

Work-Based Learning - UAS

Level: 4

Career Cluster: Advanced Manufacturing

Program: Engineering

Pathway(s): Engineering Applications UAS

Course Catalog Description

This course provides students with authentic work-based learning experiences in unmanned aircraft systems (UAS), allowing them to apply drone knowledge and engineering skills in professional settings. Students build career readiness through internships, industry projects, technical communication, safety practices, and real-world problem solving related to drone applications.

Summary

This advanced work-based learning course gives students the opportunity to apply drone and unmanned aircraft systems (UAS) knowledge in authentic professional contexts while strengthening the technical, problem-solving, and employability skills required for success in engineering and advanced manufacturing pathways. Through internships, industry-sponsored projects, client-based challenges, mentorships, and other structured workplace experiences, students engage in real-world tasks such as mission planning, data collection, visual documentation, mapping, inspection support, technical reporting, and operational problem solving. Emphasis is placed on professional communication, safety, ethical decision-making, FAA awareness, collaboration, accountability, and the ability to adapt technical knowledge to workplace expectations and client needs. Students document their learning through reflections, logs, portfolios, and presentations while building readiness for postsecondary education, credentials, entrepreneurship, and careers connected to drone applications in fields such as infrastructure, construction, agriculture, media, environmental monitoring, public safety support, and engineering technology. This course is designed to bridge classroom learning and industry experience by helping students demonstrate both technical competence and career readiness through meaningful, sustained participation in authentic work-based learning environments.

Notes

Compared with the previous work-based learning course, this updated version is significantly more pathway-specific and better aligned to UAS applications in engineering and advanced manufacturing. The original course focused on broad work-based learning expectations such as career goal setting, training plans, safety agreements, documentation of hours, supervisor evaluations, and reflection, while the new course expands those foundational elements into a more detailed and technical sequence of learning. The revised course now includes targeted student learning outcomes related to drone mission planning, FAA and airspace awareness, ethical and responsible operations, data collection and technical reporting, portfolio development, and postsecondary transition planning. It also introduces authentic UAS examples such as mapping, inspection support, infrastructure applications, environmental monitoring, and industry-sponsored drone projects, making the course more relevant to current workforce needs.

Student Learning Outcomes

1. Career Planning and Professional Launch

Objective: *Students establish career goals, identify drone/UAS industry pathways, and prepare for a sustained work-based learning placement or project.*

- Analyze drone-related engineering careers, roles, tools, and work environments
- Identify personal areas of interest such as mapping, inspection, infrastructure, agriculture, public safety support, media, or systems operations
- Develop a resume, portfolio starter, and professional introduction
- Create an individualized work-based learning plan with goals, expectations, and reflection targets
- Demonstrate understanding of workplace expectations, confidentiality, ethics, and communication norms

Real-World Experience Ideas

- Mentor matching with a drone/UAS professional
- Informational interviews with industry partners
- Placement interviews for internship/project opportunities
- Workplace readiness seminar with engineering and drone professionals

2. Safety, Regulation, and Responsible Operations

Objective: *Students connect safe drone practice to engineering responsibility, legal compliance, and professional expectations.*

- Apply safety procedures before, during, and after flight or mission activities
- Explain the importance of FAA rules, airspace awareness, and operational compliance in drone work
- Analyze ethical issues including privacy, data collection, risk, and responsible technology use
- Demonstrate professional judgment when evaluating mission readiness and operational constraints
- Maintain logs, checklists, and other operational documentation

Real-World Experience Ideas

- Safety audit of a flight area
- Mission risk assessment
- Airspace and compliance scenario analysis
- Flight operations checklist development

3. Drone Mission Planning and Engineering Applications

Objective: *Students plan drone missions that solve real problems using engineering process thinking.*

- Define a mission objective, client need, or operational problem

- Identify mission constraints such as weather, time, location, safety, privacy, and equipment limitations
- Select appropriate tools, sensors, flight patterns, or data collection methods
- Use engineering design and systems thinking to improve mission quality and efficiency
- Communicate a mission plan using technical and professional language

