

STATE UNIVERSITY OF NEW YORK  
COLLEGE OF TECHNOLOGY  
CANTON, NEW YORK



## MASTER SYLLABUS

### FLHT 105 – UAS Missions: Introduction to UAS Mapping

For available course numbers, contact the Registrar's Office at [registrar@canton.edu](mailto:registrar@canton.edu)

#### **CIP Code:**

For assistance determining CIP Code, please refer to this webpage

<https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55>

or reach out to Sarah Todd at [todds@canton.edu](mailto:todds@canton.edu)

**Created by: Michelle Burke**

**Updated by:**

**School: Canino School of Engineering Technology**

**Department: Mechanical Engineering**

**Implementation Semester/Year: Fall/2026**

A. TITLE: UAS Missions: Introduction to UAS Missions

B. COURSE NUMBER: FLHT 105

C. CREDIT HOURS (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity):

# Credit Hours per Week	<b>3</b>
# Lecture Hours per Week	
# Lab Hours per Week	
Other per Week	

D. WRITING INTENSIVE COURSE:

Yes	
No	x

E. GER CATEGORY: No

Does course satisfy a GER category(ies)? If so, please select all that apply.

[1-2] Communication	
[3] Diversity: Equity, Inclusion & Social Justice	
[4] Mathematics & Quantitative Reasoning	
[5] Natural Science & Scientific Reasoning	
[6] Humanities	
[7] Social Sciences	
[8] Arts	
[9] US History & Civic Engagement	
[10] World History & Global Awareness	
[11] World Languages	

F. SEMESTER(S) OFFERED:

Fall	x
Spring	
Fall and Spring	

G. COURSE DESCRIPTION:

This course introduces students to Uncrewed Aircraft System (UAS) mapping technologies and workflows, including GPS, GIS, LiDAR, and photogrammetry. Students will gain hands-on experience with UAS mapping software and hardware to produce professional-grade outputs such as 2D orthomosaics, 3D models, Digital Elevation Models (DEMs), Digital Surface Models (DSMs), Digital Terrain Models (DTMs), and thermal maps. Emphasis will be placed on flight planning, data acquisition, processing, analysis, and practical applications in industries such as agriculture, construction, environmental science, and public safety.

H. PRE-REQUISITES: FLHT 101 & FLHT 102 OR FAA Part 107 Certificate holder  
 CO-REQUISITES:

I. STUDENT LEARNING OUTCOMES: Courses will be assessed based on SUNY Canton's ISLO Assessment Cycle. Assessment will be overseen by Mechanical Engineering chair/director/coordinator.

Course Student Learning Outcome [SLO]	Program Student Learning Outcome [PSLO]	GER	ISLO & Subsets
a. Explain principles of GPS, GIS, LiDAR, and photogrammetry as they apply to UAS mapping.			ISLO 2 [CA], ISLO 5
b. Plan and execute FAA-compliant UAS mapping missions.			ISLO 2 [PS], ISLO 5
c. Obtain OSHA 10 Certification and apply workplace safety principles to field operations.			ISLO 5
d. Collect, process, and analyze geospatial data for professional-grade outputs.			ISLO 1 [W], ISLO 5
e. Create and interpret orthomosaics, 3D models, DEMs, DSMs, and DTMs.			ISLO 1 [W], ISLO 5
f. Integrate thermal mapping and advanced geospatial outputs for real-world applications.			ISLO 1 [W], ISLO 5

KEY	<u>Institutional Student Learning Outcomes</u> [ISLO 1 – 5]
ISLO #	ISLO & Subsets
1	<b>Communication Skills</b> Oral [O], Written [W]
2	<b>Critical Thinking</b> <i>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</i>
3	<b>Foundational Skills</b> <i>Information Management [IM], Quantitative Lit, /Reasoning [QTR]</i>
4	<b>Social Responsibility</b> <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
5	<b>Industry, Professional, Discipline Specific Knowledge and Skills</b>

J. APPLIED LEARNING COMPONENT:

Yes	X
No	

If yes, select [X] one or more of the following categories:

Non-Clinical Practicum	X	Community Service	
Internship		Civic Engagement	
Clinical Practicum		Creative Works/Senior Project	
Practicum		Research	
Service Learning		Entrepreneurship [program, class, project]	

K. TEXTS: None

L. REFERENCES:

M. EQUIPMENT: Access to UAS mapping software (Pix4D, DroneDeploy, or equivalent), UAS hardware with mapping capability (provided in class), OSHA 10 online module access (provided)

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- OSHA 10 Certification Completion: 10%
- UAS Mission Planning & Flight Logs: 20%
- Data Processing Projects (Orthomosaic & 3D Model): 25%
- Quizzes & Knowledge Checks: 15%
- Final Mapping Project & Presentation: 30%

P. DETAILED COURSE OUTLINE:

- I. GPS & GIS Principles
  - A. Coordinate systems, datums, projections, GIS basics
- II. Photogrammetry Concepts
  - A. Image overlap, GSD, camera settings, flight path planning
- III. LiDAR in UAS Mapping
  - A. LiDAR technology overview, advantages, and limitations
- IV. OSHA 10 Completion & First Mapping Mission
  - A. OSHA 10 exam & certification completion, field mission planning
- V. Data Processing I: Orthomosaics
  - A. Importing, aligning images, creating orthomosaics
- VI. Data Processing II: 3D Models
  - A. Point clouds, mesh creation, texturing
- VII. DEMs, DSMs, and DTMs
  - A. Differences, applications, accuracy checks
- VIII. Thermal Mapping Applications
  - A. Thermal camera integration, specialized use cases

IX. Advanced GIS Integration

A. Data layering, analysis, annotation in GIS software

X. Final Project Planning

A. Project selection, mission planning, data collection strategy

XI. Final Project Data Acquisition

A. Conduct mapping mission for final project

XII. Final Project Processing & Analysis

A. Orthomosaic, 3D, DEM/DSM/DTM generation

XIII. Final Project Presentations

A. Presentation of final outputs, industry reflection

Q. LABORATORY OUTLINE: