



CTE Approval Self-Study Report

P-Tech Mechanical Technology

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Self-study

Self-study is the first step in the career and technical education approval process. The self-study review is required for all existing programs and new programs seeking approval. Its purpose is to bring together partners to review the CTE program, propose relevant modifications, and evaluate the degree to which the program meets the policy requirements approved by the Board of Regents on February 6, 2001.

Self-study review will include:

Curriculum review

Benchmarks for student performance and student assessment

Teacher certification and highly-qualified status of instructional staff

Work-based learning opportunities

Teacher and student schedules

Resources, including staff, facilities, and equipment

Accessibility for all students

Work skills employability profile

Professional development plans

Projected number of students to be served

Source: <http://www.p12.nysed.gov/cte/ctepolicy/guide.html>

Mechanical Engineers

Quick Facts: Mechanical Engineers	
2021 Median Pay	\$95,300 per year \$45.82 per hour
Typical Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2021	284,900
Job Outlook, 2021-31	2% (slower than average)
Employment Change, 2021-31	6,400

What Mechanical Engineers Do

Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers design, develop, build, and test mechanical and thermal sensors and devices, including tools, engines, and machines.

Work Environment

Mechanical engineers generally work in offices. They may occasionally visit worksites where a problem or piece of equipment needs their personal attention. Mechanical engineers work mostly in engineering services, research and development, and manufacturing.

How to Become a Mechanical Engineer

Mechanical engineers typically need a bachelor’s degree in mechanical engineering or mechanical engineering technology. All states and the District of Columbia require mechanical engineers who sell services to the public to be licensed.

Pay

The median annual wage for mechanical engineers was \$95,300 in May 2021.

Related Occupations

Occupational Title	SOC Code	Employment, 2021	Projected Employment, 2031	Change, 2014-24	
				Percent	Numeric
Mechanical engineering technicians	17-3027	41,700	42,600	2	900
Drafters	17-3010	192,200	185,500	-3	-6,700
Architectural and engineering managers	11-9041	191,100	195,500	2	4,400
Materials engineers	17-2131	22,100	23,400	6	1,300

Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2016-17 Edition, Mechanical Engineers, on the Internet at <https://www.bls.gov/ooh/architecture-and-engineering/mechanical-engineers.htm> (visited September 8, 2022)

A. Curriculum Review

The curriculum review is a step in the self-study process. It is an opportunity for members of the self-study team to evaluate the proposed curriculum for completeness in terms of the knowledge, skills, and competencies required in the program field. The team reviews the curriculum to ensure that course content in the career and technical education program meets State Education Department regulations, contributes to achievement of state and industry standards, and prepares students for successful completion of a technical assessment. Approved curriculum content is nonduplicative, challenging, organized along a continuum of difficulty, and free of bias.

CTE program approval does not constitute Department approval or endorsement of proprietary curriculum or related curriculum products. Program approval indicates only that a school district or BOCES has provided the Department with assurances that the curriculum review has been completed.

Process

- The school district or BOCES identifies the faculty members and other individuals who will be involved in conducting the curriculum review
- The school district or BOCES determines the procedures used in completing the curriculum review
- Reviewers confirm that CTE program content aligns with state CDOS standards, relevant state academic standards, and related business and industry standards
- Reviewers confirm that CTE program content includes integrated or specialized units of credit
- Reviewers confirm that the CTE program meets unit of credit and other distributive requirements
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Documentation

Documentation of the curriculum review is maintained by the school district or BOCES and is updated whenever modifications are made to the approved CTE program. Recommendations from curricular review should be included in the self-study report and reviewed by the external committee.

Resources

New York State graduation requirements

<http://www.emsc.nysed.gov/part100/pages/1005.html>

Source: <http://www.p12.nysed.gov/cte/ctepolicy/guide.html>



P-TECH Mechanical Technology

Behind the scenes, behind the machines, behind the technology you use every day – there's a mechanical technician inventing, reinventing and perfecting the machines that enable our modern lives.

As a student in the Mechanical Technology program at The Institute of Technology at Central, you'll learn about the latest technological advancements in computer drafting, computer-aided design and manufacturing.

In addition, you'll gain hands-on experience using computer software to analyze and design mechanical systems and automated manufacturing systems.

With this experience, you'll have the basis to create, build and shape the way we live for generations to come.

