

Syracuse City School District
Career and Technical Education Programs
Course Syllabus
P-TECH RPAS 100: Remote Pilot Aerial Systems 100



Course Description

Students will develop critical and analytical thinking, troubleshooting and problem solving skills through hands-on activities in this project-based curriculum. This course will introduce students to the fundamentals of Remote Pilot Aerial Systems. Through hands on experience, students will learn the basics of electricity, programming, hardware, and physics. This course will give students a general overview of the Remote Pilot Aerial Systems sequence. Students will have the opportunity to earn integrated math, ELA and college credits upon successful completion of the program.

Course Objectives

1. Students will understand basic robotics and programming and apply them to given challenges.
2. Students will understand basic flight planning within the FAA regulations.
3. Students will understand weather that allow unmanned aviation systems to fly.
4. Students will know the career pathways available to RPAS technology.

Integrated Academics

N/A

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% Homework
- 25% Quiz
- 50% Projects

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.

Quizzes will be given throughout the exploratory weeks.
Unexcused absences on quizzes days will count as a zero.

Additional Course Policies

Students are required to follow all safety procedures.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none">• What is Remote Pilot Aerial Systems technology?• Careers• Technical Communication• Robotics
2	<ul style="list-style-type: none">• Weather• Geography/Navigation• Crew Management
3	<ul style="list-style-type: none">• Flight Planning• FAA Operations• Remote Pilot Aerial Systems Components
4	<ul style="list-style-type: none">• Aircraft Performance• RPAS Laws• Programming

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
RPAS 100: Unmanned Aerial Systems Technology 100



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy, Math, Science
Week 1 Course Expectations and Grading Introduction to RPAS Technology	<ul style="list-style-type: none"> What is RPAS technology? What are RPAS applications and related technology? 	<ul style="list-style-type: none"> Define RPAS and FAA List applications of RPAS in various industries Describe selected RPAS technologies 	<ul style="list-style-type: none"> Research on RPAS applications Written assignment on RPAS applications with sources PowerPoint Activity PowerPoint Presentations “Drones Take Off” – reading and response papers 	Career Ready Practices CRP 4,7,10,11	Literacy RST.9-10.1,4,7 WHST9-10.7,8
				Cluster Standards TD 1.2; ST 3,4,5	ELA RI.9-10.1 W.9-10.1,2,3,6 SL.9-10.4,5
				Pathway Standards ST-SM 1,2	Math
				Industry Standards	Science (NGSS)
Week 2 Career Opportunities	<ul style="list-style-type: none"> What career opportunities are available in drone/RPAS technology? What education is required to work in an RPAS related career? 	<ul style="list-style-type: none"> 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 a RPAS career 	<ul style="list-style-type: none"> Student research on drone/RPAS technology careers Career Search Presentations-Rubric-graded Monday “Ted Talks” videos and reaction summaries 	Career Ready Practices CRP 4,7,10,11	Literacy RST.9-10.1,4,7 WHST.9-10.7,8
				Cluster Standards TD 6.1;6.2 GV 5.2 ST 3,4,5	ELA RI.9-10.1 W.9-10.2,3 SL.9-10.1,4,5
				Pathway Standards ST-SM 3 ST-ET 6	Math
				Industry Standards	Science (NGSS)
Week 3-4 Technical Communication	<ul style="list-style-type: none"> How do engineers communicate? What is the engineering design process? What is a patent and what evidence/information is used to secure a patent? 	<ul style="list-style-type: none"> Develop and maintain a technical journal for robotics utilizing the vocabulary of the career area Describe the engineering design process Students will be able to use lettering and sketching to communicate clearly 	<ul style="list-style-type: none"> Daily reflective writing assignments Technical journal assessments-Rubric graded Vocabulary quiz Monday “Ted Talks” videos and reaction summaries FEMA: IS-242.B: Effective Communication 	Career Ready Practices CRP2,4,8,7,10,11	Literacy RST.9-10.1,4,7 WHST.9-10.7,8
				Cluster Standards TD 6	ELA W.9-10.2,3 SL.9-10.1
				Pathway Standards TD-MTN 1.2	Math
				Industry Standards	Science (NGSS)

