Syracuse City School District
Career and Technical Education Program
RPAS: Remote Piloted Aircraft Systems Pathway
Summary Overview

Pathway Overview

At the completion of this program, students will understand and be able to apply the fundamentals of Remote Piloted Aerial Systems. Students will complete hands-on, real-world projects, develop critical thinking, analysis, and problem-solving skills. This course will contribute to the preparation of students for post-secondary education and a wide range of careers using Remote Piloted Aerial Systems. Students will also have the opportunity to receive integrated academic and college credits.

Calendar for Pathway

Level	Quarter	Units of Study
100 9th Grade	**1**	• Course Expectations and Goal Setting • Introduction to RPAS Technology • Introduction to Career Opportunities • History of Flight and Drones • Presentations and Public Speaking
	2	• Introduction to (RPAS)Drone Technology • Basics of Electromechanical • Let's Fly- Safely and Responsibly • Professional Portfolio and Employability Profile • Rules and Regulations for Recreational RPAS • Drone Pilot Procedures, Protocols, and Communications • RPAS Ethics
	3	• Weather Basics • Geography and Navigation
	4	• Crew Resource Management • Aircraft Performance • Introduction to Air and Space • Flight Safety • Flight Planning • Recreational Pilot Certification • Learning Reflection
200 10th Grade	**1**	• Course Expectations, Grading and Goals • Career Exploration • Introduction to Programming • Engineering Design Process
	2	• Rules and Regulations for Commercial Application of RPAS • Personal Portfolio and Employability Profile • Weather and Climate Effects on Flight Path Creation • Introduction to Digital Photography, Post-Productional Editing, Careers with RPAS and Photography (Part 1)
	3	• Introduction to Digital Photography, Post-Productional Editing, Careers with RPAS and Photography (Continued) • Videography • Introduction to GIS
	4	• Symbolism and Flight Maps • Airport Operations • Flight Planning • Physics of Flight

		• Critical Thinking, Problem Solving and Decision Making • Personal Reflection
300 **11th Grade**	**1**	• Course Expectations, Grading and Goals • Career Exploration • Application of Engineering Design Process
	2	• Personal Portfolio and Employability Profile • Flight Planning
	3	• Physics of Flight and Craft Loading • Certification for Commercial RPAS and Other Applicable Certifications (as needed)
	4	• Airport Operations • Radio Communications • Career Exploration • Aeronautical Crew Resource Management • Review for RPAS Certification • Personal Reflection
400 **12th Grade**	**1**	• Course Expectations, Grading and Goals • Career Exploration • Application of RPAS (Collaborative Project) • Introduction to Community Service • Planning for Future- College and Career Preparedness and Application
	2	• Student Led Project • Personal Portfolio and Employability Profile
	3	• Student Led Capstone Project
	4	• Project Results and Reporting • Review of RPAS Commercial Applications • Personal Reflection

Syracuse City School District
Career and Technical Education Programs
Course Syllabus

P-TECH RPAS 100: Remote Piloted Aircraft Systems
Level 100

Program Overview

At the completion of this program, students will understand and be able to apply the fundamentals of Remote Piloted Aerial Systems. Students will complete hands-on, real-world projects, develop critical thinking, analysis and problem-solving skills. This course will contribute to the preparation of students for post-secondary education and a wide range of careers using Remote Piloted Aerial Systems. Students will also have the opportunity to receive integrated academic and college credits.

Course Description

In this course, students will define and understand the basic concepts of Remote Pilot Aerial or Aircraft Systems, identify career opportunities in the field and learn key concepts used by drone pilots. Students will participate in hands-on activities and lessons to explore the history of flight and evolution of remote flight. Students will be introduced to recreational remote flight by exploring the impact of weather, geography, and physics of flight . They will have the opportunity to begin to operate a drone and obtain certification for recreational flight of RPAS. This course will contribute to the preparation of students for a wide range of careers by exploring potential careers, individual skills, talents and interests, goals and implementing career ready practices. Students will practice clear and concise communication when writing and speaking. Resumes, employability profile, and professional portfolios will begin to be developed.

Work-Based Learning

Students will be connected with professionals in the Remote Pilot Aerial Systems field through field trips, job shadowing and career coaching, leading to opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume.

Pre-Requisites

N/A

Course Objectives

1. Students will explore the evolution of flight and RPAS applications.
2. Students will understand basic flight planning within the FAA regulations.
3. Students will demonstrate safe flights and decision-making to protect the safety of themselves and others.
4. Students will explain how weather impacts unmanned aviation systems.
5. Students will explore career pathways available through RPAS technology.
6. Students will obtain recreational RPAS certification.

Integrated Academics

N/A

Dual Enrollment College Credit

N/A at this level

Equipment and Supplies

- School will provide: All necessary lab and classroom equipment.
- Student will provide: N/A

Textbook

N/A

Grading

20% Class attendance/ participation
15% Student assignments
20% Quizzes/exams
10% Professionalism- application of career ready practices
35% Projects

Additional Course Policies

- Students are required to follow all classroom professionalism and safety procedures.
- All work is due at the time and day specified when the assignment is given. Submission details for work to be graded will be given at the time the work is assigned.
- Unexcused absences on quiz days will count as a zero unless discussed with the teacher.
- Students are required to follow all safety procedures and guidelines.

Course Calendar

Quarter	Units of Study
1	● Course Expectations and Goal Setting ● Introduction to RPAS Technology ● Introduction to Career Opportunities ● History of Flight and Drones ● Presentations and Public Speaking
2	● Introduction to (RPAS)Drone Technology ● Basics of Electromechanical ● Let's Fly- Safely and Responsibly ● Professional Portfolio and Employability Profile ● Rules and Regulations for Recreational RPAS ● Drone Pilot Procedures, Protocols, and Communications ● RPAS Ethics
3	● Weather Basics ● Geography and Navigation
4	● Crew Resource Management ● Aircraft Performance ● Introduction to Air and Space ● Flight Safety ● Flight Planning ● Recreational Pilot Certification ● Learning Reflection

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
RPAS: Remote Piloted Aircraft Systems
Level 100

