

Technical Writing - UAS

Level: 2

Career Cluster: Advanced Manufacturing

Program: Engineering

Pathway(s): Engineering Applications UAS, Aerospace Engineering Technician, Engineering

Aligns with: ENG 1031 Technical Writing

Course Catalog Description

Introduces students to the principles and practices of technical writing in engineering, unmanned aircraft systems (UAS), and related workplace settings. Students create clear, accurate, and professional documents while using research, digital tools, visuals, and revision strategies to communicate technical information for specific audiences and purposes, including documentation that supports drone operations, maintenance, safety, and compliance.

Summary

This course develops the knowledge and skills students need to create clear, accurate, and professional technical documents for engineering, drone, and related workplace settings. Students examine the purpose and structure of technical writing, adapt communication for specific audiences and purposes, and use digital tools to draft, format, revise, and publish documents. Through research, process writing, technical descriptions, visual communication, and collaborative writing tasks, students learn to organize information effectively and present it in formats such as reports, instructions, manuals, memos, flight procedures, maintenance records, and presentations. The course also emphasizes information literacy, ethical source use, intellectual property, revision strategies, and professional standards so students can produce polished technical documents that support engineering systems, UAS operations, safety procedures, regulatory compliance, and communication in academic, industry, and postsecondary contexts.

Notes

This revised course retains the core focus of the earlier Technical Writing course—audience, purpose, organization, revision, document design, research, and workplace genres—but shifts the emphasis to engineering and unmanned aircraft systems so students apply technical communication in a more pathway-specific and industry-relevant context. The updated version also moves beyond a general technical writing approach by strengthening connections to engineering systems, drone operations, maintenance, safety, and compliance documentation. Key updates include a rewritten catalog description and summary, a reorganized sequence of student learning outcomes, and added emphasis on digital writing tools, cloud-based file management, version control, accessibility, technical records, leadership, and work-based learning. Overall, the course is now more coherent, more directly aligned to Colorado CTE expectations, and more relevant to postsecondary preparation and workforce applications in engineering and UAS settings.

Student Learning Outcomes

1. Career Exploration and Postsecondary Opportunities

Objective: *Students will analyze career pathways in engineering and drones by exploring industry roles, workplace expectations, required education, certifications, professional organizations, and postsecondary opportunities available in Colorado in order to make informed academic and career decisions.*

- 1) Identify employment opportunities in various fields with a focus in the area of engineering and drones
 - a. Recognize the work typically performed, tools and technology used, and nature of work environments
 - b. Identify potential certifications within the careers
 - c. Find membership organizations associated with the careers
 - d. Understand the necessary education associated within the careers
- 2) Define professionalism within the context of engineering and drones
 - a. Criticism and evaluation
 - b. Presentation
 - c. Assessment
- 3) Recognize laws, regulations, and ethics significant to the fields of engineering and drones
- 4) Identify postsecondary opportunities offered in the state of Colorado
 - a. Technical college, community college, 4-year institutions
 - b. Certificates, associates, bachelor, and advanced degree opportunities

2. Foundations of Technical Writing in Engineering

Objective: *Students will understand and analyze the purpose, structure, and role of technical writing in engineering, drone operations, and digital communication environments.*

- 5) Define technical writing and its role in engineering and UAS fields.
- 6) Differentiate between technical and non-technical writing styles.
- 7) Describe characteristics of effective technical communication.
- 8) Analyze how audience and purpose influence writing choices.
- 9) Evaluate examples of strong and weak technical documents.

3. Digital Communication Tools and Platforms

Objective: *Students will apply and evaluate digital tools used to create, edit, share, and manage technical documents for engineering and drone operations.*

- 10) Identify digital tools used for technical writing such as word processors, collaborative platforms, cloud tools, and UAS mission documentation systems.
- 11) Demonstrate the use of digital writing environments for document creation.
- 12) Apply formatting tools to improve readability and organization while evaluating digital tools based on usability, collaboration features, and suitability for flight or maintenance documentation.
- 14) Manage files using cloud-based systems and version control.

4. Audience, Purpose, and Professional Tone

Objective: Students will analyze and adapt writing to meet audience needs and professional expectations in engineering and drone contexts.

- 15) Identify target audiences for engineering and drone documents.
- 16) Analyze audience needs and expectations.
- 17) Adjust tone, vocabulary, and structure for different audiences.
- 18) Apply professional tone in written communication.
- 19) Evaluate effectiveness of communication based on audience feedback.

5. Technical Writing Formats and Document Types

Objective: Students will create and analyze common technical documents used in engineering, UAS operations, and digital environments.