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy, Math, Science
Week 5-9 Robotics/ Mechanics	<ul style="list-style-type: none"> • What mechanisms are used to move automated systems? • How is energy manipulated? 	<ul style="list-style-type: none"> • Describe the mechanisms used to move automated systems • Calculate mechanical advantages and gear ratios for given systems • Solve a given problem through the development of an autonomous and driver controlled robot 	<ul style="list-style-type: none"> • Daily reflective writing assignments • Technical journal assessment-Rubric graded • Robotics engineering challenge • Monday “Ted Talks” videos and reaction summaries • Quiz on gear ratios 	Career Ready Practices CRP 2,6,8	Literacy RST.9-10.1,4,7 WHST.9-10.7,8
				Cluster Standards ST 1,2,4,6	ELA W.9-10.2,3 SL.9-10.1
				Pathway Standards ST-SM 1,2, ST-ET 1,2,3,4,5,	Math
				Industry Standards	Science (NGSS)
Week 10-11 Introduction to Programming	<ul style="list-style-type: none"> • How does programming control our machines? • How do machines understand directions? 	<ul style="list-style-type: none"> • Understand the logic and sequence in programming • Discussion on programming controlling our machines • Write systematic directions • Locate errors in programs 	<ul style="list-style-type: none"> • Daily reflective writing assignments • Technical journal Assessment-Rubric graded • Rubric Graded Interview on engineering design process • Marked up programming of robot designs • Programming Challenge Project • Monday “Ted Talks” videos and reaction summaries 	Career Ready Practices CRP 2,6,8	Literacy RST.9-10.1,4,7 WHST.9-10.7,8
				Cluster Standards ST 1,2,4,6	ELA W.9-10.2,3 SL.9-10.1
				Pathway Standards ST-SM 1,2, ST-ET 1,2,3,4,5,	Math
				Industry Standards	Science (NGSS)
Week 12 Weather Basics	<ul style="list-style-type: none"> • How does weather form? • How does weather affect RPAS operations? 	<ul style="list-style-type: none"> • Examine the causes of a variety of weather phenomenon • Explain the effects of weather on RPAS flight and operation 	<ul style="list-style-type: none"> • Daily reflective writing assignments • Summative robotics reflection essay • Weather station packets • Reading and response assignments • Monday “Ted Talks” videos and reaction summaries 	Career Ready Practices CRP 2,5,11	Literacy RST.9-10.1,4,7
				Cluster Standards ST 1,2,4,6	ELA RI.9-10.1 W.9-10.2,3 SL.9-10.1
				Pathway Standards ST-SM 3	Math
				Industry Standards	Science (NGSS)
Week 13-15	<ul style="list-style-type: none"> • How do natural 	<ul style="list-style-type: none"> • Describe how natural 	<ul style="list-style-type: none"> • Summative exam 	Career Ready Practices CRP 2,5,11	Literacy RST.9-10.1,4,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy, Math, Science
Geography/ Navigation	<ul style="list-style-type: none"> formations affect flight? What information can be gathered by RPAS about geographic data? 	<ul style="list-style-type: none"> formations affect flight Plan navigation from given geographic data 	<ul style="list-style-type: none"> Rubric evaluated project-PowerPoint Activity Monday “Ted Talks” videos and reaction summaries 		
				Cluster Standards ST 1,2,4,6	ELA W.9-10.2 SL.9-10.1
				Pathway Standards ST-SM 3	Math
				Industry Standards	Science (NGSS)
Week 16-18 Crew Resource management Introduction to Portfolios	<ul style="list-style-type: none"> What roles are needed for a successful RPAS mission? What are the responsibilities of the PIC and VO? 	<ul style="list-style-type: none"> Discuss the roles and responsibilities of the RPAS crew Create a plan/strategy to foster leadership and continuous self-improvement Act on the responsibilities of assigned roles 	<ul style="list-style-type: none"> Daily reflective writing assignments Students create a rubric/guide to self-assess their behavior Student log of time spent acting in the different RPAS roles Planning and organizing the career portfolio Initial portfolio entries Monday “Ted Talks” videos and reaction summaries 	Career Ready Practices CRP 1,3,9,12	Literacy RST.9-10.1,4,7 WHST.9-10.7,8
				Cluster Standards ST 1,2,4,6 GV 2	ELA W.9-10.2,3
				Pathway Standards ST-ET 1,3,4	Math
				Industry Standards	Science (NGSS)
Week 19-21 Flight Planning	<ul style="list-style-type: none"> 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? 	<ul style="list-style-type: none"> Create a pre-flight checklist that covers needed role assignment and aircraft inspection Create and be able to practice in-flight emergency procedures 	<ul style="list-style-type: none"> Rubric based evaluation of student-created pre-flight checklist Rubric rated analysis of in-flight emergency procedures Monday “Ted Talks” videos and reaction summaries 	Career Ready Practices CRP 1,3,4,9,12	Literacy RST.9-10.1,4,7 WHST.9-10.7,8
				Cluster Standards GV 3 ST 1,2,4,6	ELA W.9-10.2,3
				Pathway Standards ST-ET 1,3,4	Math
				Industry Standards	Science (NGSS)
Week 22-25 FAA Operations	<ul style="list-style-type: none"> Who is the FAA? What are the classifications of FAA 	<ul style="list-style-type: none"> Detail the role of the FAA Explain FAA regulations about airspace as it governs RPAS 	<ul style="list-style-type: none"> Daily reflective writing assignments Summative exam 	Career Ready Practices CRP 1,3,9,12	Literacy RST.9-10.1,4,7 WHST.9-10.7,8