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-2 **Course Expectations, and Goal Setting** **Introduction to Remote Pilot Aerial Systems Technology**	• What are the expectations for students in the Remote Pilot Aerial Systems program? • What are student goals for career and learning outcomes? • What is RPAS technology? • What are the benefits and drawbacks to the use of RPAS? • What are RPAS applications and related technology?	• Develop classroom rules and establish relationships. • Define short and long-term goals. • Create personal short term (Sept- Jan and Jan-June)goals. • Create a vision board. • Create personal long-term goals for program learning over the coming years. • Define RPAS and FAA. • Define common terms used in the field. • Summarize use of RPAS. • Compare and contrast benefits and drawbacks to use of RPAS. • List applications of RPAS in various industries. • Describe selected RPAS technologies.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 4,10 **Cluster Standards** ST 4,5 TD 2 **Pathway Standards** ST-SM 3	**ELA** 9-10.R. 1 9-10.W.1,2,5,6,7 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.WHST. 2,5,6,7 **Math/Science**
Weeks 3-4 **Introduction to Careers**	• What does it mean to be career ready? • What career opportunities are available using RPAS technology?	• Define career ready practices. • Provide examples of career ready practices. • List ways that RPAS technology is applied.	• Student assignment • Student presentations • Student research on drone/RPAS technology careers	**Career Ready Practices** CRP 1,4,5,7,10	**ELA** 9-10.R.1,2,3,4,5,6, 8,9 9-10.W.1,5,6,7 9-10.SL.1,2,3,4,5,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	● How is RPAS relevant to daily, global life? (Note: this is addresses on a continuous embedded basis).	● List careers associated with RPAS. ● Locate current news articles that relate to RPAS. ● Connect current news articles to RPAS and analyze the relationship.	project ● Student portfolio ● Weekly presentation on news event and connection to RPAS (continues all year)		9-10.L.1,2,3,4,6
				Cluster Standards TD 6 GV 5 ST 4,5	**Literacy** 9-10.RST. 2,4,6,8
				Pathway Standards ST-SM 3	**Math/Science**
Weeks 5-7 **History of Flight and Drones**	● When did flight originate? ● Who were early innovators? ● What were early experiences? ● What did early planes look like? ● How has manned flight evolved? ● What are the basic physics of motion and flight? ● What makes for a successful rudimentary model of a plane?	● Describe early efforts and development of flight. ● Create a model of an early plane. ● Describe basic physics of flight. ● Demonstrate basic physics of motion and flight through modeling of paper planes and parachutes.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 2,4,6,8	**ELA** 9-10.SL.1,4,5,6 9-10.L.1,3,4,6
				Cluster Standards TD 2 ST 4,5	**Literacy** 9-10 RST. 7 9-10.WHST.2
				Pathway Standards ST-ET 4 ST-SM 12,3	**Math/Science**
Weeks 8-9 **Presentations and public speaking**	● What makes good communication skills- both written and spoken? ● What does it mean to present as a professional?	● Describe the communication process and the importance of listening and speaking skills and their relationship to job performance. ● Describe the importance of good reading and writing skills	● Student assignments ● Class and group participation ● Student presentations	**Career Ready Practices** CRP 4,11	**ELA** 9-10.SL.1,4,5,6 9-10.L.1,3,4,6
				Cluster Standards	**Literacy** 9-10 RST. 7 9-10.WHST.2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	● What makes an effective presentation?	and their relationship to job performance. ● Demonstrate effective communication using verbal and writing skills. ● Communicate effectively using electronic communication devices. ● Explore how visual aids assist in presentations. ● Demonstrate professional standards and employability skills (attendance, collaboration). ● Demonstrate use of concise and clear language.	● Project (teach a skill or interest) ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Pathway Standards**	**Math/Science**
Weeks 10-14 **Introduction to RPAS or Drone Technology** **Basics of Electromechanical** **Let's Fly-Safely and Responsibly**	● What components are used in a RPAS? ● How are the mechanical components controlled in a RPAS? ● How are the physics of motion demonstrated in a RPAS? ● What is the difference between manual and autonomous RPAS? ● Why is it important to be aware of environmental surroundings? ● What are safety considerations to keep myself and others healthy and unharmed?	● Identify the components in a RPAS. ● Diagram the parts of a RPAS and detail how they interact. ● Distinguish the functional differences between a fixed wing and a multi-copter design and operation. ● Explain how physics of motion are applied in a RPAS. ● Compare and contrast manual and autonomous RPAS. ● List applications for manual and autonomous RPAS. ● Describe what to be aware of in the environment when flying a drone. ● Articulate what harm could	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 1,4,9 **Cluster Standards** ST 1,3,6 **Pathway Standards** ST-ET 1,3,4	**ELA** 9-10.R.1 9-10.SL.1,4,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.1,2,4,7 9-10.WHST.2 **Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	● How is a RPAS safely operated?	occur if a drone is operated in an unsafe and irresponsible manner. ● Articulate how to be a safe and responsible drone operator. ● Demonstrate safe and responsible use of a drone in an indoor environment. ● Demonstrate control over craft given obstacles and challenges.			
Week 15 **Personal Portfolio and Employability Profile**	● How might personal goals need to be revised? ● How might goals be revised or augmented? ● How do individual talents, skills and interests relate to RPAS? ● What is a personal portfolio? ● What is an employability profile?	● Evaluate goals for the first semester. ● Create goals for the second semester. ● Reflect and analyze how personal talents, skills and interests are changing and relate to this field. ● Evaluate current progress on employability profile. ● Synthesize learning experiences to update resume and professional portfolio.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 1,4,10 **Cluster Standards** ST 4,5 **Pathway Standards** ST-SM 3	**ELA** 9-10.W.1,2,3 9-10.SL.1,4,5,6 9-10.L.1,2,3,6 **Literacy** 9-10.WHST.1,2,3,4 **Math/Science**
Weeks 16-19 **Rules and Regulations for RPAS Recreational Use**	● What is the difference between recreational and commercial RPAS applications and certifications? ● Who is the FAA? ● What are the classifications of FAA airspace?	● Compare and contrast recreational and commercial applications and certifications. ● Detail the role of the FAA. ● Explain FAA regulations about airspace as it governs RPAS. ● Cite regulations of each classification of airspace.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation	**Career Ready Practices** CRP 1,4,5,8,9 **Cluster Standards** GV 2 ST 3 TD 4,5	**ELA** 9-10.R.1 9-10.W.1,2,5,6,7 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.1,2,4,7,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Drone Pilot Procedures and Protocols and Communications **RPAS Ethics**	● What are the operation requirements within FAA controlled airspace? ● What are commonly used vocabulary terms and acronyms used in communication for users of RPAS? ● What are ethical concerns with RPAS applications? ● What are the potential mal-uses of RPAS technology? ● What are considerations for responsible decisions for RPAS technology? ● How might unethical practices harm individuals/society and negatively impact the use of drones/RPAS?	● Identify what Notices to Airmen (NOTAMS) mean. ● Name and define common communication terms and acronyms. ● Demonstrate appropriate use of common communication terms and acronyms. ● Discuss potential uses of RPAS application. ● Debate the thesis of various RPAS applications. ● Distinguish between ethical and unethical decision-making and state possible outcomes.	● Student self-reflection ● Quizzes and exams	**Pathways Standards** GV-MGT 1 TD-HSE 1,2	**Math/Science**
Weeks 20-26 **Weather Basics**	● How does weather form? ● What is the difference between weather and climate? ● What are the types of clouds? ● How does elevation and cloud type determine weather conditions? ● What is the difference between fog and clouds?	● Explain causes of a variety of weather phenomena. ● Describe how weather and climate differ. ● Name and identify categories of clouds. ● Categorize clouds according to classification. ● Explain how evaluation and cloud type impact weather. ● Compare and contrast fog and clouds. ● Explain how wind direction	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 1,2,4,5,7 **Cluster Standards** ST 2, **Pathway Standards** ST-ET 6	**ELA** 9-10.R.1,2 9-10.W.1,2,5,6,7 9-10.SL. 1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.1,2,4,7 9-10.WHST.2,5,6,7 **Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	● How is wind direction and speed determined? ● What is METER? ● How is METER used? ● What are characteristics of stable and unstable air? ● What is turbulence? ● Why is consistency of precipitation important? ● What is military time? ● How is military time and universal time (UTC) converted to local EST/EDT? ● What information does a weather map provide? ● How is weather information deciphered? ● How does weather affect RPAS operation?	and speed are determined. ● Explain the impact of wind. ● Define METAR (Meteorological Terminal Air Report or Routine Aerodrome Meteorological Report). ● Explain where to obtain METAR locally. ● List what makes stable and unstable air. ● Explain turbulence. ● Explain precipitation types, conditions for formation of different precipitation and impact. ● Translate military time into local time. ● Convert universal time to local EST or EDT time. ● Describe the information and symbols on a weather map and report. ● Create a report or map based on current weather. ● Explain the effects of weather on RPAS operations.		ST-SM 1,2,4	
Weeks 27-29 **Geography and Navigation**	● How do natural geographic formations affect flight?	● Describe different ways natural formations impact weather, air flow, temperature and flight. ● Demonstrate how geography can alter flight conditions through modeling.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-	**Career Ready Practices** CRP 1,2,4,7 **Cluster Standards** ST 3 **Pathway Standards**	**ELA** 9-10.R.1,2 9-10.W.2 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.1,2,3,7 9-10.WHST.2 **Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
			reflection ● Quizzes and exams	ST-SM 1,2,3,4	
Weeks 30-32 **Crew Resource Management**	● What roles are needed for a successful RPAS mission? ● What are the responsibilities of the PIC and VO?	● Discuss the roles and responsibilities of the RPAS crew. ● Explain the responsibilities of assigned roles.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 1,3,5,9,12	**ELA** 9-10.R.1 9-10.W.2 9-10.SL. 1,2,4,5,6 9-10.L.1,2,3,4,6
				Cluster Standards ST 1,2,4,6 GV 2	**Literacy** 9-10.RST.2 9-10.WHST.2
				Pathway Standards ST-ET 1,3,4	**Math/Science**
Weeks 32-35 **Aircraft Performance** **Introduction to Air and Space (FAA)** **Flight Safety**	● What affects aircraft performance? ● What affects the PIC's performance? ● What are FAA regulations regarding controlled and uncontrolled airspace? ● How is permission to access controlled airspace obtained? ● What are the 5 hazards for decision making in	● Explain the environmental factors that affect aircraft performance. ● List regulations regarding controlled and uncontrolled airspace. ● Demonstrate how permission to access controlled airspace is requested (who, where, why). ● Describe the human factors that increase, or decrease aircraft performance.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 1,3,4,9,12	**ELA** 9-10.R.2 9-10.W.2,5 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,**6**
				Cluster Standards GV 3 ST 1,2,4,6 TD 4	**Literacy** 9-10.RST.2,4,7 9-10.WHST.2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Flight Planning	aeronautics? ● What other factors impact decision-making? ● What actions should be taken to ensure flight safety? ● How is a mission planned? ● In the event of an emergency, what actions must be taken?	● List and define the five hazards of attitude and the antidote. ● List other factors that impact decision-making. ● Create a pre-flight checklist that covers needed role assignment and aircraft inspection. ● Collaboratively plan a mission. ● Describe and be able to practice in-flight emergency procedures. ● Analyze response to unexpected occurrences and rehearse responses.		**Pathway Standards** ST-ET 1,3,4 GV-MGT 1 GV-REG 1 TD-MTN 1 TD-HSE 1,2	**Math/Science**
Weeks 35-39 **RPAS Recreation Certification**	● What are the requirements for certification as a recreational remote pilot? ● How is recreational RPAS certification obtained? ● What does recreational remote pilot certification allow and what are the limitations?	● Articulate requirements for certification. ● Demonstrate knowledge and skills for certification. ● Apply knowledge and skills to demonstrate proficiency on TRUST (The Recreational UAS Safety Test **).** ● Articulate what is allowable and what is limited with recreational certification.	● Performance on TRUST	**Career Ready Practices** CRP 1,2,4,10	**ELA** 9-10.R.2 9-10.W.2 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6
				Cluster Standards ST 6	**Literacy** 9-10.RST.4 9-10.WHST.2
				Pathway Standards ST-SM 4	**Math/Science**
Week 40 **Learning Reflection**	● What personal goals have been accomplished? ● How has personal vision evolved?	● Articulate accomplishments and goals. ● Analyze previous learning goals to determine future	● Student assignments ● Class and group participation ● Student presentations ● Project (Professional	**Career Ready Practices** CRP 1,4,10	**ELA** 9-10.W.1,2,3 9-10.SL.1,4,5,6 9-10.L.1,2,3,6
				Cluster Standards	**Literacy**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	● What learning is still needed? ● How do current talents, skills, and accomplishments support vision and goals? ● How are accomplishments reflected on a resume, employability profile and professional portfolio?	learning needs. ● Evaluate personal accomplishments and goals. ● Refine and update resume, employability profile and professional portfolio.	Portfolio) ● Teacher observation ● Student self-reflection ● Quizzes and exam	ST 4,5 **Pathway Standards** ST-SM 3	9-10.WHST.1,2,3,4 **Math/Science**

