

DRONE TECHNOLOGIES 1

ACTIVITY COURSE CODE: 57T1

PROGRAM DESCRIPTION: This course is designed to provide students with basic information about the drone industry to gain an understanding of careers and skills in this field. Students will explore the basic skills and knowledge needed to be a recreational/commercial drone pilot. Students will learn pathway certification, Drone Theory and Aeronautical regulations operating rules, Airspace operating rules, Aviation weather, unmanned aircraft systems, flight procedures, radio communications, airport operations, and maintenance inspections procedures.

COURSE DESCRIPTION –This course is designed to provide students with basic information about the drone industry to gain an understanding of careers and skills in this field. FAA 14 CFR part 107 (The Small UAS Rule), officially known as "Part 107 Remote Pilot Certificate. Students will explore the basic skills and knowledge needed be a recreational drone pilot. Students will learn pathway certification, Drone Theory and Aeronautical regulations operating rules, Airspace operating rules, Aviation weather, unmanned aircraft systems, flight procedures, radio communications, airport operations, maintenance inspections procedures.

OBJECTIVE: Given the necessary equipment, materials, and instruction, students, on completion of the prescribed course of study, will be able successfully accomplish the following core competencies.

COURSE CREDIT: 1 (120 hours) credit

RESOURCES: See Materials and Resources

COMPUTER ACCESS: 1 computer per student

MAXIMUM ENROLLMENT: 16 per instructor

A. THE FAA PART 107 LICENSE

Drone Technology students understand the purpose and use of FAA PART 107 licenses. The following accountability criteria are considered essential for students in the pre-professional Drone Technology program of study.

1. Describe the types of driver's license and driver's permits.
2. Identify and analyze licensing requirements.
3. Research and present required non-commercial license tests.
4. Identify situations that may result in loss of driving privileges.

B. STATE LAWS

Drone Technology students demonstrate knowledge of state drone laws and rules. The following accountability criteria are considered essential for students in the pre-professional Drone Technology program of study.

1. Research state laws regarding licensing and flying privileges.
2. Compare and contrast State laws and Federal Laws.

C. PHYSICAL AND MENTAL THINKING WHILE PILOTING A DRONE

Drone Technology students understand the importance of physical and mental fitness while piloting a drone. The following accountability criteria are considered essential for students in the Drone Technology Program of Study.

1. Analyze key facts which can affect each of the following:
 - a. vision
 - b. fatigue
 - c. distraction
 - d. aggressive flying
 - e. emotions
2. Research and explain the consequences of using alcohol and drugs while flying.
3. Explain how physical and mental fitness affects flying performance.

D. FLYING PREPARATION (FAA Part 107 Training)

Drone Technology students demonstrate appropriate knowledge and skills to prepare safely operate an Unmanned Aircraft System (UAS). The following accountability criteria are considered essential for students in preparing for the pre-professional Drone Technology program of study.

1. Demonstrate the proper inspection procedure prior to operating a UAS.
2. Demonstrate proper pilot staging area.
3. Understand the need to regulate airspace.
4. Analyze the safety guidelines for sUAS recreational users.
5. Define the reason behind not needing a pilot's license.
6. Analyze drone usage within the commercial industry.
7. Discuss the different types of UAVs.
8. Define each component of a drone.
9. Analyze how each drone component functions.
10. Understand the importance of each drone component.
11. Define aerodynamics.
12. Analyze Newton's Laws of Force and Motion.
13. Understand Bernoulli's Principle.
14. Define an airfoil.
15. Understand the four forces of flight.
16. Analyze the mechanical design of an airplane.
17. Define the three axes of flight.
18. Analyze how multicopters fly.
19. Define the pilot's alphabet.
20. Assess knowledge regarding drone theory and Certification.
21. Analyze various definitions pertaining to Part 107.
22. Define the responsibilities of a remote PIC.