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy, Math, Science
	<p>Airspace?</p> <ul style="list-style-type: none"> What are the operation requirements within FAA controlled Airspace? 	<ul style="list-style-type: none"> Cite regulations for each classification of airspace Decipher Notices to Airmen (NOTAMs) 	<ul style="list-style-type: none"> Create flight plans for areas detailing rationale given NOTAMs and identification of airspace classifications Monday "Ted Talks" videos and reaction summaries 	<p>Cluster Standards GV 1,2</p> <p>Pathway Standards ST-ET 1,3,4 GV-GOV 2</p> <p>Industry Standards</p>	<p>ELA W.9-10.2,3</p> <p>Math</p> <p>Science (NGSS)</p>
<p>Week 26-32</p> <p>Electromechanical</p>	<ul style="list-style-type: none"> What components are used in an RPAS? How are the mechanical components controlled in an RPAS? 	<ul style="list-style-type: none"> Identify the components in an RPAS Diagram the parts of an RPAS and detail how they interact Distinguish the functional differences between a fixed wing and a multi-copter design and operation 	<ul style="list-style-type: none"> Daily reflective writing assignments Summative assignment Rubric graded project Monday "Ted Talks" videos and reaction summaries 	<p>Career Ready Practices CRP 2,6,8</p> <p>Cluster Standards ST 1,3,6</p> <p>Pathway Standards ST-ET 1,3,4</p> <p>Industry Standards</p>	<p>Literacy</p> <p>ELA W.9-10.2,3</p> <p>Math</p> <p>Science (NGSS)</p>
<p>Week 33-35</p> <p>Aircraft Performance</p>	<ul style="list-style-type: none"> What affects aircraft performance? What affects the PIC's performance? 	<ul style="list-style-type: none"> Explain the environmental factors that affect aircraft performance Describe the human factors that increase, or decrease aircraft performance 	<ul style="list-style-type: none"> Daily reflective writing assignments Rubric evaluated presentation FAA study guide reading Monday "Ted Talks" videos and reaction summaries 	<p>Career Ready Practices CRP 2, 6, 8</p> <p>Cluster Standards ST 1,3,6</p> <p>Pathway Standards ST-ET 1,3,4</p> <p>Industry Standards</p>	<p>Literacy RST.9-10.1,4,7 WHST.9-10.7,8</p> <p>ELA RI.9-10.1 W.9-10.3</p> <p>Math</p> <p>Science (NGSS)</p>
<p>Week 35-40</p> <p>RPAS Ethics</p>	<ul style="list-style-type: none"> What are the ethical concerns with RPAS applications? What are the potential mal-uses of RPAS technology? 	<ul style="list-style-type: none"> Discuss current events and debate the ethics of various RPAS applications Distinguish between ethical and unethical decision-making and state possible outcomes 	<ul style="list-style-type: none"> Daily reflective writing assignments Students present in-class debate News Article Submission/ Discussions 	<p>Career Ready Practices CRP 1,2,4,5,8,9</p> <p>Cluster Standards GV 1,2 ST 1,3,6</p>	<p>Literacy RST.9-10.1,4,7 WHST.9-10.7,8</p> <p>ELA RI.9-10.1,8 W.9-10.2,3 SL.9-10.1,4,5</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy, Math, Science
	<ul style="list-style-type: none"> How might unethical practices harm individuals/society and negatively impact the use of drones/RPAS? 	for society	<ul style="list-style-type: none"> Monday "Ted Talks" videos and reaction summaries 	Pathway Standards ST-ET 1,3,4 GV-GOV 2,3,4 Industry Standards	Math Science (NGSS)

Syracuse City School District
Career and Technical Educational Programs
Course Syllabus
P-TECH RPAS 200: Remote Pilot Aerial Systems 200



Course Description

This course will continue students' study of Remote Pilot Aerial Systems. Through hands on experience, students will learn the basics CADD, GIS, and FAA weather notifications. This course will give students a background in design, navigations, and alert interpretations. Students will have the opportunity to earn integrated math, ELA and college credits upon successful completion of the program.

Course Objectives

1. Students will understand basic sketching and CADD.
2. Students will understand how to read and produce a map.
3. Students will understand the abbreviations used in METARs, NOTAMs, and TAFs.
4. Students will understand aeronautical decision making.

Integrated Academics

N/A

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%	Homework
25%	Quiz
50%	Projects

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.

Quizzes will be given throughout the exploratory weeks. Unexcused absences on quizzes days will count as a zero.

Additional Course Policies

Students are required to follow all safety procedures.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none">• Sketching• 2D CADD
2	<ul style="list-style-type: none">• 3D CADD• Assembly Drawings
3	<ul style="list-style-type: none">• Map Reading• GIS
4	<ul style="list-style-type: none">• Weather and climate notifications• METAR, NOTAM, and TAF reading

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
RPAS 200: Remotely Piloted Aviation Systems 200



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
Weeks 1-3 Sketching	<ul style="list-style-type: none"> How do we visually communicate ideas with accuracy? How can 3D space be seen in 2D space? 	<ul style="list-style-type: none"> Show objects using a variety of standard views Illustrate relationships between parts and whole objects Create depth to show 3D space in sketching Label sketches for clear communication 	<ul style="list-style-type: none"> TED Talks and Reflections on Mondays Sketch challenges Revisit/continuation of portfolios – Drafting entries 	Career Ready Practices CRP 2,4,6,8	Literacy
				Cluster Standards ST 1,6	ELA
				Pathway Standards ST-SM 2 ST-ET 1,2,4	Math G-GMD.4 G-MG.1 G-MG.3
				Industry Standards	Science (NGSS)
Weeks 4-5 Introduction to Computer-Aided Drafting & Design (CADD)	<ul style="list-style-type: none"> What is CADD? How do you create shapes and lines in CADD? 	<ul style="list-style-type: none"> Create shapes and lines in CADD Create a title block Identify the necessary file types and explain their uses 	<ul style="list-style-type: none"> CADD Applications Produce title block TED Talks and Reflections on Mondays 	Career Ready Practices CRP 2,4,6,8,11	Literacy
				Cluster Standards ST 1,6	ELA W.9-10.2
				Pathway Standards ST-SM 2 ST-ET 1,2,4	Math G-GMD.4 G-MG.1 G-MG.3
				Industry Standards	Science (NGSS)
Weeks 6-10 2-Dimensional Drawings	<ul style="list-style-type: none"> What tools are available in CADD? How does the CADD tools assist drawing work? 	<ul style="list-style-type: none"> Use a variety of tools to create specific drawings Determine when to use tools for more efficient drawings 	<ul style="list-style-type: none"> 2D drawing challenges to replicate example or produce drawings from given object Rubric Graded drafting Portfolio TED Talks and Reflections on 	Career Ready Practices CRP 2,4,6,8,11	Literacy
				Cluster Standards ST 1,2,6	ELA W.9-10.2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
			Mondays	Pathway Standards ST-SM 2 ST-ET 1,2,4	Math G-GMD.4 G-MG.1 G-MG.3
				Industry Standards	Science (NGSS)
Weeks 11-15 3-Dimensional Drawings	<ul style="list-style-type: none"> • What is the z-axis? • Can you describe some of the advantages of using 3D images? • How do we work in 3D? 	<ul style="list-style-type: none"> • Create 3D images of designed product • Render objects to create appearance of materials 	<ul style="list-style-type: none"> • 2D drawing project challenges to replicate example or produce drawings from given object • Rubric Graded drafting Portfolio • TED Talks and Reflections on Mondays • Reflective journal entries 	Career Ready Practices CRP 2,4,6,8,11	Literacy
				Cluster Standards ST 1,2,6	ELA W.9-10.2,3
				Pathway Standards ST-SM 2 ST-ET 1,2,4	Math G-GMD.4 G-MG.1 G-MG.3
				Industry Standards	Science (NGSS)
Weeks 16-20 Assembly	<ul style="list-style-type: none"> • How do we create parts of a whole? • How are parts shown in relation to each other? 	<ul style="list-style-type: none"> • Create assemblies using constraints • Create explosion views of products 	<ul style="list-style-type: none"> • Reverse engineering challenge • Rubric graded portfolio • TED Talks and Reflections on Mondays • Reflective journal entries 	Career Ready Practices CRP 2,4,6,8,11	Literacy WHST.9-10.2
				Cluster Standards ST 1,2,6	ELA W.9-10.2,3
				Pathway Standards ST-SM 2 ST-ET 1,2,4	Math G-GMD.4 G-MG.1 G-MG.3
				Industry Standards	Science (NGSS)
Week 21 Map Reading Basics	<ul style="list-style-type: none"> • What ways do maps provide information to the user? • How do map reading skills relate to flight planning? 	<ul style="list-style-type: none"> • Plan a route between given points on a map • Describe the location of a point on a map using latitude and longitude 	<ul style="list-style-type: none"> • Flight plan creation • Navigation/GIS lab Field trip • Reading and interpreting symbols • TED Talks and Reflections on Mondays • Reflective journal entries 	Career Ready Practices CRP 2,4,7,11	Literacy RST.9-10.1,4,7 WHST.9-10.2,4,6,7,9
				Cluster Standards ST 2,4,6 GV 1,3,4 TD 2,4,5,6	ELA W.9-10.2,3
				Pathway Standards ST-ET 1,2,3,5	Math