Syracuse City School District
Career and Technical Education Program
Course Syllabus
P-TECH RPAS: Remote Piloted Aircraft Systems
Level 200

Program Overview

At the completion of this program, students will understand and be able to apply the fundamentals of Remote Piloted Aircraft Systems. Students will complete hands-on, real-world projects, develop critical thinking, analysis and problem-solving skills. This course will contribute to the preparation of students for post-secondary education and a wide range of careers using Remote Piloted Aircraft Systems. Students will also have the opportunity to receive integrated academic and college credits.

Course Description

This course continues the study of Remote Piloted Aircraft Systems. During the second year, students focus on engineering design, coding and programming and physics of flight to build foundational knowledge regarding operation of RPAS. Understanding of weather and impacts on flight, reading and interpreting weather reports, maps and navigation are integral skills to build student understanding of safe flights. Photography and videography are the focus of learning as students explore applications of RPAS. Decision making for safe and effective flights is stressed. Students continue to explore career options, goals and interests.

Work-Based Learning

Students will be connected with professionals in the Remote Pilot Aerial Systems field through field trips, job shadowing and career coaching, leading to opportunities for direct job training and real-world experience. Integration with professionals in the field is an integral part of their independent project. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume and employability profile..

Pre-Requisites

RPAS 100

Course Objectives

- Students will demonstrate basic coding skills to direct a flight.
- Students will experience the engineering design process.
- Students will explore commercial applications for RPAS.
- students will articulate rules and regulations for commercial operations.
- Students will analyze weather patterns, reports, and forecasts to determine flight safety.
- Students will apply knowledge of photography and imaging to capture, edit and display images.
- Students will explore a variety of types and styles of photography.
- Students will apply knowledge of videography to capture, edit and produce images.
- Students will explore GIS (Geographic Information Systems) and demonstrate collaboration and interaction with the GIS field.
- Students will interpret maps and symbols.
- Students will articulate FAA rules and regulations regarding airport operations.
- Students will demonstrate basic understanding of physics of flight.
- Students will demonstrate proficiency with flight planning including pre and post actions.
- Students will explore and evaluate their talents, interests and skills for related careers.

Integrated Academics

- UA 120- Unmanned Aerial Systems Operational and Industrial Operations (MVCC)

Equipment and Supplies

- School will provide: All necessary lab and classroom equipment.
- Student will provide: N/A

Textbook

N/A

Grading

20% Class attendance/Participation
15% Class assignments
20% Quizzes/Exams
35% Projects
10% Application of professionalism- application of Career Ready Practices

Additional Course Policies

- Students are required to follow all classroom professionalism and safety procedures.
- All work is due at the time and day specified when the assignment is given. Submission details for work to be graded will be given at the time the work is assigned.
- Unexcused absences on quiz days will count as a zero unless discussed with the teacher.
- Students are required to follow all safety procedures.

Course Calendar

Quarter	Units of Study
1	● Course Expectations, Grading and Goals ● Career Exploration ● Introduction to Programming ● Engineering Design Process
2	● Rules and Regulations for Commercial Application of RPAS ● Personal Portfolio and Employability Profile ● Weather and Climate Effects on Flight Path Creation ● Introduction to Digital Photography, Post-Productional Editing, Careers with RPAS and Photography (Part 1)
3	● Introduction to Digital Photography, Post-Productional Editing, Careers with RPAS and Photography (Continued) ● Videography ● Introduction to GIS
4	● Symbolism and Flight Maps ● Airport Operations ● Flight Planning ● Physics of Flight ● Critical Thinking, Problem Solving and Decision Making ● Personal Reflection

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
RPAS: Remote Piloted Aircraft Systems
Level 200

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-2 **Course Expectations, Grading and Goals** **Career Exploration**	• What are the expectations for students in the Remote Pilot Aerial Systems program? • What are potential careers of interest related to RPAS? • What education is required to work in an RPAS related career? • How have year 1 experiences refined thinking about plans for the future? • What are student goals for career and learning outcomes? • How are experiences and certifications professionally documented? • How is RPAS relevant to daily, global life? (Note this is addressed on a continuous embedded basis).	• Develop classroom rules and establish relationships. • Explore various careers related to drone/RPAS technology. • Identify required education/training to enter RPAS related fields. • Explore post-secondary programs in drone/RPAS technology. • Analyze a job posting for RPAS. • Identify personal strengths and interests for a potential career path. • Evaluate previous year's goals in relation to current thinking of potential career. • Define short and long-term goals. • Create personal short term (Sept-Jan and Jan- June) goals. • Create a vision board. • Develop a personal action plan for goals. • Communicate and share goals by making them visible. • Evaluate their current resume and professional portfolio and make relevant revisions. • Locate current news articles that relate to RPAS. • Connect news articles to RPAS and analyze the relationship.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,4,10 **Cluster Standards** ST 4,5 TD 2 **Pathway Standards** ST-SM 3	**ELA** 9-10.R.1 9-10.W.2,3,5,6,7 9-10.LS.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.2 9-10.WHST.2,3,4,5,6,7 **Math/ Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 3-8 **Introduction to Programming**	● How are manual and autonomous flight different? ● How does programming control drones? ● How do machines understand directions? ● What is CI (Continuous Integration)? ● How does block coding work? ● What are key vocabulary and algorithms? ● How does a stimulator help develop skill? ● What is JAVA? ● How is code tested? ● How is code revised?	● Compare and contrast manual and autonomous flight. ● Describe how autonomous flights work. ● Describe how software and hardware integrate with drones to fly autonomously. ● Demonstrate use of block coding (through Scratch or Code.org). ● Explain why CI is integral for autonomous flights. ● Demonstrate use of block code with a stimulator. ● Plan and implement flight with a stimulator. ● Describe key aspects, terms, and algorithms with JAVA language. ● Demonstrate use of debugging techniques to test and refine code. ● Apply JAVA to create a webpage. ● Incorporate webpage into professional portfolio.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 2,4,6,8,11,12 **Cluster Standards** ST 2 **Pathway Standards** ST-ET 1	**ELA** 9-10.R.2 9-10.W.2 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.2,7 9-10.WHST.2 **Math/ Science**
Weeks 9-11 **Engineering Design Process**	● What is the engineering design process? ● How do engineers communicate and document processes? ● How are ideas visually communicated? ● What is CADD? ● What tools are available in CADD? ● How does CADD assist in the engineering design process? ● How are parts assembled into a whole?	● Describe steps in the engineering design process. ● Relate engineering process to previous work with coding. ● Compare and contrast technical writing with literary writing. ● Show objects through basic sketching and labeling. ● Describe CADD and how it works. ● Demonstrate use of CADD to create simple design. ● List tools and applications for CADD. ● Demonstrate use of tools in CADD to create drawings of a design.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 1,2,4,6,8,11,12 **Cluster Standards** ST 1,2,6 TD 2 **Pathway Standards** ST-ET 1,2,3,4,5 ST-SM 1 TD-LOG 1 TD-SAL12	**ELA** 9-10.R.2,4 9-10.R.2 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.2,3,5 9-10.WHST.2 **Math/ Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	● What is a 3-D prototype and how are they created? ● How are parts shown in relation to each other? ● How do ideas translate into a product? ● How are prototypes developed? ● How are prototypes tested? ● How are prototypes revised? ● How does an idea translate into a business with a product or service? ● What are key components for a business plan? ● How can support for an idea be gained?	● Demonstrate creation of 3D design. ● Create explosion views of products. ● Analysis examples of design journals. ● Within a group, brainstorm ideas for products or services related to RPAS. ● Select ideas and form a business group. ● Apply software coding and engineering design process to create a prototype. ● Demonstrate and document testing of the prototype. ● Demonstrate and document refinements made based upon testing. ● Develop a business plan including financial and marketing for product or service. ● Present with visual aids the product or services including prototype and business plans (Shark tank style).			