Real-World Experience Ideas

- Plan a mapping mission for a school or community site
- Develop an inspection workflow for a roof, solar array, or infrastructure model
- Create a mission proposal for agricultural observation or environmental monitoring
- Build a client brief for aerial imaging or site documentation

4. Applied Workplace Experience in Drone Engineering

Objective: *Students complete sustained work-based learning tasks in authentic professional settings.*

- Apply drone, engineering, and technical skills in a workplace or client-based setting
- Contribute to real tasks such as data capture, visual documentation, mapping, inspection support, analysis, troubleshooting, or reporting
- Demonstrate professionalism, communication, and accountability during work-based learning experiences
- Respond to feedback from mentors, teachers, or employers and improve performance
- Document hours, tasks, challenges, and accomplishments

Real-World Experience Ideas

- Internship with a local engineering-related organization
- Industry-sponsored drone data project
- Supervised entrepreneurship model for drone imaging or mapping
- Team-based field application project with a community partner

5. Data Analysis, Communication, and Technical Reporting

Objective: *Students interpret and communicate findings from drone-based work.*

- Organize drone-generated media, observations, and/or data in a logical workflow
- Interpret findings and relate them to mission goals or engineering decisions
- Create technical reports, summaries, visuals, and presentations for clients or stakeholders
- Use professional communication standards in written, verbal, and visual formats
- Reflect on the reliability, usefulness, and limitations of collected information

Real-World Experience Ideas

- Inspection report with annotated visuals
- Mission summary presentation to advisory committee or industry panel
- Mapping data reflection and improvement memo
- Client-facing technical brief

6. Advanced Career Readiness and Transition

Objective: *Students prepare for postsecondary education, certifications, employment, or entrepreneurship in drone-related pathways.*

- Evaluate next-step options in workforce, college, apprenticeships, and technical training
- Identify credentials or certifications relevant to their goals
- Strengthen interview, networking, and professional presentation skills
- Update career materials using evidence from the WBL experience
- Develop a personal action plan for the first year after high school

Real-World Experience Ideas

- Postsecondary program comparison
- Mock technical interview with partner employer
- Apprenticeship exploration
- Entrepreneurship pitch for a drone-related service

7. Portfolio and Public Presentation

Objective: *Students synthesize learning into a polished, professional demonstration of readiness.*

- Curate a portfolio of work samples, reflections, technical artifacts, and evidence of growth
- Present a project or workplace problem/solution narrative
- Explain technical decisions, workplace learning, and impact
- Reflect on strengths, areas for growth, and future goals
- Demonstrate readiness for the next step in engineering/UAS learning or employment

Additional Information

WBL Experience Options (Learning THROUGH → AT Work)

- Drone internship with a company, public agency, college lab, utilities partner, construction firm, media team, or agriculture/environmental organization
- Industry-sponsored project such as aerial mapping, inspection planning, data collection, or community problem-solving
- Pre-apprenticeship in engineering technology, advanced manufacturing, infrastructure, or aviation-related technical work
- Supervised entrepreneurship such as a student-run drone services concept, aerial media service, or mapping/documentation service
- School-based enterprise or campus operations support using drones for approved documentation, imaging, or data projects

End-of-Course Outcomes

- Apply engineering and drone/UAS knowledge to authentic workplace or industry-sponsored challenges.
- Demonstrate safe, ethical, and regulation-aware drone practices in authentic professional contexts.
- Plan, execute, document, and evaluate drone missions based on a defined purpose, audience, and operational constraints.
- Use drone technologies and related engineering tools to gather, analyze, or communicate information for real-world applications.
- Demonstrate employability skills including punctuality, accountability, teamwork, communication, and adaptability.
- Collaborate with teachers, mentors, employers, and peers to complete technical work and improve performance through feedback.
- Produce a professional portfolio presentation that demonstrates technical competence, work-based learning growth, and career readiness.
- Evaluate postsecondary and career pathways related to engineering, UAS, aerospace, mapping, inspection, media, public safety, agriculture, and other emerging drone fields.

Assessment Structure

- Work-Based Learning Training Plan
- Employer/Mentor Feedback Forms
- Weekly Reflection Logs
- Skills Demonstrations
- Mission Planning Documents
- Technical Reports or Client Products
- Professional Portfolio
- Presentation / Defense