# Unmanned Aircraft Systems (UAS) Course No. 40490 Credit: 1.0

|  |  |  |  |
| --- | --- | --- | --- |
| **Student name:** |  | **Graduation Date:** |  |

Pathways and CIP Codes:Aviation Maintenance (47.0000) - Avionics & Airframe Strand

Course Description: **Application Level:** A course that will provide students with the academic knowledge about commercial remote pilot operations, while also giving hands-on experience planning and executing UAS missions. (Prerequisite: Aviation Fundaments or Aviation Systems.)

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Drones and their Components

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Compare the types of missions that might be flown by both fixed-wing and multicopter drones. |  |
| 1.2 | Compare the ways that multicopters achieve thrust and lift with those of airplanes. |  |
| 1.3 | Identify the similarities and differences between categories of unmanned aerial systems (UAS). |  |
| 1.4 | Summarize safe and smart practices for flying UAS. |  |
| 1.5 | Relate control inputs made to a multicopter to changes in the platform’s thrust. |  |

## Benchmark 2: Part 107 and Beyond

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Identify the major topics covered by the Code of Federal Regulations (CFR) 14 Part 107. |  |
| 2.2 | Construct a list of rules, using research on local ordinances and knowledge of NTIA guidelines, that the class should adhere to while flying an UAS. |  |
| 2.3 | Develop a logical argument for how to approach certain operational scenarios taking into consideration federal regulations, local ordinances, and operational best practices. |  |
| 2.4 | Distinguish between UAS operations included within Part 107 and those that are excluded from the rule. |  |
| 2.5 | Recall best practices and guidelines suggested by the NTIA. |  |
| 2.6 | Summarize the process by which a remote pilot can become certificated under Part 107. |  |
| 2.7 | Summarize the process in which a remote pilot can register an UAS under Code of Federal Regulations (CFR) 14 Part 107. |  |

## Benchmark 3: Weather and Performance

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Assess weather conditions based on reports, forecasts, and observations to decide if an unmanned operation can be completed safely, and how it can best be conducted. |  |
| 3.2 | Identify and describe different ways that atmospheric conditions and aerodynamic principles might impact Unmanned Aircraft System (UAS) performance. |  |
| 3.3 | Assess real-world scenarios to determine risks posed by factors such as density altitude, wind, or vortex ring state, and identify ways to mitigate them. |  |
| 3.4 | Make observations and draw conclusions about how an Unmanned Aerial Vehicle’s (UAV) Center-of-Gravity (CG) can shift in flight, using manufacturer data, experimentation, and weight and balance formulas. |  |
| 3.5 | Identify different characteristics that an Unmanned Aerial Vehicle (UAV) might exhibit if it is overloaded or unbalanced in flight. |  |

## Benchmark 4: UAS Safety and Management

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Assess the readiness of a UAS for safe operation through careful examination of its components using a risk matrix assessment to mitigate identified risks (e.g. common abnormalities and emergencies). |  |
| 4.2 | Identify important components of a UAS that should be inspected prior to every flight (e.g. construct a preflight checklist). |  |
| 4.3 | Identify the various members of a multi-person drone crew and explain their roles, including key elements of effective communication in a UAS operation. |  |
| 4.4 | Make observations about aeronautical decision making (ADM) in a variety of scenarios, and identify hazardous attitudes. |  |
| 4.5 | Research and build emergency checklists for a UAS. |  |

## Benchmark 5: Planning and Executing a Mission

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Demonstrate concepts on the practical act of controlling and flying the classroom drone. |  |
| 5.2 | Draw conclusions about the type of UAS that would be ideal, given a specific mission to be flown. |  |
| 5.3 | Relate the appropriateness of a drone’s payload to the operation it will be performing. |  |
| 5.4 | Summarize common sensors that can be found in flight controllers, as well as the flight modes that they make possible. |  |
| 5.5 | Apply concepts to plan and execute an operation using a drone. |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

(785) 296-4908

[pathwayshelpdesk@ksde.org](mailto:pathwayshelpdesk@ksde.org)



900 S.W. Jackson Street, Suite 102

Topeka, Kansas 66612-1212

[https://www.ksde.org](https://www.ksde.org/)

The Kansas State Department of Education does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities and provides equal access to any group officially affiliated with the Boy Scouts of America and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: KSDE General Counsel, Office of General Counsel, KSDE, Landon State Office Building, 900 S.W. Jackson, Suite 102, Topeka, KS 66612, (785) 296-3201.