CAREER OPPORTUNITIES:

Mechanical Engineer, Drafter, Mechanical Technician, Machinist/Tool and Die Maker

Syracuse City School District
Career and Technical Education Program
Course Syllabus
MET100: Mechanical Technology 100



Program Overview

The PTECH Mechanical Technology program provides students with the opportunity to learn the fundamentals of engineering toward the goal of earning college credits and an Associate's degree in Mechanical Technology from Onondaga Community College. Students in the Mechanical Technology program will gain hands-on experience in using measuring tools, simple machines, machine tools, and computer software to analyze and design mechanical systems. Students will explore and utilize the latest technological advancements in computer drafting, computer-aided design and automated manufacturing. Student will learn techniques for data collection and analysis, and the process of failure analysis. Students will also learn about the importance of ethical conduct and will develop the critical and analytical thinking, troubleshooting and problem-solving skills necessary for success in the engineering field. Students will explore the different career pathways available within the field of Mechanical Technology and have the opportunity to apply and enhance their skills through multiple work-based experiences.

Course Description

This course will provide an overview of various aspects of the engineering profession. Students will explore different careers, learn more about pathways to selected engineering careers and begin to develop foundational skills in professional and ethical responsibilities. Students will learn fundamental math and science concepts, practical engineering tools, engineering design and the basics of CAD and CAM, air conditioning and refrigeration. Through various work-based experiences, they will learn about the education and licensing requirements, roles and responsibilities, regulatory agencies and work settings for various career pathways within the engineering field. Students will work collaboratively as part of a team to create, problem-solve and present projects that address authentic issues in the community and will learn and apply standard engineering nomenclature within the context of their projects. Professionalism, critical thinking and problem-solving skills, and accurate and appropriate oral and written communication will be emphasized.

Work-Based Learning

Students will be connected with working mechanical engineering professionals through field trips, job shadowing and Career Coaching, leading to opportunities for direct job training and real-world experiences. 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

N/A

Course Objectives

By the end of this course, students will:

- identify and understand the major disciplines in the engineering field and associated pathways to becoming educated and licensed.
- apply math and science concepts to the engineering profession.
- learn basic design processes for application to assigned projects.
- identify ethical and professional roles and responsibilities in the engineering profession.
- learn and apply basic skills in technical drawing and design, CAD, and use of practical engineering tools.
- understand the concepts of materials and fabrication in the manufacturing process.
- understand motion and simple machines.
- learn basic concepts of mechanical and electrical engineering.
- apply teamwork, communication skills research practices to assigned projects.

Integrated Academics

N/A

Equipment and Supplies

- **School will provide:** Computer hardware and software, all necessary instruments and equipment
- **Student will provide:** Necessary school supplies

Textbook
TBD

Grading

Quarters 1 and 2	Quarters 3 and 4
<ul style="list-style-type: none">• Homework, Quizzes 25%• Tests, Reports, Projects 25%• Technical Drawings 25%• Professionalism 25%	<ul style="list-style-type: none">• Homework, Quizzes, Tests 20%• Technical Writing, Projects 20%• Data Analysis Application 20%• Research Papers 20%• Professionalism 20%

Additional Course Policies

- Meet all deadlines and be on time. Meeting deadlines and being on time are a major part of being a professional.
- Produce your best work, including being prepared for presentations.
- Participate in class, including contributing to discussions and critiquing your own and others' work, as well as diligently working on your own projects.
- Seek help when needed.
- Be attentive, ask questions if you do not understand something, and offer your opinions.
- Use provided software platforms for preparing and sharing all work.
- Give credit and use proper citations for all research and project ideas.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none">• Introduction to the Program, the School, and the Future• Introduction to Technology and Engineering• The Engineering Design Process• Design and Modeling
2	<ul style="list-style-type: none">• Measurement Tools and Techniques• Manufacturing Engineering• Math and Science Connections
3	<ul style="list-style-type: none">• Materials and Fabrications• Mechanical Engineering• Electrical Engineering• Electronics
4	<ul style="list-style-type: none">• Air Conditioning and Refrigeration• The Engineering Team• Final Class Project• Course Wrap-Up and Evaluation