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
				Industry Standards	Science (NGSS)
Weeks 22-23 Symbolism and Flight Maps	<ul style="list-style-type: none"> What information can we get from a navigation/Flight map? How can symbols further define the information on a map? 	<ul style="list-style-type: none"> Explain the symbols on a flight map Make flight decisions based on given maps and symbols 	<ul style="list-style-type: none"> Map reading Test Flight plan assessment Navigation/GIS Lab Field trip TED Talks and Reflections on Mondays 	Career Ready Practices CRP 2,4,7,11	Literacy RST.9-10.1,4,7
				Cluster Standards ST 2,4,5,6 GV 1,3,4 TD 2,4,5,6	ELA W.9-10.2
				Pathway Standards ST-ET 1,2,3,5	Math
				Industry Standards	Science (NGSS)
Weeks 24-34 Geographic Information System (GIS) Basics	<ul style="list-style-type: none"> What is GIS? How are RPAS applied within GIS? 	<ul style="list-style-type: none"> Define GIS and discuss how it is used in the RPAS field Create an accurate map with details captured by aerial imagery 	<ul style="list-style-type: none"> Application of GIS principles to create a sample map Map creation using student-gathered data Mapping field trip lab TED Talks and Reflections on Mondays 	Career Ready Practices CRP 2,4,7,11	Literacy RST.9-10.14,7
				Cluster Standards ST 2,4,5,6 TD 2,4,5,6	ELA RI.9-10.1 W.9-10.2
				Pathway Standards ST-ET 1,2,3,5	Math
				Industry Standards	Science (NGSS)
Week 35 Weather and Climate Effects on Flight Path Creation	<ul style="list-style-type: none"> Why does weather occur? How does weather affect RPAS operations? 	<ul style="list-style-type: none"> Identify cumuliform, stratiform, and standing lenticular auto cumulous clouds Make decisions for flight planning based on given weather information 	<ul style="list-style-type: none"> Flight path decisions and creation based on weather conditions Weather report section of flight log TED Talks and Reflections on Mondays 	Career Ready Practices CRP 2,4,7,11	Literacy RST.9-10.1,2,7 WHST.9-10.2,4,6,7,9
				Cluster Standards ST 2,4,5,6	ELA RI.9-10.1 W.9-10.2,3
				Pathway Standards ST-SM 1,2,3 ST-ET 1,2,3,5	Math N-Q.3
				Industry Standards	Science (NGSS)

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
Weeks 36-37 Meteorological Aerodrome Report (METAR)s, NOTAMs and Terminal Aerodrome Forecast (TAF)s	<ul style="list-style-type: none"> How are weather and weather advisories communicated? 	<ul style="list-style-type: none"> Make decisions for flight planning based on given METARs (Meteorological Aerodrome Report), TAFs (Terminal Aerodrome Forecast), and NOTAMS (Notice to Airmen) Describe the weather presented in a METAR 	<ul style="list-style-type: none"> Decode METARs and TAFs on exam and when making pre-flight decisions Weather report section of flight log-continued Give flight recommendations based on METARs, TAFs, and NOTAMs TED Talks and Reflections on Mondays 	Career Ready Practices CRP 2,4,7,11	Literacy RST.9-10.4,7
				Cluster Standards ST2,4,5,6	ELA RI.9-10.1 W.9-10.3 SL.9-10.1,4
				Pathway Standards ST-SM 1,2,3 ST-ET 1,2,3,5	Math N-Q.3
				Industry Standards	Science (NGSS)
Weeks 38-40 Critical Thinking, Problem Solving & Decision Making	<ul style="list-style-type: none"> What are the hazards and risks of RPAS? How do people influence the risks associated with RPAS flights? 	<ul style="list-style-type: none"> Assess risks in presented scenarios and in-field practice Describe how to mitigate risks Use a pre-flight checklist to assess risks Vision and flight 	<ul style="list-style-type: none"> Presentation on risk management Reading and Interpreting FEMA guides: <ul style="list-style-type: none"> FEMA: IS-240: Leadership and Influence FEMA: IS-241.B Decision Making and Problem Solving FEMA: IS-454: Fundamentals of Risk Management 	Career Ready Practices CRP 2,3,4,7,11	Literacy RST.9-10.1,2,7 WHST.9-10.2,4,6,7
				Cluster Standards ST 2,4,5,6 TD 2,4,5,6	ELA RI.9-10.1 W.9-10.1,2,3,6 SL.9-10.4,5
				Pathway Standards TD-LOG 1,2 TD-OPS 1,3	Math
				Industry Standards	Science (NGSS)