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Week 12 **Rules and Regulations for Commercial Applications of RPAS**	• What are examples of commercial use of RPAS? • What are the rules and regulations for commercial use of RPAS? • How do commercial and recreational rules and regulations compare?	• Describe commercial applications for RPAS. • Describe rules and regulations for commercial use of RPAS. • Compare and contrast recreational and commercial rules and regulations.	• Student assignments • Class and group participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,4,7 **Cluster Standards** ST 5 GV 2 TD 4 **Pathway Standards** ST-ET 4 GV-MGT 1 TD-HSE 1	**ELA** 9-10.R.2 9-10.W.2 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.1,2,4 9-10.WHST.2 **Math/ Science**
Week 13 **Personal Portfolio and Employability Profile**	• How might my personal goals need to be revised? • What new goals do I have? • How do my talents, skills and interests relate to RPAS? • What updates can be added to resume, employability profile and professional portfolio	• Evaluate goals for first semester • Create goals for the second semester. • Reflect and analyze how personal talents, skills and interests are changing and relate to this field. • Evaluate current progress on employability profile. • Synthesize learning experiences to update resume and professional portfolio.	• Student assignments • Class and group participation • Student presentations • Project (portfolio, profile and resume) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 4,10 **Cluster Standards** ST 4,5 **Pathway Standards** ST-SM 3	**ELA** 9-10.W.1,2,3 9-10.SL.1,4,5,6 9-10.L.1,2,3,6 **Literacy** 9-10.WHST.1,2,3,4 **Math /Science**
Weeks 14-16 **Weather and Climate Effects on Flight Path Creation**	• Why do specific weather patterns and phenomena occur? • How does weather affect RPAS operations? • What aspects of weather impact RPAS operations? • How is the weather report read? • How is a weather forecast interpreted?	• Explain causes of a variety of weather phenomena. • Explain how cloud types, air pressure, and wind impact flying conditions. • Explain why weather conditions need to be accounted for before creating a flight plan. • Explain symbols used on weather maps. • Compare and contrast METAR (Meteorological Aerodrome Report), TAF (Terminal Aerodrome	• Student assignments • Class and group participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4 **Cluster Standards** ST 2,3 **Pathway Standards** ST-ET 2,6 ST-SM 1,2,4	**ELA** 9-10.R.2,4 9-10.W.2 9-10.SL.1,4,5,6 9-10.L.1,2,3,6 **Literacy** 9-10.RST.1,2,4,7 9-10.WHST.2 **Math/ Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	• How are weather and weather advisories communicated?	Forecast) and NOTAMS (Notice to Airmen). • Demonstrate accurate reading of METAR, TAF, and NOTAM reports. • Explain decisions for flight planning based on varied METAR, TAF and NOTAM reports.			
Weeks 17-23 **Introduction to Digital Photography**	• How are images captured? • What is digital photography? • What types of cameras are utilized? • What are the components and functions of parts of cameras? • What is composition and framing? • What are different types of photography? • How does lighting impact photography? • How are images captured? • How can images be altered through camera settings? • How is still photography different from videography? • What is aerial photography? • How can photos be manipulated?	• Explain how lens, light and optics work to capture an image. • Describe the history of photography into the digital age. • List types of cameras. • Describe how the device used influences the image captured. • Evaluate different types of cameras and equipment for a variety of purposes. • Label and describe functions of parts of the camera. • Demonstrate how framing and composition impact the final image. • Describe different types of photography (Portrait Photography, Photojournalism, Fashion Photography, Sports Photography, Still Life Photography, Editorial Photography, Architectural Photography). • Demonstrate how lighting impacts the resulting photograph. • Demonstrate how to alter images by changing settings such shutter speed and aperture.	• Student assignments • Class and group participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,5,6,11,12 **Cluster Standards** ST 2,3,4 **Pathway Standards** ST-ET 2,4,5	**ELA** 9-10.R.1,2,7 9-10.W.2,3,4,5,6,7 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.2,4,6,7 9-10.WHST.2,3,4,5,6,7 **Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Post- Production Editing **Careers with RPAS and Photography**	● How are photos and videos edited? ● What is photo stitching? ● What tools and techniques are used to manipulate images? ● What makes an effective display for visual art such as photography? ● How can work be organized? ● What is the difference between raster and vector images? ● How can research, interviews and examples help inform work? ● What careers combine photography and RPAS? ● What makes an effective collaboration? ● What personal skills and traits support collaboration? ● How do different professions collaborate?	● Compare and contrast purposes and techniques of photography and videography. ● Describe application of different video file types. ● Describe uses and purposes of aerial photography. ● Demonstrate aerial photography. ● Demonstrate use of Adobe Lightroom and Photoshop for post-production editing. ● Demonstrate manipulating images to create new images. ● Create an image from several images. ● Demonstrate editing of a video using trimming, titles, and AV layers. ● Evaluate photo manipulations for effectiveness. ● Compare and contrast raster and vector images. ● Demonstrate selection type of image file to use in different applications. ● Demonstrate management of files utilizing folder structure, filing naming, and correct file types. ● Develop relevant questions for guest speakers regarding the function and career of a type of photography. ● Describe different styles of photography. ● Demonstrate producing different types of photography.			