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
MET 100: Mechanical Technology 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 Introduction to the Program, the School, and the Future	<ul style="list-style-type: none"> What is the ultimate goal of this CTE program? What are the expectations for the CTE Mechanical Technology classroom and lab? How will students be successful in school and in the CTE program? How can students use technology appropriately and effectively? How will students keep themselves and others safe? What is the district's Code of Conduct? What supports are available to students in the classroom, lab, school, and district? What do respect and leadership mean? 	<ul style="list-style-type: none"> Explain the goals and expectations of the 4-year high school Mechanical Technology program. Summarize classroom procedures and expectations. Explain and follow classroom rules and procedures. State and apply safety rules and procedures for the class and school. Describe the Code of Conduct and where to reference it. Identify classroom, lab, school, and district supports and resources. Demonstrate classroom respect and leadership. 	<ul style="list-style-type: none"> Community Building Activities Safety Quiz Compliance with Procedures Posters with Presentations: Respect and Leadership 	Career Ready Practices CRP 1,2,4,7,10,11	ELA 9-10R 1,2,4 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 4	Literacy 9-10RST 1,2,4 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 2	Math Science
Weeks 3-4 Introduction to Technology and Engineering	<ul style="list-style-type: none"> What is the definition of engineering? What are the connections between science, technology, engineering, and mathematics? What are some early examples of engineering and great engineering achievements of the past century? How do major engineering activities compare? 	<ul style="list-style-type: none"> Define engineering. Describe how engineering has affected the world in the past and the present. Identify several early examples of engineering. Evaluate great engineering achievements of the past century. Compare and contrast the major engineering activities. 	<ul style="list-style-type: none"> Engineering Terms Quiz Research Paper: Engineering Achievements of the Past Research Assignment: Benefits of the Engineering Profession Student-Developed Questions for Guest Speaker 	Career Ready Practices CRP 1,2,4,7,8,10,11	ELA 9-10R 1,2,4 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 4	Literacy 9-10RST 1,2,4 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 2	Math Science HS-ETS1-2 HS-ETS1-3
Weeks 5-7 The Engineering Design Process	<ul style="list-style-type: none"> What is meant by the engineering design process? What are the common design process steps? What are the constraints to engineering design? 	<ul style="list-style-type: none"> Outline and describe the engineering design process. List steps in common design process. Identify engineering problems and opportunities. 	<ul style="list-style-type: none"> Design Project Presentations Quiz, Test PBL Project 	Career Ready Practices CRP 1,2,4,7,8,11,12	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 1,2,6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7

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
	<ul style="list-style-type: none"> How can old products or buildings be updated to include new engineering ideas and achievements? 	<ul style="list-style-type: none"> Describe the rationale for detailed documentation. Explain design constraints. Identify types of research involved in developing a project. 		Pathway Standards ST-ET 2,5	Math G SRT 5,6,8 G-MG-1,3 G-GMD.4 N-Q.1 Science HS-ETS1-2 HS-ETS1-3
Weeks 8-10 Design and Modeling	<ul style="list-style-type: none"> Why is sketching an important part of engineering? What are the different types of lines used in engineering drawings? How are the most common views, perspectives and drawing types of engineered objects used today? What are the types and uses of theoretical models? What are the methods of generating three-dimensional models? What are the purposes and features of a prototype? 	<ul style="list-style-type: none"> Identify the sketching skills and techniques used by engineers. Recognize the different types of lines in engineering drawings. Examine the methods of generating three-dimensional models. Generate and describe three dimensional views. Compare and explain the types of theoretical models and their uses. Explain prototyping and rapid prototyping. 	<ul style="list-style-type: none"> Design Project with Sketches, Drawings, and Prototyping Quizzes Project Completion and Assessment 	Career Ready Practices CRP 1,2,4,8	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,3,4 ST-SM 4	Math G SRT 5,6,8 G SRT 5,6,8 G-GMD.4 N-Q.1 S-IC.4 Science HS-ETS1-2 HS-ETS1-3 HS-ETS1-4
Weeks 11-12 Measurement Tools and Techniques	<ul style="list-style-type: none"> What are standard measuring tools? How are measuring devices used? What is tolerance and how is it checked? What is scaling? 	<ul style="list-style-type: none"> Identify standard measuring tools. Demonstrate correct use of tools to measure components. Define geometric tolerance. Analyze dimensions from a drawing and check components. Determine where to locate drawing scale from a print. 	<ul style="list-style-type: none"> Quiz: Application of Measurement Terminology Drawing Dimensions Assessment Performance Assessment: Use of Measuring Tools 	Career Ready Practices CRP 1,2,4,7,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 4,6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-SM 1,4	Math G-MG.1,3 N-Q.3 S-IC.4 Science
Weeks 13-16 Manufacturing Engineering	<ul style="list-style-type: none"> What is rapid prototyping? What are the four basic types of manufacturing? What is quality control? What is computer-aided manufacturing? What is computer-integrated manufacturing? 	<ul style="list-style-type: none"> Explain the benefits of rapid prototyping. Identify four types of manufacturing systems and explain the benefits of each. Explain how quality control in manufacturing has evolved. Compare and contrast the roles of computer-aided and computer-integrated manufacturing. 	<ul style="list-style-type: none"> Terminology Quiz Packaging Challenge Quality Analysis Exercise 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards MN 6 ST 1,6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3,4,5	Math S-IC.1,4,6 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
	<ul style="list-style-type: none"> Why is packaging important to a manufacturer? 	<ul style="list-style-type: none"> Analyze the role of packaging in the manufacturing process. 			HS-ETS1-4
Weeks 17-19 Math and Science Connections	<ul style="list-style-type: none"> Why are math and science important in engineering tasks? How do engineers use mathematics to measure energy savings and construction costs? What is the impact of nature on engineering design? What types of energy should engineers be able to evaluate? 	<ul style="list-style-type: none"> Explain why math and science are important to the daily tasks of engineers in all disciplines. Describe the concept of a normal distribution and two ways in which this concept can be applied in engineering. Describe three levels of mathematics used by engineers. Describe how probability and statistics affect the choices applied to engineering designs. List applications of geometry and trigonometry in engineering. Identify three main physics topics of interest to engineers. Describe how engineers work within four fields of science. 	<ul style="list-style-type: none"> Written Summary Discovery Project 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 4	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-SM 1,4	Math A-CED.4 S-ID.4
					Science HS- ESS2-1 HS-PS3-1
Weeks 20-22 Materials and Fabrications	<ul style="list-style-type: none"> What are the characteristics and classifications of natural and synthetic materials? How do engineers choose materials for a project? How are the strengths of materials established? How does the development of new materials affect the techniques used to fabricate various objects and structures? 	<ul style="list-style-type: none"> Identify the characteristics used to classify and group both natural and synthetic materials. Evaluate how engineers choose materials for a project. Describe how the strength of a material can be established. Compare and contrast manufacturing and construction. Analyze how fabrication techniques affect the design process. 	<ul style="list-style-type: none"> Assessment of Material Types Using Various Testing Procedures Terminology Exam Team Competition PBL Project 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards MN 6 ST 1,2,3	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2	Math A-CED.4 N-Q.1
					Science HS-ETS1-2 HS-ETS1-3 HS-PS2-6
Weeks 23-25 Mechanical Engineering	<ul style="list-style-type: none"> What are Newton's laws of motion? What are the laws of thermodynamics? What is the difference between hydraulics and pneumatics? What is a simple machine? What are the six simple machines? What are the different types of motion? 	<ul style="list-style-type: none"> Summarize Newton's three laws of motion. Evaluate the laws of thermodynamics. Compare and contrast hydraulics and pneumatics. Describe and explain the six simple machines. Identify five different types of motion. Analyze the purpose of basic mechanisms. 	<ul style="list-style-type: none"> Task Analysis: Engineering Steps Needed for the Development of a Selected Product Research Report: Product Using Simple Machines Mechanical Terminology Quiz 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards MN 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3,5	Math
					Science HS-PS2-1 HS-PS3-1 HS-PS3-2