Syracuse City School District
Career Technical Education Programs
Course Syllabus
P-TECH RPAS 300: Remote Pilot Aerial Systems 300



Course Description

This course will continue students' study of Remote Pilot Aerial Systems. This course will focus on aerial imagery and FAA part 107 exam prep. Students will learn photography, videography, physics, and general airport operations. Students will have the opportunity to earn integrated math, ELA and college credits upon successful completion of the program.

Course Objectives

1. Students will understand basic photography and videography.
2. Students will understand how chemicals affect the human body and its ability to operate a RPAS.
3. Students will understand physics of flight, signal transmission, and basic electronics.
4. Students will understand airport operations and its effects on UAS operations.

Integrated Academics

N/A

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%	Homework
25%	Quiz
50%	Projects

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.

Quizzes will be given throughout the exploratory weeks.
Unexcused absences on quizzes days will count as a zero.

Additional Course Policies

Students are required to follow all safety procedures.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none">• Lights, lenses, and optics• Image manipulation• Video production
2	<ul style="list-style-type: none">• Composite video• Physiology and flight• Physics of flight
3	<ul style="list-style-type: none">• Waves• Electronics• Airport operations
4	<ul style="list-style-type: none">• Final Remote Pilot's license review

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
RPAS 300: Remotely Piloted Aviation Systems 300



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
Weeks 1-2 Lenses, Light, and Optics	<ul style="list-style-type: none"> • How are images captured? • How does the device influence the image captured? • What information is gathered by RPAS 	<ul style="list-style-type: none"> • Explain the impact of lenses on the image capture process • Judge the use of different equipment for a variety of applications and explain the rationale for each 	<ul style="list-style-type: none"> • Research and presentation on lenses and there applications • Presentations on RPAS data/information collection • Technical journal vocabulary 	Career Ready Practices CRP 2,4,7,11	Literacy RST.11-12.1,2,7 WHST.11-12.2,4,6,7,9
				Cluster Standards ST 2,4	ELA RI.11-12.1 W.11-12.2,3,5 SL.11-12.1,6
				Pathway Standards ST-SM 1,2,3	Math
				Industry Standards	Science (NGSS)
Week 3 Raster VS Vector	<ul style="list-style-type: none"> • What makes up an image? • What are different file types used and what does that mean? 	<ul style="list-style-type: none"> • Distinguish the differences between raster and vector images • Select the type of image file to use in different situations • Manage files utilizing folder structure, filing naming, and correct file types 	<ul style="list-style-type: none"> • Quiz • Using correct file types for media image projects • File management activities • Technical vocabulary 	Career Ready Practices CRP 2,4,7,11	Literacy WHST.11-12.2,4
				Cluster Standards ST 2,4	ELA
				Pathway Standards ST-SM 1,2,3	Math
				Industry Standards	Science
Weeks 4-7 Introduction to Adobe Photoshop	<ul style="list-style-type: none"> • How can images be manipulated? • What is the process of photo stitching? • How do views change with this process? • How is Adobe Photoshop used to 	<ul style="list-style-type: none"> • Read and interpret technical information to follow a sequence of steps for manipulating images • Create new images from existing images • Recommend an order of operation to create an image 	<ul style="list-style-type: none"> • Rubric-graded photo manipulation • Photo-stitching projects • Photo critiquing activities 	Career Ready Practices CRP 2,4,7,8,11	Literacy RST.11-12.3,4
				Cluster Standards ST 2,4	ELA
				Pathway Standards ST-ET 2	Math

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
	manipulate images?	<ul style="list-style-type: none"> Critique photo manipulations 		Industry Standards	Science
Weeks 8-10 Working in Video Layers and Editing	<ul style="list-style-type: none"> What are video file types and how are the types determined? In what ways can video be edited? 	<ul style="list-style-type: none"> Describe the application of given video file types Read and follow directions to create a video using trimming, titles, and AV layers 	<ul style="list-style-type: none"> Rubric- graded video production Rubric-graded videos communicating information gathered through RPAS operations 	Career Ready Practices CRP 2,4,7,11	Literacy RST.11-12.3,4
				Cluster Standards ST 2,4	ELA SL.11-12.1
				Pathway Standards ST-ET 2	Math
				Industry Standards	Science
Weeks 11-15 Special FX	<ul style="list-style-type: none"> How can special FX be applied to RPAS applications? What are video layers? How can video layers be blended? 	<ul style="list-style-type: none"> Understand and apply process to create a video utilizing, chroma key, key frames, and scale/rotation Bring in files to overlay on video for communicating information 	<ul style="list-style-type: none"> Rubric-graded video production Technical journal writing 	Career Ready Practices CRP 2,4,7,11	Literacy RST.11-12.3,4
				Cluster Standards ST 2,4	ELA W.11-12.2
				Pathway Standards ST-ET 2	Math
				Industry Standards	Science
Week 16 Physiology and Flight	<ul style="list-style-type: none"> How is one's physical ability related to flight safety? Can you identify physical conditions that might influence flight safety? When is it not safe to fly? 	<ul style="list-style-type: none"> Discuss the effects of drugs on a person's decision making Identify and describe the effects of sleep and physiology on flight Describe correlations between being physically compromised on safety, financial costs and costs to RPAS applications 	<ul style="list-style-type: none"> Research papers and graded presentation on compromised physical abilities Quiz on drugs and physiology 	Career Ready Practices CRP 1,2,3,12	Literacy WHST.11-12.2,4
				Cluster Standards ST 3,5	ELA RI.11-12.1 W.11-12.2,3,5 SL.11-12.5,6
				Pathway Standards ST-SM 1,2 ST-ET 1,5	Math
				Industry Standards	Science (NGSS)