- 20) Identify common technical writing formats such as reports, manuals, instructions, memos, flight logs, and standard operating procedures.
- 21) Explain the purpose of different document types.
- 22) Create structured technical documents using standard formats.
- 23) Organize information clearly using headings, lists, and visuals.
- 24) Evaluate document effectiveness based on clarity and usability.

6. Research, Information Literacy, and Source Use

Objective: Students will gather, evaluate, and integrate information from digital sources into technical writing for engineering and drone applications.

- 25) Identify credible digital sources for technical and regulatory information.
- 26) Evaluate sources for accuracy and relevance.
- 27) Summarize research findings in clear and concise language.
- 28) Integrate research into technical documents appropriately.
- 29) Cite sources using accepted formats.

7. Technical Description and Process Writing

Objective: Students will develop and communicate clear descriptions and step-by-step technical procedures for engineering systems and drone operations.

- 30) Describe technical systems, tools, drone components, and operational processes.
- 31) Write step-by-step instructions for technical tasks.
- 32) Organize procedural writing logically and clearly.
- 33) Use visuals and formatting to support clarity.
- 34) Evaluate instructions for usability and accuracy.

8. Visual Communication and Data Representation

Objective: Students will interpret and create visual representations of technical information, including engineering and drone-related data.

- 35) Interpret graphs, charts, diagrams, and flight-related data visuals.
- 36) Create visuals to support technical writing.
- 37) Integrate visuals into documents effectively.
- 38) Analyze how visuals enhance communication.
- 39) Evaluate clarity and accuracy of visual data.

9. Editing, Revising, and Document Quality

Objective: *Students will apply revision strategies to improve clarity, accuracy, and professionalism in technical documents.*

- 40) Apply editing techniques to improve grammar and structure.
- 41) Revise documents based on feedback.
- 42) Analyze clarity and coherence of writing.
- 43) Evaluate writing for accuracy and completeness.
- 44) Produce polished, professional technical documents.

10. Ethics, Intellectual Property, and Digital Responsibility

Objective: *Students will analyze ethical considerations and apply responsible practices in digital technical communication, including UAS safety and regulatory compliance.*

- 45) Define intellectual property and copyright.
- 46) Explain ethical issues in technical communication and drone operations.
- 47) Apply proper citation and attribution practices.
- 48) Analyze ethical and regulatory challenges in digital publishing and UAS use.
- 49) Evaluate consequences of unethical behavior.

11. Collaboration and Team Communication

Objective: *Students will collaborate and communicate effectively using digital tools in engineering and drone project contexts.*

- 50) Collaborate using digital communication tools.
- 51) Contribute effectively to team writing tasks.
- 52) Communicate ideas clearly in group settings.
- 53) Evaluate team communication effectiveness.
- 54) Demonstrate accountability in collaborative work.

12. Technical Communication and Documentation Project

Objective: *Students will design, deliver, and document technical content for digital platforms, presentations, engineering processes, drone systems, and technical solutions.*

- 55) Create digital documents, presentations, and technical documentation for engineering and drone contexts.
- 56) Organize technical information for clear visual, digital, and written communication.
- 57) Design accessible, readable, and audience-appropriate technical content.
- 58) Present technical information clearly and evaluate presentation effectiveness.
- 59) Document engineering and drone systems, processes, and procedures using accurate

technical records and reports.

60) Analyze documentation for accuracy, completeness, usability, and clarity for intended users.

13. Leadership

Objective: *Students will demonstrate leadership skills, professionalism, and responsible participation in career and technical student organization, classroom, and project settings.*

61) Demonstrate professional behavior, responsibility, and accountability in leadership roles.

62) Apply effective communication, teamwork, and decision-making skills in group settings.

63) Participate in leadership activities that support classroom, school, or CTSO goals.

64) Set personal and professional goals and reflect on leadership growth.

65) Evaluate how leadership skills contribute to success in technical and workplace environments.

14. Work-Based Learning

Objective: *Students will connect classroom learning to real-world applications through work-based learning experiences, career preparation activities, and reflection on workplace expectations.*

66) Identify the purpose and value of work-based learning experiences in career development.

67) Demonstrate workplace readiness skills such as punctuality, communication, initiative, and dependability.

68) Apply technical and employability skills in authentic workplace settings.

69) Analyze workplace expectations, safety practices, and professional norms.

70) Reflect on work-based learning experiences to identify strengths, challenges, and career interests.

