



FLYROBOTICS

sUAS Commercial Operator

Course syllabus



1. Aerodynamics

a. Forces of Flight

- i. Weight
- ii. Lift
- iii. Drag
- iv. Thrust

b. Airfoil

- i. Leading Edge
- ii. Trailing Edge
- iii. Chord
- iv. Camber
- v. Angle of Attack

c. Stalls

- i. Power On Stall
- ii. Power Off Stall
- iii. Stall Recovery

d. Fixed Wing Flight Control

- i. Longitudinal Axis
 - 1. Ailerons
- ii. Lateral Axis
 - 1. Elevator
- iii. Vertical Axis
 - 1. Rudder

e. Rotary Wing Flight Control

- i. Rotor Blades
- ii. Longitudinal and Lateral Axis
 - 1. Collective
 - 2. Cyclic
- iii. Vertical Axis
 - 1. Rudder Pedals
- iv. Hovering



f. Multi-Rotor Flight Control

2. Scientific Principles of Flight

a. Newton's Laws of Motion

b. Bernoulli's Principle of Lift

3. Aviation Meteorology

4. Atmospheric

a. Layers of the Atmosphere

b. Atmospheric Pressure

- i. Atmospheric Pressure Measurements**
- ii. Altitude and Atmospheric Pressure**
- iii. The effect of Altitude on Flight**

5. Winds

a. Wind Patterns

b. Wind Shears

c. Directional Winds

- i. Headwind**
- ii. Tailwind**
- iii. Crosswind**

d. Obstructions and Wind



6. Moisture in the Atmosphere

a. Temperature and Moisture

b. Temperature and Dewpoint

c. Humidity

d. Atmospheric Moisture

i. Dew and Frost

ii. Fog

1. Ceiling and Visibility

iii. Clouds

1. Cloud Types

iv. Precipitation

1. Drizzle

2. Rain

3. Freezing Rain

4. Sleet

5. Hail

6. Snow

v. Icing

1. Icing Conditions

2. Icing Hazards to Flight

7. METARs

a. Composition

b. Acronyms



8. Fundamentals of sUAS

9. The Modern Unmanned System

a. The Air Vehicle

- i. The Autopilot Subsystem
- ii. Propulsion Subsystem
- iii. Communications Subsystem

b. Ground Control System

- i. Human Machine Interface Subsystem
- ii. Ground Communications Subsystem

c. Payload System

10. Unmanned Flight Characteristics

a. Modes of Flight

- i. Manual Mode
- ii. Stabilization Mode
- iii. Waypoint Mode
- iv. Loiter Mode
- v. Failsafe Mode
- vi. Other Modes

11. Radio Control Fundamentals

a. Transmitter

- i. Fixed Wing Control
- ii. Rotary Wing Control
- iii. Multi-Rotor Control



12. National Airspace System

13. Airspace Types

a. Classes

b. Special Use Airspace

- i. Alert Areas
- ii. Warning Areas
- iii. Restricted Airspace
- iv. Prohibited Airspace
- v. Military Operational Areas
- vi. Controlled Fire Areas
- vii. National Security Areas

c. Temporary Flight Restrictions

d. Notice to All Airman (NOTAMs)

14. Sectional Aeronautical Charts

a. Land Features

b. Airport Data

c. Controlled Airspace

d. Special Use Airspace

15. Terminal Charts

16. Aviation Safety



17. Aviation Record Keeping

- a. Pilot's Logbook**
- b. Aircraft Logbook**
- c. Flight Logs**

18. Inspections

- a. Preflight Checklist**
 - i. Criteria
 - ii. Basic Preflight Checklist
- b. Postflight Checklist**
 - i. Criteria
 - ii. Basic Postflight Checklist

19. Lithium Polymer Battery Safety

- a. LiPo Composition**
- b. LiPo Terminology**
- c. LiPo Safety**
 - i. Charging/Discharging
 - ii. Storage