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
Weeks 17-20 Physics of Flight	<ul style="list-style-type: none"> • What factors increase an aerial system's ability to fly? • What affects the way an RPAS flies? • What information can you gather to support you're your predictions about increasing an RPAS ability to fly? 	<ul style="list-style-type: none"> • Explain the Bernoulli's principle and its effects on flight • Define drag and the effects on flight • Use a given chart to recommend RPAS loading and angle of attack 	<ul style="list-style-type: none"> • Quiz on aerodynamics and lift • Technical journal writings 	Career Ready Practices CRP 2	Literacy WHST.11-12.2,4
				Cluster Standards ST 2,5,6	ELA W.11-12.2
				Pathway Standards ST-SM 1,2 ST-ET 1,5	Math G-SRT.6 G-SRT.8 A-CED.1 A-REI.6
				Industry Standards	Science (NGSS)
Week 21 Waves	<ul style="list-style-type: none"> • What are waves and what are their parts? • How are signals sent through different media? 	<ul style="list-style-type: none"> • Identify the parts of waves • Explain how waves interact with each other • Identify types of waves • Summarize the way signals are sent through various media 	<ul style="list-style-type: none"> • Quiz on waves 	Career Ready Practices CRP 2	Literacy
				Cluster Standards ST 6	ELA
				Pathway Standards ST-SM 1,2 ST-ET 1,5	Math A-CED.1
				Industry Standards	Science (NGSS)
Weeks 22-24 Electronics	<ul style="list-style-type: none"> • What is electricity? • How do different configurations of components affect the control of electricity? 	<ul style="list-style-type: none"> • Describe the relationship between volts, amps, and ohms • Create circuits to perform given tasks based on required voltage, current, and resistance 	<ul style="list-style-type: none"> • Electric circuit design challenges – Group projects • Quiz on ohm's law 	Career Ready Practices CRP 2	Literacy RST.11-12.3,4
				Cluster Standards ST 6	ELA
				Pathway Standards ST-SM 1,2 ST-ET 1,5	Math A-CED.1
				Industry Standards	Science (NGSS)
Weeks 25-27 Airport Operation	<ul style="list-style-type: none"> • How do airports work? • What are the types of airports? 	<ul style="list-style-type: none"> • Describe flight patterns around airports • Define the types of airports 	<ul style="list-style-type: none"> • Rubric-graded presentation on airports • Quiz 	Career Ready Practices CRP 1,2,4,11	Literacy RST.11-12.3,4 WHST.11-12.2,4

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
		and how the airspace around them operates	<ul style="list-style-type: none"> Jigsaw activities on airport operations 	Cluster Standards ST 3,4,6 GV 3 Pathway Standards GV-MGT 1 Industry Standards	ELA RI.11-12.1 SL.11-12.4 Math Science (NGSS)
Weeks 28-30 Review Airspace Classifications and Flight Restrictions	<ul style="list-style-type: none"> How are airports classified, and how does that affect RPAS usage? How are flight restrictions communicated? 	<ul style="list-style-type: none"> Read and interpret air charts to determine restrictions and landmarks Explain how airport flight patterns operate 	<ul style="list-style-type: none"> Quiz on chart reading, NOTAMs, METARS, and TAFs 	Career Ready Practices CRP 1,2,4,11 Cluster Standards ST 3,4,6 GV 3 Pathway Standards GV-MGT 1 Industry Standards	Literacy RST.11-12.4 ELA Math Science (NGSS)
Week 31 Review Aviation Weather	<ul style="list-style-type: none"> How does weather form? Can you identify the different types of clouds and the weather conditions they indicate? 	<ul style="list-style-type: none"> Identify clouds and weather from both ground and satellites views Explain the causes of weather 	<ul style="list-style-type: none"> Exam on weather and its relation to METARS 	Career Ready Practices CRP 1,2,4,11 Cluster Standards ST 3 Pathway Standards ST-SM 2,3 ST-ET 5 Industry Standards	Literacy RST.11-12.4 ELA Math Science (NGSS)
Week 32 Review Weather/Geography Effects on Flight	<ul style="list-style-type: none"> How do mountainous regions affect flight? What are the indicators of poor flying weather? 	<ul style="list-style-type: none"> Explain the effects of geography on wind and weather Make choices about flight based on current and predicted weather 	<ul style="list-style-type: none"> Rubric graded presentation on given weather situations 	Career Ready Practices CRP 1,2,4,11 Cluster Standards ST 3 Pathway Standards ST-SM 2,3 ST-ET 5	Literacy RST.11-12.4 ELA RI.11-12.1 W.11-12.2 SL.11-12.4 Math