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Evaluate samples of work to decide what to print and display in the school photo gallery. • Synthesize research, interviews, experiences to share a career pathway or photography style. • Analyze why a career of photographer, or photography style resonates personally. • Describe an effective collaboration. • Evaluate the collaboration for the project with students from different programs (CIS and Media). • Evaluate how contributions result in an effective collaboration. • Describe how the different perspectives and talents from different career pathways support a successful outcome on common goal or project.			
Weeks 24-27 **Videography**	• How is a video project planned and organized? • How does a storyboard function? • What makes an effective script? • How is a script written? • How does a script translate into video action? • What equipment/cameras are utilized for videography? • What are video file types?	• Articulate ways to plan and organize a video project using a storyboard. • Demonstrate use of technology to build a storyboard. • Analyze components of video scripts to identify components and purpose. • Create a script for a short video project. • Compare and contrast different common videography devices such as DSLR camera and cell phone.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,6,11,12 **Cluster Standards** ST 1,2,3 **Pathway Standards** ST-ET 1,2,3,5,6	**ELA** 9-10.R.1,2,3,4,5,6 9-10.W.2,3,4 9-10.SL.1,2,4,5,6 9-10.L.1,2,3,4,6 **Literacy** 9-10.RST.2,5,6 9-10.WHST.3,4 **Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	• How are video files saved and organized? • How are video files edited? • How does what specific question is asked impact information received? • How can an effective public relations promotion or advertisement be created?	• Compare and contrast purposes and techniques of photography and videography. • Describe application of different video file types. • Demonstrate management of files utilizing folder structure, filing naming, and correct file types. • Demonstrate use of editing tools such Adobe Premiere. • Plan and produce a short video. • Demonstrate creation of a short video with images, transitions, motion graphics, interviews (sound) and music. • Evaluate effectiveness of promotion or advertisement video.			
Weeks -28-31 **Introduction to Geographic Information Systems (GIS)**	• What is GIS? • How does RPAS connect with GIS? • How do different professions collaborate? • What makes effective professional collaborations?	• Define GIS. • Explain the concepts of latitude and longitude. • Read topographic maps and explain what they represent. • Describe how RPAS and GIS are related. • Demonstrate use of software packages. • Create an accurate map with details captured by aerial imagery. • Document how Geospatial and RPAS students collaborated. • Describe what skills and traits contribute to a productive and efficient collaboration.	• Student assignments • Class and group participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,11,12 **Cluster Standards** ST 2 **Pathway Standards** ST-ET 1,2,3,6 ST-SM 1,2	**ELA** 9-10.R.2 9-10.W.2,3 9-10.SL.1,4,5,6 9-10.L.1,2,3,6 **Literacy** 9-10.RST.1,4,7 9-10.WHST.2,3,4 **Math/ Science**
Weeks 31-32		• Explain and define symbols on a flight map.	• Student assignments • Class and group	**Career Ready Practices** CRP 1,2,4	**ELA** 9-10.R.2 9-10.W.2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Symbolism and Flight Maps	• What information is gathered from a navigation or flight map? • What do symbols add to information on a map? • How do map reading skills relate to flight planning?	• Using latitude and longitude locate specific points on the map. • Interpret coordinates. • Describe flight decisions based on provided varied maps and symbols. • Apply direction and scale to interpret a map.	participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams		9-10.SL.1,4,5,6 9-10.L.1,2,3,6
				Cluster Standards ST 2 GV 1,2,3,4 TD 2,4,5,6	**Literacy** 9-10.RST.1,2,4,7 9-10.WHST.2
				Pathway Standards ST-SM 1,2	**Math/ Science**
Weeks 33-34 **Airport Operations**	• What is the FAA? • What are the classifications of FAA airspace? • What are the operation requirements within FAA Airspace?	• Describe the role of the FAA. • Explain FAA regulations regarding airspace as it governs RPAS. • Cite regulations for each classification of airspace. • Decipher notices of Airmen (NOTAMS). • Describe what airspace is available and limited locally. • Describe under what conditions permission to access airspace can be granted.	• Student assignments • Class and group participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4	**ELA** 9-10.R.2 9-10.W.2 9-10.SL.1,4,5,6 9-10.L.1,2,3,6
				Cluster Standards ST 3,6 GV 3	**Literacy** 9-10.RST.2,3,4,7 9-10.WHST.2
				Pathway Standards ST-SM 1,2,3 GV-MGT 1	**Math/ Science**
Weeks 35-36 **Flight Planning**	• What are considerations for planning a flight? • What roles are required for a flight? • What is a preflight checklist? • What is a flight log? • What are post flight protocols?	• Describe pre-flight decisions based on weather and map data. • Describe roles for a mission/flight. • Explain a preflight checklist and list what components are incorporated into the checklist. • Demonstrate conducting a pre-flight checklist including weather, notices, equipment status. • Demonstrate proper cleaning and storing of equipment post flight. • Demonstrate filing of data collected according to protocols. • Demonstrate a safe and accurate flight.	• Student assignments • Class and group participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,8,11,12	**ELA** 9-10.R.2 9-10.W.2,3 9-10.SL.1,4,5,6 9-10.L.1,2,3,6
				Cluster Standards ST 1,3	**Literacy** 9-10.RST.1,2,4,7 9-10.WHST.2,3
				Pathway Standards ST-ET 6	**Math/ Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Analyze flight to determine what contributed to success and what would be revised.			
Weeks 36-38 **Physics of Flight**	• What are key concepts of aerodynamics? • How can the engineering design process be applied to build a glider plane?	• Describe key concepts of aerodynamics. • Design and build a glider plane. • Assemble glider planes from specific materials with given criteria. • Test and refine design. • Reflect on design to determine what was successful and what could be revised.	• Student assignments • Class and group participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,6,8 **Cluster Standards** ST 1,2,3,5,6 **Pathway Standards** ST-ET 3,5,6 ST-SM 1	**ELA** 9-10.R.2 9-10.W.2,3 9-10.SL.1,4,5,6 9-10.L.1,2,3,6 **Literacy** 9-10.RST.1,4,7 9-10.WHST.2,3 **Math/ Science**
Week 39 **Critical thinking, Problem Solving and Decision Making**	• What are the hazards and risks of RPAS? • How do people influence the risks and benefits associated with RPAS flights?	• Evaluate risks in scenarios and in-field practice. • Describe how to mitigate risks. • Use a pre-flight checklist to assess risks. • Interpret FEMA guides: IS-240 (Leadership and Influence), IS-241 (Decision Making and Problem Solving), and IS-454 (Fundamentals of Risk Management).	• Student assignments • Class and group participation • Student presentations • Project • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,5,8,9 **Cluster Standards** ST 3 GV 3 TD 2,4,5 **Pathway Standards** ST-SM 4 GV-MGT 1 TD-LOG 1,2 TD-OPS 1,2,3	**ELA** 9-10.R.2 9-10.W.2 9-10.SL.1,4,5,6 9-10.L.1,2,3,6 **Literacy** 9-10.RST.1,2,4,5,7 9-10.WHST.2 **Math/ Science**
Week 40 **Personal Reflection**	• What personal goals have been accomplished? • How has personal vision evolved?	• Articulate accomplishments and goals. • Analyze previous learning goals to determine future learning needs.	• Student assignments • Class and group participation • Student presentations • Project (Professional Portfolio)	**Career Ready Practices** CRP 4,10 **Cluster Standards** ST 4,5	**ELA** 9-10.W.1,2,3 9-10.SL.1,4,5,6 9-10.L.1,2,3,6 **Literacy** 9-

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	• What learning is still needed? • How do current talents, skills, and accomplishments support vision and goals? • How are accomplishments reflected on a resume, employability profile and professional portfolio?	• Evaluate personal accomplishments and goals. • Refine and update resume, employability profile and professional portfolio.	• Teacher observation • Student self-reflection • Quizzes and exam	**Pathway Standards** ST-SM 3	10.WHST.1,2,3,4 **Math/Science**

Syracuse City School District
Career and Technical Education Program
Course Syllabus
P-TECH RPAS: Remote Piloted Aircraft Systems
Level 300

Program Overview

At the completion of this program, students will understand and be able to apply the fundamentals of Remote Piloted Aircraft Systems. Students will complete hands-on, real-world projects, develop critical thinking, analysis and problem-solving skills. This course will contribute to the preparation of students for post-secondary education and a wide range of careers using Remote Piloted Aircraft Systems. Students will also have the opportunity to receive integrated academic and college credits.

Course Description

This course continues the study of Remote Piloted Aircraft Systems. Students will experience hands-on project-based learning to further their skills and knowledge on RPAS. Engineering design process, building their own drone, and application of safe operations continue to build foundational knowledge and skills. Students will work to successfully obtain certification for commercial RPAS applications under part 107.

Work-Based Learning

Students will be connected with professionals in the Remote Pilot Aerial Systems field through field trips, job shadowing and career coaching, leading to opportunities for direct job training and real-world experience. Integration with professionals in the field is an integral part of their independent project. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume and employability profile.

Pre-Requisites

RPAS 100
PRAS 200

Course Objectives

- Students will continue to explore professional goals and careers.
- Students will apply engineering design processes to create 3D prototypes.
- Students will collaborate with other professional pathways to create common projects.
- Students will demonstrate safe flight planning, critical thinking and problem solving as they implement flights.
- Students will apply knowledge of the physics of flight as they build their own drone.
- Students will demonstrate knowledge and skills necessary for successful certification under Part 107 for commercial operation of RPAS.