20. Fuel Safety

- a. Storage**
- b. Handling**



21. Airfield Safety Guidelines

- a. AMA Hobbyist Safety Code**
 - i. Aircraft Restrictions
 - ii. Pilot Restrictions
 - iii. Operational Guidelines
 - iv. Safety Requirements

22. Weight and Balance

- a. Aircraft Loading and Performance**
- b. Terminology**
- c. Weight and Balance Control**
- d. Weight**
 - i. Flight Performance
 - ii. Aircraft Structures
- e. Balance**
 - i. Flight Performance
 - ii. Flight Stability

23. Aeromedical Factors and Physiology

24. Self-Certification

- a. Medical Conditions Deemed Unsafe for Flight Clearance**

25. Physiology Factors that affect Flight



a. Hyperventilation

- i. Symptoms
- ii. Hazard to Flight
- iii. Treatment

b. Dehydration

- i. Symptoms
- ii. Hazard to Flight
- iii. Treatment
- iv. Prevention

c. Heatstroke

- i. Symptoms
- ii. Prevention

d. Stress

- i. Acute
- ii. Chronic

e. Fatigue

- i. Acute
- ii. Skill Fatigue
 - 1. Prevention
 - 2. Symptoms
- iii. Chronic

26. Drugs and Alcohol

a. Alcohol

- i. Impairment and Flight
- ii. Time Tables
- iii. Regulations

b. Drugs

- i. Regulations
- ii. Impairment and Flight
- iii. Over the Counter Drugs



c. Offenses involving Drugs and Alcohol

- i. Regulations
- ii. Suspension or Revocation Criteria

27. Radio Communications

28. Best Aviation Radio Practices

- a. Effective Communication Guidelines
- b. Aviation Jargon
- c. Initial Contact
- d. Continuing Communication
- e. Initial Request
- f. Interrogatives

29. Aviation Phraseology

- a. Responses
- b. Phonetic Alphabet
- c. Figures and Numbers
- d. Altitude
- e. Direction
- f. Airspeed
- g. Time



30. Ethical Airmanship

31. Responsibility of Airmanship

a. Ethical Conduct

- i. Ethics
- ii. Good Decision Making

32. Aviation Decision Making (ADM)

a. ADM Fundamentals

b. Understanding Hazard and Risk

c. Understanding and Identifying Hazardous Attitudes

d. Situational Awareness, PAVE, and Operational Risk Management

- i. Situational Awareness
- ii. Remote PIC “IMSAFE” Checklist
- iii. Aircraft Considerations
- iv. Environmental Considerations
- v. External Pressures
- vi. The ORM Process

33. Selecting an Operational Area

a. Permission to Operate

- i. Trespassing

b. Environmental Considerations/Hazards

34. Mission Planning



- a. Safe Practices
- b. Geo-Fencing
- c. Fail Safe Measures

35. First Person View (FPV) Operations

36. Ethical Guidelines for Aerial Photography, Videography, and Data Collection

37. Part 107

38. General Guidelines

- a. What's NOT Covered
- b. Definitions
- c. Abbreviations
- d. Falsification, Alteration, or Reproduction
- e. Accident Reporting
 - i. Criteria
 - ii. Reporting Timelines

39. Operational Guidelines

- a. Flight Crew Definitions



- i. Remote PIC
- ii. Person Manipulating the Controls
- iii. Visual Observer

b. Autonomous Operations

c. Aircraft Registration

- i. Display Guidelines
- ii. Foreign Aircraft

d. Maintenance/Inspections

e. Medical Requirements

f. Operations Near Airports/Restricted Airspace

- i. Notifications and Permissions

g. Operational Limitations

- i. Altitude
- ii. Airspeed
- iii. Weather Minimums
- iv. Restrictions
- v. Moving Vehicles
- vi. Transportation of Property
- vii. Hazardous Materials
- viii. Daylight Operations
- ix. In Flight Emergencies

h. Waivers

- i. Criteria
- ii. Waiver Process

40. Remote PIC Certification Process and Requirements

a. Eligibility

b. Application Process

c. Security Disqualification



FLYROBOTICS

d. Aeronautical Knowledge Test

- i. Initial
- ii. Recurrent