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
				Industry Standards	Science (NGSS)
Week 33 Review Craft Loading and Physics	<ul style="list-style-type: none"> How are end effectors attached to a flying system? Why is load important in aircraft performance? 	<ul style="list-style-type: none"> Read and interpret charts to determine G-forces on a turning aircraft Explain how load impacts aircraft performance 	<ul style="list-style-type: none"> Exam on flight physics 	Career Ready Practices CRP 1,2	Literacy
				Cluster Standards ST 6	ELA
				Pathway Standards ST-SM 2,3 ST-ET 5	Math A-REI.6
				Industry Standards	Science (NGSS)
Weeks 34-35 Review Emergency Procedures and Risk Management	<ul style="list-style-type: none"> How are risks managed? What steps can be taken to mitigate risks? 	<ul style="list-style-type: none"> Define and explain the "PAVE" checklist Explain ways to assess and mitigate risks 	<ul style="list-style-type: none"> Exam on risk management Demonstrate use of PAVE checklist during flight operations 	Career Ready Practices CRP1,2,4,11	Literacy RST.11-12.4
				Cluster Standards ST-3,6	ELA SL.11-12.1
				Pathway Standards ST-SM 2,3 ST-ET 6	Math
				Industry Standards	Science (NGSS)
Weeks 35-38 Review Human Factors	<ul style="list-style-type: none"> How does a team work together to fly a mission? What impacts a person's ability to operate? 	<ul style="list-style-type: none"> Explain the principle of Crew Resource Management Define and explain the 3P model Explain how drugs, emotion, and human physiology impact the ability make decisions 	<ul style="list-style-type: none"> Demonstrate crew resource management in flight operations Create presentation to be shared with younger RPAS students on the effects of drugs, emotions, and human physiology 	Career Ready Practices CRP 1,2,4,11	Literacy RST.11-12.2
				Cluster Standards ST 3,6	ELA SL.11-12.1,5,6
				Pathway Standards ST-SM 2,3 ST-ET 6	Math
				Industry Standards	Science (NGSS)
Weeks 38-40 Chose Applications of RPAS	<ul style="list-style-type: none"> What industries use RPAS and HOW? 	<ul style="list-style-type: none"> Distinguish RPAS applications and their related industries Pass the FAA Exam for Remote Pilot License 	<ul style="list-style-type: none"> Students will research applications of RPAS in current and upcoming industries Student-chosen research 	Career Ready Practices CRP1,2,4,11	Literacy RST.11-12.1,4
				Cluster Standards ST6	ELA RI.11-12.1

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
Final Review for License Exam FAA Exam for Remote Pilot License			presentation on RPAS applications	Pathway Standards	Math
				Industry Standards	Science (NGSS)

Syracuse City School District
Career and Technical Education Programs
Course Syllabus
P-TECH RPAS 400: Remote Pilot Aerial Systems 400



Course Description

This course is the final in the 4-year sequence on Remote Pilot Aerial Systems. Through hands-on, project-based experiences, students will continue to apply critical thinking and problem-solving skills while expanding GIS knowledge. They will explore a range of GIS applications, including agriculture, emergency services, insurance and inspection, photography and videography. Students will perform research on emerging technologies and applications, and with instructor guidance, select and complete independent projects. Students will also have the opportunity to earn integrated math, ELA and college credits upon successful completion of the program.

Course Objectives

1. Students will understand how to use ArcMap and their own aerial images to generate their own maps.
2. Students will understand the current state of RPAS in agriculture, emergency services, inspection, and imagery.
3. Students will propose and develop their own solutions to RPAS technology or engineering problems.

Integrated Academics

N/A

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%	Homework
25%	Quiz
50%	Projects

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. Quizzes will be given throughout the exploratory weeks. Unexcused absences on quizzes days will count as a zero.

Additional Course Policies

Students are required to follow all safety procedures.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none">• GIS and ArcMap• Georeferencing images
2	<ul style="list-style-type: none">• RPAS applications in agriculture• RPAS Applications in Emergency Services• RPAS Applications in Inspection• RPAS Applications in photo and videography
3	<ul style="list-style-type: none">• Research in emerging technologies and applications• Introduction to RPAS independent project• Development of draft proposals
4	<ul style="list-style-type: none">• Final Project proposal• Project development• Project presentation