Integrated Academics

- UA 215- Remotely Piloted Aircraft Systems Mission Planning and Operations
- UA 265-Introduction to geographic Information Systems
- UA 267- Advanced GIS

Equipment and Supplies

- School will provide: All necessary lab and classroom equipment.
- Student will provide: N/A

Textbook

- Remote Pilot- Small Unmanned Aircraft Systems Study Guide | US Department of Transportation, FAA

- Airman Knowledge Testing Supplement for Sport Pilot, Recreational Pilot, Remote Pilot & Private Pilot | US Department of Transportation, FAA

Grading

15% Class attendance/Participation
10% Class assignments
20% Quizzes/Exams
50% Projects
5% Application of professionalism- application of Career Ready Practices

Additional Course Policies

- Students are required to follow all classroom professionalism and safety procedures.
- All work is due at the time and day specified when the assignment is given. Submission details for work to be graded will be given at the time the work is assigned.
- Unexcused absences on quiz days will count as a zero unless discussed with the teacher.
- Students are required to follow all safety procedures.

Course Calendar

Quarter	Units of Study
1	● Course Expectations, Grading and Goals ● Career Exploration ● Application of Engineering Design Process
2	● Personal Portfolio and Employability Profile ● Flight Planning
3	● Physics of Flight and Craft Loading ● Certification for Commercial RPAS and Other Applicable Certifications (as needed)
4	● Airport Operations ● Radio Communications ● Career Exploration ● Aeronautical Crew Resource Management ● Review for RPAS Certification ● Personal Reflection

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
RPAS: Remote Piloted Aircraft Systems
Level 300

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-3 **Course Expectations, Grading and Goals** **Career Exploration**	• What are the expectations for students in the Remote Pilot Aerial Systems program? • What are potential career pathways? • What are student goals for career and learning outcomes? • How is RPAS relevant to daily, global life? (Note this is addressed on a continuous embedded basis).	• Develop classroom rules and establish relationships. • Explore career pathways of interest including education and experience requirements, salary, and locations. • Identify local and regional employers. • Define short and long-term goals. • Create personal short term (Sept-Jan and Jan- June) goals. • Create a vision board. • Develop a personal action plan for goals. • Communicate and share goals by making them visible. • Create personal long-term goals for program learning over the coming years. • Locate current news articles that relate to RPAS. • Connect current news articles to RPAS and analyze the relationship.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,4,10 **Cluster Standards** ST 4,5 **Pathway Standards** ST-SM 3	**ELA** 11-12.W.2,3 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.WHST.3,4 **Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Week 4-6 **Application of Engineering Design Process**	• How do tools such as CAD and 3D printing support the design process?	• Recall engineering design process. • Create a prototype according to the given criteria and environment.	• Student assignments • Teacher observation • Class and group participation • Student presentations • Project • Self-reflection • Quizzes/exams	**Career Ready Practices** CRP 1,2,6,8,11 **Cluster Standards** ST 1,2 **Pathway Standards** ST-ET 1,2,3,5	**ELA** 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.2,4,7 11-12.WHST.2 **Math/Science**
Week 7-9 **Personal Portfolio and Employability Profile**	• How might personal goals need to be revised? • What new goals need to be established? • How do individual talents, skills and interests relate to careers utilizing RPAS? • What updates can be added to a resume, employability profile and professional portfolio?	• Evaluate goals for first semester • Create goals for the second semester. • Reflect and analyze how personal talents, skills and interests are changing and relate to this field. • Evaluate current progress on employability profile. • Synthesize learning experiences to update resume and professional portfolio.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 4,10 **Cluster Standards** ST 4,5 **Pathway Standards** ST-SM 3	**ELA** 11-12.W.2,3 11-12.SL.1,2,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.WHST.3,4 **Math/Science**
Week 10-12 **Flight Planning**	• What needs to occur pre-flight? • How is a mission planned? • How are aerial images taken by RPAS?	• Demonstrate a complete pre-flight checklist and preparation. • Demonstrate application of information and tools to plan a successful and safe mission that includes aerial photography. • Demonstrate accurate and safe flight.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,12 **Cluster Standards** ST 1,3 TD 5	**ELA** 11-12.R.3 11-12.W.2,3 11-12.SL.1,2,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.1,2,4,7,8,9 11-12.WHST.2,3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
				Pathway Standards ST-ET 6 TD-HSE 1	**Math/Science**
Weeks 13-23 **Physics of Flight and Craft Loading**	• What factors increase an aerial system ability to fly? • What affects the way a RPAS flies? • What information is needed to support predictions about increasing a RPAS ability to fly? • How are end effectors attached to a flying system? • Why is load important in aircraft performance? • What are the parts of a drone? • How do the parts integrate to form a whole? • Why is technical reading and sequencing of directions important? • What needs to be tested prior to flight? • How is a drone programmed?	• Explain Bernoulli's principle and its effects on flight. • Define drag and the effects on flight. • Demonstrate use of a provided chart to recommend RPAS loading and angle of attack. • Interpret charts to determine G-forces on a turning craft. • Explain how load impacts aircraft performance. • Identify parts of a drone. • Articulate what components a finished drone needs to have and why each component is integral for performance. • Create a working drone from provided parts and directions. • Demonstrate use of soldering techniques. • Demonstrate testing a model for center of gravity and weight among other factors. • Apply coding to program the drone for flight. • Demonstrate flight with the drone that was built. • Evaluate what contributed to success and what would be revised.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,6,8,11	**ELA** 11-12.R.7 11-12.W.2,3,5,6,7 11-12.SL.1,2,4,5,6 11-12.L.1,2,3,4,6
				Cluster Standards ST 1,2,3,5,6	**Literacy** 11-12.RST.1,2,4,7,8,9
				Pathway Standards ST-ET 3,5,6 ST-SM 1	**Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 24-32 **Certification for Commercial RPAS Operation**	• What purpose and role do professional certifications serve? • What skills and knowledge need to be demonstrated for certification as commercial drone operator? • What benefits and responsibilities comes with certification?	• Explain the importance and benefits of obtaining professional certification as a commercial RPAS operator. • Identify what skills and knowledge need to be demonstrated for certification. • Demonstrate application of skills and knowledge needed for certification. • Apply skills and knowledge to successfully obtain certification. • Describe the benefits and responsibilities of holding commercial certification.	• Successfully obtaining certification	**Career Ready Practices** CRP 1,2,10 **Cluster Standards** ST 5 TD 6 **Pathway Standards**	**ELA** 11-12 R 2 11-12 W 2,5 11-12 L 1,2,3,**4** **Literacy** 11-12 RST 2 11-12 WHST **2** **Math/Science**
Weeks 33-35 **Airport Operations** **Radio Communications**	• How do airports work? • What are the types of airports? • How are airports classified? • How does airport classification impact RPAS? • How are flight restrictions communicated? • What are waves and their parts? • How are signals sent through different media?	• Describe flight patterns around airports. • Define the types of airports. • Compare and contrast how the type of airport impacts the use of airspace. • Explain how airport flight patterns operate. • Interpret air charts to determine restrictions and landmarks. • Identify parts of waves. • Explain how waves interact with each other. • Identify types of waves. • Summarize the way signals are sent through various media.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4 **Cluster Standards** ST 3,6 GV 2 **Pathway Standards** ST-SM 1,2,3 GV-MGT 1	**ELA** 11-12.R.2 11-12.W.2 11-12.SL.1,2,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.1,2,4 11-12.WHST.2 **Math/Science**
Week 36 **Career Exploration**	• Why is collaboration across career pathways important?	• Explain how collaborations with other programs across the year allow for complex projects. • Explain how different fields of study contribute to an outcome (sum is greater than parts) using the corn maze experience or	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation	**Career Ready Practices** CRP 4,10,12 **Cluster Standards** ST 4,5	**ELA** 11-12.SL.1,2,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.WHST.3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		another experience as an example.	• Student self-reflection • Quizzes and exams	**Pathway Standards** ST-SM 3	**Math/Science**
Week 37 **Aeronautical Crew Resource Management**	• How does a team work together to fly a mission? • What impacts a person's ability to operate?	• Explain the principle of Crew Resource Management. • Demonstrate crew resource management in flight operations. • Define and explain the 3P model. • Explain how drugs, emotions, sleep, and human physiology impact the ability to make decisions. • Describe the correlations between being physically compromised on safety, financial costs and costs to RPAS applications.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exam	**Career Ready Practices** CRP 1,2,3,4 **Cluster Standards** ST 3,5 TD 5 **Pathway Standards** ST-SM 1,2 ST-ET 4 TD-HSE 1,2	**ELA** 11-12.R.2 11-12.W.2 11-12.SL.1,2,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.2,6 11-12.WHST.2,3,4 **Math/Science**
Weeks 38-39 **Review for pilot exam (as needed)**	• How does weather form? • What are the different types of clouds? • What weather conditions do each type of cloud indicate? • How do mountainous regions affect flight? • What are indicators of poor flying conditions? • How are risks managed? • What steps can be taken to mitigate risks?	• Identity clouds and weather formations from both ground and satellite views. • Explain causes of weather. • Explain the effects of geography on wind and weather. • Evaluate choices about flight based on current and predicted weather.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,4,5 **Cluster Standards** ST 1,3,6 **Pathway Standards** ST-ET 4	**ELA** 11-12.R.2 11-12.W.2 11-12.SL.1,2,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.1,2,4,7,8 11-12.WHST.2,3,4 **Math/Science**
Week 40 **Personal Reflection**	• What personal goals have been accomplished? • How has personal vision evolved? • What learning is still needed? • How do current talents,	• Articulate accomplishments and goals. • Analyze previous learning goals to determine future learning needs. • Evaluate personal accomplishments and goals. • Refine and update resume,	• Student assignments • Class and group participation • Student presentations • Project (Professional Portfolio) • Teacher observation • Student self-reflection	**Career Ready Practices** CRP 1,4,10 **Cluster Standards** ST 4,5 **Pathway Standards** ST-SM 3	**ELA** 11-12.W.2,3 11-12.SL.1,2,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.WHST.3,4