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
Weeks 26-27 Electrical Engineering	<ul style="list-style-type: none"> What is required for licensing of electrical engineers? How is electricity measured and what terms are used in measuring electricity? How is electricity generated? What is the difference between direct and alternating current? 	<ul style="list-style-type: none"> Describe specialty and licensing options of electrical engineers. Identify at least four measurements (and their units of measure) that are critical to electrical and electronics engineers. Describe several ways energy is used to create electricity. Compare direct current and alternating current. 	<ul style="list-style-type: none"> Simple Generator Construction Electrical Terminology Quiz Performance Test: Calculating and Measuring Volts, Ohms, Amps 	Career Ready Practices CRP 1,2,4,6,8,11,12	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 2,5	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 5 ST-SM 1,2,3,4	Math A-CED.2,4 Science HS-PS3-6 HS-PS3-1 HS-PS3-2
Weeks 28-30 Electronics	<ul style="list-style-type: none"> What is electronics engineering and what are the licensing requirements for electronics engineers? What is Ohms Law? What type of equipment and components are used in electronics? What is a capacitor? 	<ul style="list-style-type: none"> Explain electronics engineering, educational and licensing requirements. Explain Ohm's Law. Analyze the effect of digital electronics and integrated circuits. Describe the relationship between electrical potential (voltage), rate of flow (current), and resistance in an electric circuit, according to Ohm's law. 	<ul style="list-style-type: none"> Task Analysis: Engineering Steps Needed for the Development of a Selected Product Terminology Quiz Reading Schematic Drawings Assessment 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 3 ST-SM 1,4	Math A-CED.2,4 Science HS-PS3-6
Weeks 31-33 Air Conditioning and Refrigeration	<ul style="list-style-type: none"> What is air-conditioning and refrigeration? What is latent heat? What is sensible heat? What are conduction, convection and radiation? What is pressure? 	<ul style="list-style-type: none"> Compare and contrast air-conditioning and refrigeration. Explain latent heat. Explain sensible heat. Analyze the difference between conduction, convection and radiation. Explain pressure and the effects of pressure. 	<ul style="list-style-type: none"> Terminology quiz Lab Practical 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 2,6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 2,3	Math Science HS-PS1-9 HS-PS3-3
Weeks 34-35 The Engineering Team	<ul style="list-style-type: none"> What other professions are involved with engineers? What are the ways in which engineers communicate? Why is communication an integral part of engineering? 	<ul style="list-style-type: none"> Identify the professionals and team members who work with engineers. Describe communication skills engineers must develop to work successfully with others. Examine the additional safety, information technology, cultural, and 	<ul style="list-style-type: none"> Research and Presentations: Professional Qualities Used in the Field of Engineering 	Career Ready Practices CRP 1,2,4,7,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 5	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards	Math