23. Analyze the required documents for sUAS flight.
24. Analyze the registration requirements for sUAS operations.
25. Understand the purpose of a remote ID.
26. Analyze the Part 107 daylight operation regulations.
27. Understand visual-line-of-sight.
28. Analyze requirements for visibility, cloud clearance, altitude and speed.
29. Understand the yielding the right-of-way.
30. Analyze requirements for operations over non- participants.
31. Understand the regulations in place for flying a drone from a moving vehicle or a water-borne vehicle.
32. Understand regulations for drone flights over stadiums and concert venues.
33. Analyze hazardous operations.
34. Analyze authorization and operation near airports.
35. Understand waivers and authorizations.
36. Understand airspace designations.
37. Analyze airspace classifications.
38. Analyze resources which are critical for remote PICs.
39. Analyze Notices Airmen.
40. Define temporary flight restrictions.
41. Analyze aeronautical sectional charts.
42. Define the difference in above ground level and mean sea level.
43. Analyze military training routes.
44. Analyze the influences of weather on flight.
45. Define military and ZULU time.
46. Define METARs and TAFs.
47. Decode a METAR and a TAF.
48. Analyze the information a METAR provides a pilot.
49. Define the components of a weather brief.
50. Define stable and unstable air.
51. Analyze the components of wind and surface friction.
52. Understand air masses and fronts.
53. Define the four fog types.
54. Understand how clouds are classified.
55. Analyze cloud composition and appearance.
56. Analyze the various types of thunder.
57. Understand how visibility and clouds impact flight.
58. Decode various METARs.
59. Analyze the weather conditions which affect flight.
60. Assess knowledge regarding aviation weather, effects and sources.
61. Define aeronautical stability.
62. Understand how to fly with a payload.
63. Determine speed and altitude.
64. Define weight and balance.
65. Analyze uncontrollable performance facrs.
66. Analyze load factors applied physics.
67. Avoid superseding the critical Angle of Attack.
68. Understand the basic Center of Gravity performance.

69. Define launch considerations.
70. Understand the effect of runway slopes.
71. Assess knowledge regarding sUAS loading and performance.
72. Understand lost link procedures.
73. Understand fly-away procedures.
74. Understand battery fire procedures.
75. Analyze how to report accidents.
76. Understand how to avoid collision.
77. Assess knowledge regarding emergency flight procedures.
78. Understand aeronautical decision-making a judgement.
79. Analyze CRM effectiveness.
80. Define the five hazardous attitudes.
81. Understand contingency reactions.
82. Assess knowledge regarding crew resources.
83. Management (CRM).
84. Understand proper radio procedures and analyze radio technique tips.
85. Define several contact procedures.
86. Analyze Chart Supplements U.S.
87. Understand sectional frequencies.
88. Analyze how to make position reports as a Remote PIC.
89. Understand NOTAMs and TFRs.
90. Analyze how to find NOTAMs and TFRs.
91. Analyze mountains, towers and power lines.
92. Define AGL and MSL.
93. Understand airport traffic patterns.
94. Analyze sUAS flight frequencies.
95. Analyze various VFR sectional chart symbols.
96. Understand longitude and latitude.
97. Define statute and nautical miles.
98. Assess knowledge regarding airport operations.

Shop and Personal Safety, Student Organizations, Technology Knowledge, Personal Qualities and Skills, and Professional Knowledge are to be embedded in course standards A-D.

SHOP AND PERSONAL SAFETY

Drone Technology students know the academic subject matter, including safety as required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.

1. Review classroom safety rules and procedures.
2. Review school safety policies and procedures.
3. Review safety procedures for using equipment in the classroom/lab/field.
4. Identify major causes of work-related accidents in the trucking environment.
5. Demonstrate safety skills in a classroom/work environment.

STUDENT ORGANIZATIONS

Drone Technology students know the academic subject matter, including professional development, required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

TECHNOLOGY KNOWLEDGE

Drone Technology students know the academic subject matter, including digital citizenship and the ethical use of technology as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.

1. Demonstrate proficiency and skills associated with the use of technologies that are common in a specific occupation (e.g., keying speed).
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., cyberbullying, piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related copyright laws, fair use laws, and ethics pertaining downloading of images, photographs, documents, video, sounds, music, trademarks, Creative Commons, and other elements for personal use.
6. Describe ethical and legal practices safeguarding the confidentiality of business- and personal-related information.
7. Describe threats a laptop, tablet, computer, and/or network and methods of avoiding attacks.
8. Evaluate various solutions common hardware and software problems.

PERSONAL QUALITIES AND EMPLOYABILITY SKILLS

Drone Technology students know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.

1. Demonstrate creativity and innovation.
2. Demonstrate critical thinking and problem-solving skills.
3. Demonstrate initiative and self-direction.
4. Demonstrate integrity.
5. Demonstrate work ethic.
6. Demonstrate conflict resolution skills.
7. Demonstrate listening and speaking skills.
8. Demonstrate respect for diversity.
9. Demonstrate customer service orientation.
10. Demonstrate teamwork.

PROFESSIONAL KNOWLEDGE

Drone Technology students know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.

1. Demonstrate global or “big picture” thinking.
2. Demonstrate career and life management skills and goal-making.
3. Demonstrate continuous learning and adaptability skills changing job requirements.
4. Demonstrate time and resource management skills.
5. Demonstrates information literacy skills.
6. Demonstrates information security skills.
7. Demonstrates information technology skills.
8. Demonstrates knowledge and use of job-specific tools and technologies.
9. Demonstrate job-specific mathematics skills.
10. Demonstrates professionalism in the workplace.
11. Demonstrates reading and writing skills.
12. Demonstrates workplace safety.