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	skills, and accomplishments support vision and goals? ● How are accomplishments reflected on a resume, employability profile and professional portfolio?	employability profile and professional portfolio. ● Demonstrate success on Part 107 pilot exam if meet age requirement and are prepared.	● Quizzes and exam ● Part 107 Certification for commercial applications		**Math/Science**

Syracuse City School District
Career and Technical Education Program
Course Syllabus
P-TECH RPAS: Remote Piloted Aircraft Systems
Level 400

Program Overview

At the completion of this program, students will understand and be able to apply the fundamentals of Remote Piloted Aircraft Systems. Students will complete hands-on, real-world projects, develop critical thinking, analysis and problem-solving skills. This course will contribute to the preparation of students for post-secondary education and a wide range of careers using Remote Piloted Aircraft Systems. Students will also have the opportunity to receive integrated academic and college credits.

Course Description

This course will complete the Remote Piloted Aircraft Systems sequence. Students will complete an approved project, including all project aspects, from project planning to implementation and presentation of results. Students will successfully obtain certification for commercial RPAS applications under part 107 (if not completed in year 3). Students will be prepared to enter a related college field or obtain entry level positions in industry or military. Collaboration with other professionals to complete a shared goal is an integral part of this course.

Work-Based Learning

Students will be connected with professionals in the Remote Pilot Aerial Systems field through field trips, job shadowing and career coaching, leading to opportunities for direct job training and real-world experience. Integration with professionals in the field is an integral part of their independent project. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume and employability profile..

Pre-Requisites

RPAS 100
PRAS 200
RPAS 300

Course Objectives

- Students will describe commercial applications for RPAS.
- Students will apply RPAS skills and technology to provide community service.
- Students will be prepared for application to post -secondary education, training or an industry position.
- Students will develop, implement, and evaluate a project highlighting skills and knowledge of applications of RPAS.
- Students will experience opportunities to collaborate with professionals and students in other fields towards accomplishment of common goals.
- Students will complete an employability profile, resume, cover letter and professional portfolio.

Integrated Academics

- ENG 103- Freshman Composition and Literature 1
- ENG 104- Freshman Composition and Literature II
- MAT 118- Introduction to Statistics
- GE 101- Essentials of World Geography
- CT 266- Capstone GIS
- UA 102- Introduction to Remote Sensing

Equipment and Supplies

- School will provide: All necessary lab and classroom equipment.
- Student will provide: N/A

Textbook

N/A

Grading

15% Class attendance/Participation
10% Class assignments
20% Quizzes/Exams
50% Projects
5% Application of professionalism- application of Career Ready Practices

Additional Course Policies

- Students are required to follow all classroom professionalism and safety procedures.
- All work is due at the time and day specified when the assignment is given. Submission details for work to be graded will be given at the time the work is assigned.
- Unexcused absences on quiz days will count as a zero unless discussed with the teacher.
- Students are required to follow all safety procedures.

Course Calendar

Quarter	Units of Study
1	● Course Expectations, Grading and Goals ● Career Exploration ● Application of RPAS (Collaborative Project) ● Introduction to Community Service ● Planning for Future- College and Career Preparedness and Application
2	● Student Led Project ● Personal Portfolio and Employability Profile
3	● Student Led Capstone Project
4	● Project Results and Reporting ● Review of RPAS Commercial Applications ● Personal Reflection

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
RPAS: Remotely Piloted Aircraft Systems
Level 400