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
		business skills that are important to the engineer's professional life. <ul style="list-style-type: none"> Analyze the need to diversify the engineering workforce. 		ST-ET 2,3	Science HS-ETS1-2 HS-ETS1-3
Weeks 36-39 Final Class Project	<ul style="list-style-type: none"> How can I apply what I know in a final project? 	<ul style="list-style-type: none"> Apply all aspects of the design process to a final project. Evaluate peer projects and provide growth-producing feedback. 	<ul style="list-style-type: none"> Final Project with Peer and Instructor Rubrics 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 2,3,6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2,4,5	Math G-SRT.5,6,8 5G-MG.1,3 G-GMD.4 N-Q.1 S-IC.1,4,6 Science HS-ETS1-2 HS-ETS1-3
Week 40 Course Wrap-Up and Evaluation	<ul style="list-style-type: none"> How can I apply what I know in a final project? What have I learned? 	<ul style="list-style-type: none"> Apply engineering knowledge and principles to a topic as a final project. Review for final exam. 	<ul style="list-style-type: none"> Final Exam 	Career Ready Practices CRP 1,2,4,6,7,8,11,12	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST1,2,3,6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2,3	Math Science

Syracuse City School District
Career and Technical Education Program
Course Syllabus
MET 200: Mechanical Technology 200



Program Overview

The PTECH Mechanical Technology program provides students with the opportunity to learn the fundamentals of engineering toward the goal of earning college credits and an Associate's degree in Mechanical Technology from Onondaga Community College. Students in the Mechanical Technology program will gain hands-on experience in using measuring tools, simple machines, machine tools, and computer software to analyze and design mechanical systems. Students will explore and utilize the latest technological advancements in computer drafting, computer-aided design and automated manufacturing. Student will learn techniques for data collection and analysis, and the process of failure analysis. Students will also learn about the importance of ethical conduct and will develop the critical and analytical thinking, troubleshooting and problem-solving skills necessary for success in the engineering field. Students will explore the different career pathways available within the field of Mechanical Technology and have the opportunity to apply and enhance their skills through multiple work-based experiences.

Course Description

In this course, students will continue to work on the engineering concepts, practices and projects introduced in MET 100 and will explore various aspects of the engineering profession. Students will gain additional knowledge about potential career pathways to selected engineering roles. They will work to further develop skills in professional and ethical responsibilities and behaviors. Through their enrollment in MET 150: Introduction to Engineering, students will be introduced to more advanced skills in technical drawing, the use of practical engineering tools, engineering design, CAD, data collection and analysis methods. Students will learn and apply concepts and skills of the fundamentals of electricity, electrical circuits and input/output devices, drive systems and hydraulics. Through various work-based experiences, students will continue to study education and licensing requirements, roles and responsibilities, regulatory agencies and work settings for various career pathways within the engineering field. Students will work collaboratively as part of a team to create, problem-solve and present projects that address authentic issues in the community and will learn and apply standard engineering nomenclature within the context of their projects. Professionalism, critical thinking and problem-solving skills, and accurate and appropriate oral and written communication will continue to be emphasized and developed.

Work-Based Learning

Students will be connected with working mechanical engineering professionals through field trips, job shadowing and Career Coaching, leading to opportunities for direct job training and real-world experiences. 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

MET 100

Course Objectives

By the end of the course students will:

- identify the major disciplines in the engineering field and associated pathways to becoming educated and licensed.
- identify ethical and professional roles and responsibilities of the engineering profession.
- apply teamwork, communication skills research practices to assigned projects.
- learn and apply electrical, hydraulic and drive system concepts.
- learn and apply basic skills in technical drawing and design, CAD and use of practical engineering tools.
- learn and apply data collection and elementary statistics to a variety of designs in both student-produced and industry-produced projects.

Integrated Academics

N/A

Concurrent Enrollment College Credit

Upon successful completion of MET 200, will earn 3 college credits for MET 150: Introduction to Engineering from Onondaga Community College.

