.2 – Drone Maintenance not FAA-Required, but ...

8.3 – Create a Pre-Flight Checklist

8.4 - Software and Firmware Maintenance

8.5 – Logging Your Flights

8.6 – Documenting Your Logs

8.7 LiPo Battery Maintenance and Care

8.8 LiPo Chargers Revisited

8.9 – Use of LiPo Bags

8.10 – Charging Temperatures

8.11 – Charging Rates

8.12 – Discharging Rates

8.13 – Working Temperatures

8.14 – Battery Puffing

8.15 – “Breaking-in” New LiPo Batteries

8.16 – Handling Damaged LiPo Batteries

8.17 – Storage and Shelf-Life of your LiPo Battery

8.18 – The 80% Rule: Retiring LiPo Batteries

8.19 – Disposal of LiPo Batteries

Unit 8 Summary

CURRICULUM TIMELINE

This curriculum is extremely thorough while allowing for flexibility. The instructor has the option to teach the entire curriculum and have the students complete all the activities, or the instructor can pick, choose, and/or skip any of the activities or quizzes. Instructors may also decide to include projects of their own. Below is a suggested timeline showing minimum and maximum days for each Unit.

(1 day = 60-minute class)

	Description	Minimum # days (if some activities are skipped)	Maximum # days (if all activities completed)
Unit 1: Safety Considerations	Stresses the importance of adopting a “safety attitude” when building and flying a drone. Covers workshop safety and outdoor flying.	3	5
Unit 2: Overview of Drones	Covers nomenclature, history of aerial drones, reputation, airframe, configurations, basic components, and current/future uses of drones.	3	5
Unit 3: Basics of Flight	Introduces aerodynamics, history of flight, Newton’s Laws of Motion, Bernoulli’s Principle, four forces of flight, three axes of flight, how they apply to drone flight. Reveals issues aircraft pilots encounter including airspace, traffic patterns, and safe altitudes.	5	7
Unit 4: Beginning Flight Skills	Discusses flight considerations for the beginner including controller basics. Introduces four beginning skills for acquiring flight competency.	5	10
Unit 5: Advanced Flight Skills	Introduces five advanced skills for acquiring flight competency.	5	10
Unit 6: Common Sense Flying	Discusses responsibility of flying and being “neighborly.” Discusses building or buying a drone.	3	5
Unit 7: Regulations & The FAA	Covers role of the FAA and NTSB. Stresses importance of regulation, and lists registration and recreational use of drones. Section 333 Exemptions and Part 107 Rules are explained.	3	5
Unit 8: Maintenance & LiPo Battery Care	Emphasizes importance of pre-flight checklists and logging flights. Stresses safety when using LiPo batteries including proper charging methods, discharging, handling, and disposal.	3	5
	TOTALS:	30	52