15. Career and Technical Student Organizations

Objective: *Using the CTSO Resource Document, chapter activities will provide some of the best opportunities CTSO members will have to learn by doing. A successful program of work creates a positive learning atmosphere in the classroom. CTSO members learn how to accept responsibility, work as a team, manage a budget, and handle success and failure. Per the CTE Admin Handbook, CTSOs are embedded into curriculum.*

Professional Development

Prepare each member for entry into the workforce and provide a foundation for success in a career. Becoming a professional does not stop with acquiring a skill, but involves an increased awareness of the meaning of good citizenship and the importance of labor and management in the world of work.

Community Service

Promote and improve goodwill and understanding among all segments of the community through services donated by CTSO chapters, and to instill in its members a lifetime commitment to community service.

Business and Industry Connections

Increase awareness of quality job practices and attitudes, and increase the opportunities for employer engagement and eventual employment.

Financial Leadership

Plan and participate in activities to allow all members to carry out the chapter's projects. Educate members on their own personal finance for current and future success.

Public Relations

Make the general public aware of the good work that students in career and technical education are doing to better themselves and their community, state, nation, and world.

Social Activities

To increase cooperation in the school and community through activities that allow CTSO members to get to know each other in something other than a business or classroom setting.

Academic Standards Alignment

Colorado CTE courses are required to integrate academic and essential skills into course content. The following academic standards have been identified as aligned to this course and should be integrated throughout instruction.

[CO CTE Academic Standards Resources](#) (Rubrics, integration strategies, etc)

[CDE Colorado Academic Standards Online](#) (Online standards lookup tool)

Note: Mathematics and Science standards will be added in the future. Visit the [Colorado Academic Standards](#) page for the most current version.

Reading, Writing and Communicating Crosswalk

Course: Technical Writing

Colorado Academic Standards – Reading, Writing, and Communicating

Standard	Prepared Graduate Competency	Description	Course Evidence / Alignment
Standard 1: Oral Expression and Listening	Prepared Graduate 1 – Collaboration	Collaborate effectively as group members or leaders.	Technical writing includes peer review, collaborative writing, giving and receiving feedback, and group revision/editing tasks.
Standard 1: Oral Expression and Listening	Prepared Graduate 2 – Oral Presentations	Deliver effective oral presentations for varied audiences.	Students present written products or proposals and explain technical documents and decisions to different audiences.
Standard 2: Reading for All Purposes	Prepared Graduate 4 – Informational Texts	Read a wide range of informational texts.	Students read professional technical documents, including manuals, reports, specifications, and model texts.
Standard 2: Reading for All Purposes	Prepared Graduate 5 – Language in Context	Understand how language functions in different contexts.	The course emphasizes adapting tone, vocabulary, and structure to audience and purpose, with

			deliberate stylistic choices for clarity and precision.
Standard 3: Writing and Composition	Prepared Graduate 6 – Craft arguments	Craft arguments using techniques specific to the genre.	Students justify recommendations, write proposals or feasibility studies, and support claims with evidence and logic.
Standard 3: Writing and Composition	Prepared Graduate 7 – Informational Writing	Craft informational/explanatory texts.	This is the primary focus of the course through instructions, technical explanations, reports, and documentation.
Standard 3: Writing and Composition	Prepared Graduate 9 – Writing Process	Demonstrate mastery of their own writing process.	Students practice planning, drafting, revising, editing, and polishing documents to produce clear, professional final products.
Standard 4: Research Inquiry and Design	Prepared Graduate 10 – Research and Ethics	Gather information from a variety of sources.	Technical writing requires researching accurate information, evaluating sources for credibility, and using information ethically with appropriate citation.

Free Resource Links

1. Career Exploration and Postsecondary Opportunities

- CareerOneStop (career exploration certifications salary education pathways)
www.careeronestop.org
- O*NET Online (career profiles tools workplace skills job expectations)
www.onetonline.org
- Bureau of Labor Statistics Occupational Outlook Handbook (job outlook education pathways salary data)
www.bls.gov/ooh
- Colorado Community College System (Colorado programs degrees certificates pathways)
www.cccs.edu

2. Foundations of Technical Writing in Engineering

- Purdue OWL Technical Writing (technical writing fundamentals organization clarity)
owl.purdue.edu
- Federal Aviation Administration Part 107 (commercial drone regulations technical reference)
ecfr.gov/current/title-14/chapter-I/subchapter-F/part-107
- FAA Remote Identification of Drones (remote ID compliance operational documentation)
www.faa.gov/uas/getting_started/remote_id
- Drone Recordkeeping and FAA Requirements Checklist (flight documentation audit readiness compliance)
www.thedroneu.com/blog/faa-requirements-recordkeeping