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-2 **Course Expectation, Grading and Goals** **Career Exploration**	• What are the expectations for students in the Remote Pilot Aerial Systems program? • What are potential career pathways? • What are student goals for career and learning outcomes? • How is RPAS relevant to daily, global life? (Note this is addressed on a continuous embedded basis).	• Develop classroom rules and establish relationships. • Explore career pathways of interest including education and experience requirements, salary, and locations. • Identify local and regional employers. • Define short and long-term goals. • Create personal short term (Sept- Jan and Jan- June) goals. • Create a vision board. • Develop a personal action plan for goals. • Communicate and share goals by making them visible. • Create personal long-term goals for program learning over the coming years. • Locate current news articles that relate to RPAS. • Connect current news article to RPAS and analyze the relationship.	• Student assignments • Class and group participation • Student presentations • Project (student goals) • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,4,10 **Cluster Standards** ST 4,5 **Pathway Standards** ST-SM 3	**ELA** 11-12.W.2,3 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.WHST.3,4 **Math/Science**
Weeks 3-5		• Describe commercial uses for	• Student assignments	**Career Ready Practices**	**ELA** 11-12.R.1,2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Application of RPAS	● What are some applications for RPAS? ● How are aerial images used to create informative maps? ● What is it like to collaborate with other professionals to solve a problem? ● What are the benefits and risks of using RPAS?	RPAS. ● Demonstrate how to import a raster image into ArcGIS. ● Demonstrate process of georeferencing. ● Create a georeferenced image from class taken imagery. ● Demonstrate collaboration with other professional fields (such as GIS and Fire Rescue and EMT) to solve a problem (for example, the rescue of a lost person in a corn maze). ● Evaluate how the diverse skills and talents contribute to successful outcomes. ● Describe pros and cons for use of RPAS in varied scenarios. ● Explain how drones can be used- what types, what financial considerations and applications. ● Synthesize research information into RAFT (role, audience, focus, topic) project.	● Class participation ● Student presentations ● Project (corn maze rescue and RAFT project) ● Teacher observation ● Student self-reflection ● Quizzes and exams	CRP 1,2,4,5,6,8,9,11,12 **Cluster Standards** ST 1,2,6 TD 2,3 **Pathway Standards** ST-SM 1,2,4 ST-ET 2,3 TD-LOG 1	11-12.W.2,3,5,6,7 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.2,4,7,8,9 11-12.WHST.2,3,4,5,6,7 **Math/Science**
Week 6 **Introduction to Year-Long Community Service-** **(Note students work on this embedded**	● What are some community agencies or social justice groups that can be supported by RPAS applications? ● How can RPAS be applied for civic duty or to improve the world?	● Research ways RPAS have supported humanity and describe impact on community. ● Identify a way to provide community service. ● Develop a plan. ● Implement a plan. ● Evaluate the plan for success and for future	● Student assignments ● Class and group participation ● Student presentations ● Project (community service) ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 1,2,4,5,6,7,8,9,12 **Cluster Standards** ST 1,2 TD 2	**ELA** 11-12.R.7,8,9 11-12.W.3,5,6,7 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.1,2 11-12.WHST.2,3,4,5,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
throughout the year)		recommendations.		**Pathway Standards** ST-ET 1,3,4 ST-SM 1,2 TD-LOG 1	**Math/Science**
Weeks 7-10 **Planning for the Future: College and Career Preparedness and Application**	● What does successful life after high school include? ● What do I want my future to look like? ● What college or career are of interest? ● How are applications for college or a specific job position completed? ● What documents are needed for application for college or job position? ● What is financial stability and why is it important to have a real-life budget?	● Identify research and apply to at least four colleges of choice as applicable. ● Understand the FAFSA application process as applicable. ● Demonstrate financial knowledge about after-school budgets including rent, auto costs, food, etc. ● Write a college essay for submission as applicable. ● Request letters of recommendation ● Understand the job application process. ● Find job boards and postings related to their area of interest. ● Complete job positions applications as applicable. ● Create a realistic budget that can be used post-high school. ● Use NYS and IRS tax table information.	● College essay submittal ● College research assignment ● Job posting assignment ● Real-world budget in MS Excel that includes post-high school estimates ● Virtual job shadow assignments ● Post high school plan	**Career Ready Practices** CRP 1,3,4,10 **Cluster Standards** ST 5 **Pathway Standards**	**ELA** 11-12.R.2 11-12.W.1,2,3,5,6,7 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.2,7 11-12.WHST.1,2,3,4,5,6,7 **Math/Science**
Weeks 11-13 **Student Led Project: Project Planning**	● What am I interested in doing to further my learning and show my proficiency? ● What need or problem does this project solve?	● Explain what a good project plan looks like (objective, problem statement). ● Identify a problem and explain the process to answer or address it. ● Outline the functional requirements of a project plan.	● Student assignments ● Class and group participation ● Student presentations ● Project (student led-business/product or service) ● Teacher observation ● Student self-reflection	**Career Ready Practices** CRP 1,2,4,6,7,8,9,11,12 **Cluster Standards** ST 1,3,6 TD 1,2,3, **Pathway Standards** ST-ET 3,	**ELA** 11-12.W.1 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.WHST.1 **Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	● What are the different components of a complete project plan? ● How do the project plan components relate to each other? ● Why is each one critical to the overall project?	● Examine the importance of project planning. ● Define the objective. ● Define the problem statement. ● Design a feasible study project. ● Identify stakeholders and their function.	● Quizzes and exams	ST-SM 2 TD-LOG 1 TD-SAL 1 TD-OPS 1,2,3	
Week 14 **Personal Portfolio and Employability Profile** **Completion of Any Outstanding Certifications.**	● How might my personal goals need to be revised? ● What new goals do I have? ● How do my talents, skills and interests relate to RPAS? ● What updates can be added to resume, employability profile, and professional portfolio? ● What purpose and role do professional certifications serve?	● Evaluate goals for the first semester. ● Create goals for the second semester. ● Reflect and analyze how personal talents, skills and interests are changing and relate to this field. ● Evaluate current progress on employability profile. ● Synthesize learning experiences to update resume and professional portfolio. ● Complete any outstanding certifications (FEMA, Adobe, Microsoft).	● Student assignments ● Class and group participation ● Student presentations ● Project (student goals, profile, portfolio, resume) ● Teacher observation ● Student self-reflection ● Quizzes and Exams ● Certifications	**Career Ready Practices** CRP 1,2,4,6,7,8,9,11,12 **Cluster Standards** ST 4,5 **Pathway Standards** ST-SM 3	**ELA** 11-12.W.2,3 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.WHST.3,4 **Math/Science**
Weeks 15-30 **Project Implementation**	● How is a project started? ● What are the steps in implementing a successful project? ● Why is this plan/idea needed- what problem does it solve? ● What other similar businesses or services are in the same region?	● Describe steps for successful RPAS project completion. ● Analyze other businesses or services offering similar products or services. ● Develop a business or service plan including budget and marketing plans. ● Create a logo and other related materials for branding. ● Acquire and coordinate project resources.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and Exams	**Career Ready Practices** CRP 1,2,4,6,7,8,9,11,12 **Cluster Standards** ST 1,2,3 TD 1,2,3,4,5 **Pathway Standards** ST-ET 1,2,3,5,6,	**ELA** 11-12.R.7 11-12.W.2,3,6,7 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.7,8,9 11-12.WHST.2,3,4,5,6,7 **Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	● What are the advantages and disadvantages of the plan? ● How is a budget developed? ● How is a marketing plan developed? ● How is a business or service branded? ● How are data and resources acquired for a project? ● What deliverables are necessary to complete the project?	● Demonstrate safe and responsible use of equipment (drone). ● Demonstrate ability to safely plan and implement flight/mission. ● Demonstrate ability to take aerial photos or videos. ● Demonstrate skills in post-production editing. ● Apply special effects as applicable. ● Demonstrate use of mapping tools and applications and other technology to implement the project and plan. ● Apply photos and videos to tell the story of the business/service. ● Demonstrate use of coding and 3D printing as applicable. ● Demonstrate completion of the project (revising plan as needed).		ST-SM 1,2,4 TD-LOG 1,2, TD-SAL 1,2 TD-OPS 1,2,3	
Weeks 31-33 **Project Results and Reporting**	● What makes a successful project? ● What are suggestions for revisions? ● What contributed to success?	● Develop a written report that covers the entire project including planning, implementation, results and future recommendations. ● Develop an oral presentation explaining results. ● Evaluate project and determine success points and aspects to revise.	● Student assignments ● Class and group participation ● Student presentations ● Project ● Teacher observation ● Student self-reflection ● Quizzes and exams	**Career Ready Practices** CRP 1,2,4,6,7,8,9,11,12	**ELA** 11-12.W.2,3,5,6,7 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6
				Cluster Standards ST 1,2,3 TD 3	**Literacy** 11-12.RST.7,8,9 11-12.WHST.2,3,4,5,6,**7**
				Pathway Standards ST-ET 1,2,3,5,6, ST-SM 1,2,4	**Math/Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
				TD-LOG 2 TD-OPS 2	
Weeks 34-36 **Review RPAS Commercial Applications**	• How are unmanned aerial systems used in agriculture? • What are the advantages of precision agriculture? • How are RPAS used in emergency situations? • What laws dictate when and how a RPAS can be used for emergencies? • What industries use RPAS for inspections? • Why are RPAS valuable to insurance and inspection industries? • How has RPAS changed the photography and videography business? • What are emerging fields for applications of RPAS? • What are new applications of RPAS?	• Define precision farming. • Describe a farmer's use of RPAS. • Explain the techniques used with an RPAS to increase agricultural production and efficiency. • Explain the application of RPAS in emergency situations. • Explain the laws surrounding emergency services use of RPAS. • Identify industries that use RPAS for inspection. • Describe the benefits of RPAS for insurance inspection. • Evaluate the cost of replacing tasks with a RPAS. • Describe indoor and outdoor operations of RPAS. • Describe how RPAS has been used in photography and videography businesses. • Describe new applications for RPAS (new article weekly for the past 4 years). • Evaluate where new developments for RPAS use may occur.	• Student assignments • Class and group participation • Student presentations • Teacher observation • Student self-reflection • Quizzes and exams	**Career Ready Practices** CRP 1,2,11,12 **Cluster Standards** ST 1,2,5,6 GV 4 TD 2 **Pathway Standards** ST-SM 1,2,5,6 ST-ET 2,3,4 GV-GOV 2	**ELA** 11-12.R.1,2 11-12.W.2,5,6,7 11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.RST.2 11-12.WHST.2,3,4,5,6,7 **Math/Science**
Weeks 37-40				**Career Ready Practices**	**ELA** 11-12.W.2,3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Personal Reflection	● What personal goals have been accomplished? ● How has personal vision evolved? ● How do current talents, skills, and accomplishments support vision and goals? ● How are accomplishments reflected on a resume, employability profile and professional portfolio?	● Articulate accomplishments and goals. ● Analyze previous learning goals to determine future learning needs. ● Evaluate personal accomplishments and goals. ● Refine and update resume, employability profile and professional portfolio. ● Demonstrate success on Part 107 pilot exam.	● Student assignments ● Class and group participation ● Student presentations ● Project (Professional Portfolio) ● Teacher observation ● Student self-reflection ● Quizzes and exam ● Part 107 Certification for commercial applications	CRP 1,4,10 **Cluster Standards** ST4,5 **Pathway Standards** ST-SM 3	11-12.SL.1,4,5,6 11-12.L.1,2,3,4,6 **Literacy** 11-12.WHST.3,4 **Math/Science**