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



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
Weeks 1-10 Advanced GIS and Arcmap	<ul style="list-style-type: none"> How do we use our aerial images to create informative maps? What is georeferencing? 	<ul style="list-style-type: none"> Import a raster image into arcgis Understand the process of georeferencing Create a georeferenced image from self-taken imagery 	<ul style="list-style-type: none"> Rubric graded georeferenced image Projects to integrate RPAS images with ArcMap 	Career Ready Practices CRP 2,11	Literacy WHST.11-12.6
				Cluster Standards ST 1,2,5,6	ELA
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3	Math
				Industry Standards	Science (NGSS)
Weeks 11-13 RPAS Applications in Agriculture	<ul style="list-style-type: none"> How are unmanned aerial systems used in agriculture? What are the advantages of precision agriculture? 	<ul style="list-style-type: none"> Define precision farming Evaluate a farmer's use of RPAS Explain the techniques used with an RPAS to increase agricultural production/efficiency 	<ul style="list-style-type: none"> Design an unmanned aerial system to aid in precision agriculture Rubric-graded presentation on students' designs 	Career Ready Practices CRP 2,11	Literacy RST.11-12.4,7,9 WHST.11-12.2,4,6
				Cluster Standards ST 1,2,5,6	ELA RI.11-12.1 W.11-12.2 SL.11-12.4
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3	Math
				Industry Standards	Science (NGSS)
Weeks 14-16 RPAS Applications in Emergency Services	<ul style="list-style-type: none"> How are RPAS used in emergency situations? What laws dictate when and how a RPAS can be used for emergencies? 	<ul style="list-style-type: none"> Explain the application of RPAS in emergency situations Research the laws surrounding emergency services use of RPAS Students will judge the 	<ul style="list-style-type: none"> Presentation on RPAS application in emergency services Class debate on RPAS usage 	Career Ready Practices CRP 2,11	Literacy RST.11-12.4,7,9 WHST.11-12.2,4,6
				Cluster Standards ST 1,2,5,6	ELA RI.11-12.1,8 W.11-12.2 SL.11-12.1,3,4,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
		use of RPAS in EMS		Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3	Math
				Industry Standards	Science (NGSS)
Week 17 RPAS Applications in insurance and inspection	<ul style="list-style-type: none"> • What industries use RPAS for inspection? • Why are RPAS valuable to insurance and inspection industries? 	<ul style="list-style-type: none"> • Identify the industries that use RPAS for inspection • Describe the benefits on RPAS for insurance inspection • Evaluate the costs of replacing tasks with a RPAS • Describe indoor and outdoor operations of RPAS 	<ul style="list-style-type: none"> • Students will plan indoor and outdoor operations of RPAS • Create a proposal to a company for the use of RPAS in their operations (infrastructure, construction, etc.) 	Career Ready Practices CRP 2,11	Literacy RST.11-12.4,7,9 WHST.11-12.2,4,6
				Cluster Standards ST 1,2,5,6	ELA RI.11-12.1 W.11-12.2
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3	Math
				Industry Standards	Science (NGSS)
Weeks 18-19 RPAS Applications in photo and videography	<ul style="list-style-type: none"> • How has RPAS changed the photography and videography business? 	<ul style="list-style-type: none"> • Understand how RPAS has been used in photography and videography businesses 	<ul style="list-style-type: none"> • Create a mock business for video or photography – students will be graded on presentation of mock businesses 	Career Ready Practices CRP 2,11	Literacy RST.11-12.4,7,9 WHST.11-12.2,4,6
				Cluster Standards ST 1,2,5,6	ELA RI.11-12.1 SL.11-12.1, 6
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3	Math
				Industry Standards	Science (NGSS)
Week 20 RPAS Applications Independent Project	<ul style="list-style-type: none"> • What are the emerging fields for applications of RPAS? 	<ul style="list-style-type: none"> • Research the newest applications of RPAS • Develop a new or improved use or component for RPAS 	<ul style="list-style-type: none"> • Rubric-graded presentation • Progress checks 	Career Ready Practices CRP 2,11	Literacy RST.11-12.1,4,9,10 WHST.11-12.4,5,6,8
				Cluster Standards ST 1,2,5,6	ELA RI.11-12.1 W.11-12.2 SL.11-12.1, 6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3,4	Math
				Industry Standards	Science (NGSS)
Weeks 21-25 Research and Proposal	<ul style="list-style-type: none"> What are new applications of RPAS? 	<ul style="list-style-type: none"> Research new developments in RPAS Develop proposal for independent student project 	<ul style="list-style-type: none"> Progress checks Proposal submission 	Career Ready Practices CRP 2,11	Literacy RST.11-12.1,4,9,10 WHST.11-12.4,5,6,8
				Cluster Standards ST 1,2,5,6	ELA RI.11-12.1 W.11-12.2
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3,4	Math
				Industry Standards	Science (NGSS)
Week 26 Proposal Resubmit	<ul style="list-style-type: none"> What revisions are necessary for your proposal? What resources will you need for your selected project? 	<ul style="list-style-type: none"> Finalize student project proposals 	<ul style="list-style-type: none"> Final proposal submission 	Career Ready Practices CRP 2,11	Literacy RST.11-12.1,4,9,10 WHST.11-12.4,5,6,8
				Cluster Standards ST 1,2,5,6	ELA W.11-12.2
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3,4	Math
				Industry Standards	Science (NGSS)
Weeks 27-35 Final Project	<ul style="list-style-type: none"> Based on your research, how have Unmanned Ariel Services evolved over 	<ul style="list-style-type: none"> Research/develop a use/application for RPAS? Develop an end-effector 	<ul style="list-style-type: none"> Rubric graded presentation Progress check 	Career Ready Practices CRP 2,11	Literacy RST.11-12.1,4,9,10 WHST.11-12.4,5,6,8

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCLS Literacy Math, Science
Development	time? <ul style="list-style-type: none"> What new technologies have been developed and how have they been applied? 	for an RPAS		Cluster Standards ST 1,2,5,6	ELA RI.11-12.1 SL.11-12.4,5,6
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3,4	Math
				Industry Standards	Science (NGSS)
Weeks 36-38 Presentation Development and Public Speaking	<ul style="list-style-type: none"> How can you develop an informative speech? What are the parts of effective speeches? What do you need to know about your target audience? 	<ul style="list-style-type: none"> Present to an professional audience Develop a presentation sharing students' research 	<ul style="list-style-type: none"> Practice speech Progress check 	Career Ready Practices CRP 2,11	Literacy RST.11-12.1,4,9,10 WHST.11-12.4,5,6,8
				Cluster Standards ST 2,6	ELA SL.11-12.4,5,6
				Pathway Standards ST-SM 1,2,5,6 ST-ET 2,3,4	Math
				Industry Standards	Science (NGSS)
Weeks 39-40 Final Presentations	<ul style="list-style-type: none"> Have you prepared adequately for your final project presentation? Is it developed based on your target audience? Have you practiced, and does it meet the time requirement? 	<ul style="list-style-type: none"> Present to a professional panel Presentation sharing students' research 	<ul style="list-style-type: none"> Rubric graded presentation Graded by volunteer industry judges 	Career Ready Practices CRP 2,11	Literacy RST.11-12.1,4,9,10 WHST.11-12.4,5,6,8
				Cluster Standards ST 2,6	ELA SL.11-12.4,5,6
				Pathway Standards ST-SM 3 ST-ET 1,2,4	Math
				Industry Standards	Science (NGSS)