3. Digital Communication Tools and Platforms

- Google Docs Editors Help (document creation collaboration digital writing tools)
support.google.com/docs
- Microsoft Word Support (formatting editing document design tools)
support.microsoft.com
- Canva Docs (visual document design digital communication tools)
www.canva.com
- Notion (document management collaboration knowledge tools)
www.notion.so

4. Audience Purpose and Professional Tone

- Purdue OWL Audience Analysis (audience awareness communication tone strategies)
owl.purdue.edu
- MindTools Communication Skills (professional tone audience adaptation)
www.mindtools.com
- Grammarly Writing Resources (tone clarity readability communication)
www.grammarly.com/blog
- Harvard Business Writing (professional tone workplace communication)
hbr.org

5. Technical Writing Formats and Document Types

- Purdue OWL Workplace Writing (reports memos instructions formatting)
owl.purdue.edu
- Microsoft Templates (technical documents reports templates examples)
templates.office.com
- Technical Communication Center (technical documents formats examples)
www.instructionalsolutions.com
- Smartsheet Templates (business reports and documentation templates)
www.smartsheet.com

6. Research Information Literacy and Source Use

- Google Scholar (research sources academic technical information)
scholar.google.com
- Purdue OWL Research Guide (research writing citation formatting sources)
owl.purdue.edu
- Colorado State University Writing Studio (research process evaluation sources)
writing.colostate.edu
- EasyBib Citation Guide (citations formatting research sources)
www.easybib.com

7. Technical Description and Process Writing

- Southern Illinois University UAV Documentation Examples (flight logs maintenance logs checklists manuals)
facilities.siu.edu/uav/doc-examples
- FAA Part 107 Airspace Authorizations (authorization procedures planning compliance)
www.faa.gov/uas/commercial_operators/part_107_airspace_authorizations
- FAA Handbooks and Manuals (aviation manuals operational guidance technical references)
www.faa.gov/regulations_policies/handbooks_manuals
- FAA Technical Library (technical reports standards research documentation)
www.faa.gov/data_research/library

8. Visual Communication and Data Representation

- Canva Charts (data visualization charts graphs communication tools)
www.canva.com
- Tableau Public (data visualization graphs dashboards tools)
public.tableau.com
- Google Sheets Charts (data graphs visualization tools)
docs.google.com
- Datawrapper (charts and graphs technical communication visuals)
www.datawrapper.de

9. Editing Revising and Document Quality

- Grammarly (editing proofreading writing quality tools)
www.grammarly.com
- Hemingway App (readability clarity editing tool)
hemingwayapp.com
- Purdue OWL Editing (editing revising proofreading strategies)
owl.purdue.edu
- ProWritingAid (editing grammar analysis improvement tools)
prowritingaid.com

10. Ethics Intellectual Property and Digital Responsibility

- Creative Commons (copyright licensing intellectual property use)
creativecommons.org
- Purdue OWL Plagiarism Guide (ethical writing citation practices)
owl.purdue.edu
- Copyright.gov (intellectual property copyright laws overview)
www.copyright.gov
- Common Sense Education Digital Citizenship (ethical technology use responsibility)
www.commonsense.org

11. Collaboration and Team Communication

- Google Workspace (collaboration communication shared documents tools)
docs.google.com
- Slack (team communication collaboration messaging tools)
slack.com
- Microsoft Teams (collaboration communication project workspaces)
www.microsoft.com/teams
- SkillsUSA (teamwork leadership professional skills development)
www.skillsusa.org

12. Technical Communication and Documentation Project

- Canva Presentations (digital presentation design tools communication)
www.canva.com
- Google Slides (presentation tools digital communication design)
slides.google.com
- Prezi (interactive presentation tools visual storytelling)
prezi.com
- Adobe Express (digital content publishing design tools)
www.adobe.com/express
- Federal Aviation Administration Remote ID (UAS compliance identification documentation)
www.faa.gov/uas/getting_started/remote_id
- Southern Illinois University UAV Documentation Examples (operations manuals logs records templates)
facilities.siu.edu/uav/doc-examples

- FAA Part 107 Airspace Authorizations (authorization records operational planning)
www.faa.gov/uas/commercial_operators/part_107_airspace_authorizations
- Drone Recordkeeping and FAA Requirements Checklist (operator records maintenance logs compliance)
www.thedroneu.com/blog/faa-requirements-recordkeeping