Equipment and Supplies

- **School will provide:** Computer hardware and software, all necessary instruments and equipment
- **Student will provide:** Necessary school supplies

Textbook

Moaveni, S. (2019). *Fundamentals of Engineering: An Introduction to Engineering, 6th Edition*. Boston, MA: Cengage.

Grading

Quarters 1 and 2	Quarters 3 and 4
<ul style="list-style-type: none">• Homework, Quizzes 25%• Tests, Reports, Projects 25%• Technical Drawings 25%• Professionalism 25%	<ul style="list-style-type: none">• Homework, Quizzes, Tests 20%• Technical Writing, Projects 20%• Data Analysis Application 20%• Research Papers 20%• Professionalism 20%

Additional Course Policies

- Meet all deadlines and be on time. Meeting deadlines and being on time are a major part of being a professional.
- Produce your best work, including being prepared for presentations.
- Participate in class, including contributing to discussions and critiquing your own and others' work, as well as diligently working on your own projects.
- Seek help when needed.
- Be attentive, ask questions if you do not understand something, and offer your opinions.
- Use provided software platforms for preparing and sharing all work.
- Give credit and use proper citations for all research and project ideas.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none">• Introduction to Course, Classroom Practices, and Expectations: Being Successful• Roles and Responsibilities of Engineers• Engineering Careers• Use of Practical Measuring Tools• Mechanical and Electrical Engineering• Fundamentals of Electricity
2	<ul style="list-style-type: none">• Electrical Circuit Components• Input/Output Devices• Mechanical Drive Systems• Key Fasteners• Power Transmission• Spur Gears and Multiple Shaft Drives
3	<ul style="list-style-type: none">• V-Belt and Chain Drives• Introduction to Technical Drawings• Introduction to CAD (Computer Aided Drawing)• Hydraulics
4	<ul style="list-style-type: none">• Introduction to Problem Solving Failure Analysis

	<ul style="list-style-type: none">• Simple Machines• Computer Programs• Collecting and Analyzing Data, Statistics• Ethics• Final Project Presentations• Course Wrap-Up and Evaluation
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Syracuse City School District
Career and Technical Education Program
Scope and Sequence
MET 200: Mechanical Technology 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 Introduction to Course, Classroom Practices, and Expectations: Being Successful	<ul style="list-style-type: none"> What the goals and expectations of this class? How can students be successful in this course? What procedures and safety practices will be important in this class? How can students manage their time? How can students appropriately and effectively use classroom technology? 	<ul style="list-style-type: none"> Explain and follow classroom procedures. List and explain classroom rules and safety precautions and procedures. Use tools to effectively manage their time. Use tools and equipment safely and effectively. 	<ul style="list-style-type: none"> Time Management Assessment Safety Quiz Compliance with Safety Rules and Procedures 	Career Ready Practices CRP 1,2,4,7,10	ELA 9-10R 1,2,4 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 4,5	Literacy 9-10RST 1,2,4 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 2	Math Science
Week 3 Roles and Responsibilities of an Engineer	<ul style="list-style-type: none"> What are the roles and responsibilities of engineers? What are the personal attributes of successful engineers? What are the legal/ethical responsibilities for engineers? What does teamwork look like in engineering? How do U.S. companies manage engineering teams with locations overseas? 	<ul style="list-style-type: none"> Describe the tasks engineers perform. Define the duties and obligations of engineers. Describe the personal attributes to consider when pursuing an engineering career. Explain the concept of teamwork in businesses employing engineers. Determine a plan for the management of U.S. based companies with sites abroad. 	<ul style="list-style-type: none"> Questions for Guest Speaker Quiz: Roles and Responsibilities of Engineers Group Projects: Attributes Necessary for Success in Engineering Teamwork Problem Solving Activity: Strategic Plan for Collaborating with Overseas Teams 	Career Ready Practices CRP 1,2,4,8,10,12	ELA 9-10R 1,2,4,7 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 1,4,5	Literacy 9-10RST 1,2,4,7 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2	Math Science
Week 4 Engineering Careers	<ul style="list-style-type: none"> What types of engineering titles exist within the profession? What is the demand for engineers? What are the duties of an engineer? How do legal and ethical concerns impact the public? What professional organizations and memberships are available to engineers? 	<ul style="list-style-type: none"> Describe the responsibilities and duties of engineers. Explain the legal and ethical responsibilities of engineering. Identify the organizations for engineering professionals. Explain the need for policies and regulations for the profession. 	<ul style="list-style-type: none"> Research Project and Presentations: Selected Engineering Careers Field Trip to Engineering Company Written Assessment: Roles and Responsibilities in the Profession Group Activity Rubric: Legal and Ethical Responsibilities in Engineering Group Activity Rubric: Current Articles and 	Career Ready Practices CRP 1,2,4,7,10,11	ELA 9-10R 1,2,4,7 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 4,5	Literacy 9-10RST 1,2,4,7 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 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
			Research in Ethics In Engineering		
Weeks 5-6 Use of Practical Measuring Tools	<ul style="list-style-type: none"> What is the relationship between English and metric linear measurement? What tools are used for measurements in engineering? 	<ul style="list-style-type: none"> Convert English to metric linear measurement. Apply metric measurement to design models. Identify measurement tools used in mechanical and electrical engineering. 	<ul style="list-style-type: none"> Hands-On Test: Use of Measuring Instruments 	Career Ready Practices CRP 1,2,4,7,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 2,6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-SM 2	Math
					Science
Weeks 7-8 Mechanical and Electrical Engineering	<ul style="list-style-type: none"> What is a mechanical engineer? What is an electrical engineer? How do engineers impact our daily lives? What are the education and licensing requirements for mechanical and electrical engineers? Where do mechanical and electrical engineers work? 	<ul style="list-style-type: none"> Define mechanical engineering. Define electrical engineering. Describe the roles and responsibilities of mechanical and electrical engineers. Explain the education and licensing requirements for mechanical and electrical engineers. Describe the career paths for mechanical and electrical engineers. Describe the physical settings and types of companies that employ mechanical and electrical engineers. 	<ul style="list-style-type: none"> Quiz: Application of Engineering Terminology Task Analysis: Engineering Steps Needed for the Development of a Selected Product Research Paper: Mechanical/Electrical Engineering Career Paths, Education, And Degree Required Field Trip to Engineering Facility 	Career Ready Practices CRP 1,2,4,7,10,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 4,5	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-SM 3	Math
					Science
Weeks 9-10 Fundamentals of Electricity	<ul style="list-style-type: none"> What is Ohm's Law? What is magnetism? What is a resistor and how are resistors measured? What are volts, amps and resistance? What are circuits? What is electricity? What are the differences between alternating and direct current? What is engineering notation? 	<ul style="list-style-type: none"> Explain Ohm's Law. Identify volts, amps and resistance in electrical theory. Explain magnetism as it applies to electrical theory. Use a resistor color code chart. Define electricity. Explain ways in which electricity is generated, transmitted, and used. Describe the how AC and DC are different. 	<ul style="list-style-type: none"> Vocabulary of Electrical Terms Assignment Worksheets Summative Assessments Performance Evaluations Skill Sheet Assessment Quiz: Electrical Symbols 	Career Ready Practices CRP 1,2,4,7,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 4,5	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-SM 3	Math A-CED.4
					Science HS-PS 3-5 HS-PS 3-6
Weeks 11-12 Electrical Circuit Components	<ul style="list-style-type: none"> What are the basic components of an Electrical circuit? What are the types of power supplies? 	<ul style="list-style-type: none"> Describe the function of the four basic components of an electrical circuit. Describe the operation of two types of power supplies. 	<ul style="list-style-type: none"> Electrical Terminology Quiz Performance Quiz: Calculating and Measuring Volts, Ohms, Amps 	Career Ready Practices CRP 1,2,4,7,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 1	Literacy 9-10RST 1,2,4,7,8,9

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
	<ul style="list-style-type: none"> What is an electrical schematic? 	<ul style="list-style-type: none"> Draw a schematic using the symbols for circuit components. 	<ul style="list-style-type: none"> Troubleshooting a Simple Circuit 	Pathway Standards ST-ET 2,4	9-10WHST 2,5,6,7 Math A-CED.4 Science HS-PS 3-6 HS-ETS 1-2 HS-ETS 1-3
Weeks 13-14 Input/Output Devices	<ul style="list-style-type: none"> What are manual input devices? What is the meaning of NO and NC? What are three manual input devices? Why do engineers use electrical schematic drawings for manual input devices? 	<ul style="list-style-type: none"> Identify each manual input device. Explain the difference between NO and NC. Draw an electrical schematic and legend. Construct a circuit using input and output device by reading a schematic. 	<ul style="list-style-type: none"> Performance Task: Construct a Simple Circuit Troubleshooting a Simple Circuit 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 3,6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2,3	Math A-CED.4 Science HS-PS 3-6 HS-ETS 1-2 HS-ETS 1-3
Week 15 Mechanical Drive Systems	<ul style="list-style-type: none"> What is the function of a mechanical drive? What are the methods of rotary mechanical power? Why are safety rules for power transmission equipment important? When is lockout/tagout used? What methods are applied to check RPM? 	<ul style="list-style-type: none"> Explain the function of a mechanical drive. Identify the mechanical advantage of each drive system. Give an example of for each type of drive system. Explain and demonstrate a lockout/tagout procedure. Name and assemble three types of foundations. Use set-up devices. Identify and apply different fasteners in an installation. Calculate and verify RPMs. 	<ul style="list-style-type: none"> Performance Evaluations Application of Safety Rules in Practical Situations Quiz/Test Individual Projects: Constructing a Functioning Simple Machine 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 3 MN 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2,3 MN-HSE 1	Math A-CED.4 F-IF.6 Science HS-PS 3-3 HS-ETS 1-2 HS-ETS 1-3
Week 16 Key Fasteners	<ul style="list-style-type: none"> What are the different types of fasteners? What are keys and keyseats? How are shafts assembled? What are the methods of loading a mechanical drive system? What is mechanical efficiency and how is it calculated? 	<ul style="list-style-type: none"> Identify and apply different types of fasteners. Identify and give an example of keys and keyseats. Measure and cut a key from stock. Assemble a motor coupling. Calculate mechanical efficiency. 	<ul style="list-style-type: none"> Vocabulary of Fasteners Terms Assignment Lab Practicals Worksheets Unit Exam 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 3 MN 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2,3 MN-HSE 1	Math S-IC.4 A-CED.4 Science HS-PS 3-3