13. Leadership

- National Clearinghouse for Leadership Programs (leadership development student leadership frameworks resources)
<https://nclp.umd.edu/>
- University of Washington Student Leadership Competencies (leadership competencies reflection community engagement teamwork)
https://cele.uw.edu/site/assets/files/1211/guide_to_building_student_leadership_competencies_for_community_based_engagement.pdf
- University of Oregon Career Preparation Toolkit (leadership professionalism teamwork career competencies)
<https://teaching.uoregon.edu/career-preparation-toolkit>
- NACE Career Readiness Competencies (leadership professionalism teamwork communication employability skills)
<https://www.naceweb.org/career-readiness/competencies/career-readiness-defined/>

14. Work-Based Learning

- CTE Learn Workplace Skills Tutorials (workplace readiness communication feedback professionalism)
www.ctelearn.org/tutorials.php
- Colorado ACTE Student Career Development Lessons (work-based learning real-world experiences career development)
co.ctelearn.org/cte-lessons/student-career-development
- CareerOneStop Skills Assessment (skills identification workplace readiness career planning)
www.careeronestop.org/ExploreCareers/Assessments/skills.aspx
- CTE Learn High-Quality CTE Work-Based Learning (reflection portfolios employer connections career readiness)
www.ctelearn.org/certified-courses/course/HQ111/high-quality-cte-work-based-learning



Technology Student Association – National Competitive Events

STEM Mass Media

Objective: *Students will research, write, produce, and revise STEM-focused news content that informs a public audience in alignment with TSA STEM Mass Media competition requirements.*

- Research the annual STEM Mass Media theme and identify the key information needed for an informative news story.
- Write clear, accurate, audience-centered news copy that summarizes technical information for a general audience.
- Produce a digital news broadcast that presents the annual topic in an original and professional manner.
- Organize information using journalistic structure, concise wording, appropriate tone, and effective transitions.
- Develop interview questions and gather relevant information from a briefing or press-conference format.
- Write a digital news article that synthesizes background information, interview details, and evidence.
- Evaluate the final media product using TSA criteria for accuracy, organization, creativity, communication, and technical quality.

Resources

- Technology Student Association – STEM Mass Media competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- Purdue OWL – Journalism and technical writing resources
<https://owl.purdue.edu/>
- NPR Training – Audio, interviewing, and journalism guidance
<https://training.npr.org/>
- Canva – News graphics and presentation design tools
<https://www.canva.com/>



Technology Student Association – National Competitive Events

Debating Technological Issues

Objective: *Students will research, document, organize, and defend evidence-based arguments about technological issues in alignment with TSA Debating Technological Issues competition requirements.*

- Research the annual debate topic and related subtopics from credible sources.
- Prepare a one-page summary of references using MLA format according to TSA competition requirements.
- Develop evidence-based pro and con arguments for multiple technological issue subtopics.
- Organize claims, evidence, reasoning, cross-examination questions, and rebuttal points for timed debate rounds.
- Use concise, clear, and persuasive language appropriate for a formal debate setting.
- Respond to opposing arguments through questioning, analysis, and rebuttal.
- Evaluate debate performance using TSA criteria for research, argument quality, communication, reasoning, and professionalism.

Resources

- Technology Student Association – Debating Technological Issues competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- Purdue OWL – MLA Formatting and Style Guide
<https://owl.purdue.edu/owl/researchandcitation/mlastyle/mlaformattingandstyleguide/>
- National Speech & Debate Association – Debate resources
<https://www.speechanddebate.org/>
- ProCon.org – Background research on public issues
<https://www.procon.org/>



Technology Student Association – National Competitive Events

Future Technology and Engineering Teacher

Objective: *Students will create a professional teaching portfolio, lesson plan, instructional activity, and presentation/interview that communicate a technology or engineering concept in alignment with TSA Future Technology and Engineering Teacher competition requirements.*

- Research a technology or engineering education topic connected to STEM initiatives and technological literacy standards.
- Write a complete lesson plan that includes instructional purpose, standards alignment, learning activities, and assessment components.
- Develop supporting handouts, assessments, or classroom materials that communicate the lesson clearly to the intended audience.
- Organize a portfolio that documents the lesson plan, activity materials, resources, references, and teaching rationale.
- Apply reader-centered technical communication principles to make instructional materials clear, usable, and accessible.
- Present the lesson activity to judges and explain instructional decisions during the interview.
- Evaluate the portfolio and presentation using TSA criteria for lesson-plan quality, organization, resources, creativity, communication, and professionalism.

Resources

- Technology Student Association – Future Technology and Engineering Teacher competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- International Technology and Engineering Educators Association – Standards and technology education resources
<https://www.iteea.org/>
- Purdue OWL – Technical writing and professional communication resources
<https://owl.purdue.edu/>
- Canva – Handouts, instructional materials, and presentation design
<https://www.canva.com/>