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
Weeks 17-18 Power Transmission	<ul style="list-style-type: none"> How are shafts specified and used in machinery and what is the purpose of shaft alignment? What is the function of a bearing and how are they loaded? What are the types and functions of couplings? 	<ul style="list-style-type: none"> Explain the function of a shaft and identify shaft sizes from samples. Categorize bearings from a sample. Install a motor shaft and bearing assembly. Recognize where and when to use a coupling. Problem-solve shaft alignment and misalignment. Demonstrate the use of measuring devices in shaft alignment. 	<ul style="list-style-type: none"> Vocabulary Assignment Worksheets Unit Exam Performance Evaluation 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 3 MN 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2,3	Math A-CED.4 F-IF.4 A-REI.6
					Science HS-ETS 1-2 HS-ETS 1-3
Weeks 19-20 Spur Gears and Multiple Shaft Drives	<ul style="list-style-type: none"> How do the three components of a gear drive system function? How are speed, torque, and ratios calculated? What is a compound gear system? How is gear rotation determined? How is a multiple shaft system aligned? What is backlash and how is it determined? 	<ul style="list-style-type: none"> Describe the three functions of a gear drive system. Calculate pitch, speed, torque, and ratios. Calculate gear pitch, circle and diameters. Define the twelve dimensions of a gear. Describe the features of a gear drive system. Diagnose and correct backlash. Calculate speed and torques in a multiple shaft system. Describe a compound gear system. 	<ul style="list-style-type: none"> Vocabulary Assignment Research Project: Application of a Gear Drive System Worksheets Unit Exam Performance Evaluation 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 3 MN 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-SM 1	Math A-REI.1 A-CED.2,4 F-IF.6 F-TF.1
					Science HS-PS2-1
Weeks 21-22 V-Belt and Chain Drives	<ul style="list-style-type: none"> What are the basic types and components of a belt and chain drive? How is a belt size determined? What is pitch? What is tension and deflection? 	<ul style="list-style-type: none"> Identify belt and chain types. Identify the basic components of a belt or chain drive system. Measure and size V-belt. 	<ul style="list-style-type: none"> Vocabulary of Belt and Chain Drives Worksheets Quizzes Unit Exam Performance Evaluation 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 3 MN 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-SM 1	Math A-REI.1 A-CED.2,4 F-IF.6 F-TF.1 N-Q.1
					Science
Weeks 23-25 Introduction to Technical Drawings	<ul style="list-style-type: none"> What is the terminology of technical drawings? 	<ul style="list-style-type: none"> List and explain the views of each drawing. 	<ul style="list-style-type: none"> Application of Terminology in Presentations and Discussions 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 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
	<ul style="list-style-type: none"> What are isometric, oblique and orthographic drawings and designs? What are basic line conventions? What is the purpose of multi-view drawings? How are geometric shapes used in technical drawings? 	<ul style="list-style-type: none"> Define isometric, oblique and orthographic as they apply to technical drawing. Explain basic line conventions. Describe uses for multi-view drawings. Apply basic drawing techniques to project design. 	<ul style="list-style-type: none"> Application of Simple Drawing Techniques to Basic Projects 	Cluster Standards ST 1	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 2,4	Math N-Q.1
					Science HS-PS3-1
Weeks 26-27 Introduction to CAD (Computer Aided Drawing)	<ul style="list-style-type: none"> What is CAD? What are some different types of CAD applications? What is important to consider in using CAD? 	<ul style="list-style-type: none"> Describe essential drawing tools in CAD. Apply CAD drawing applications to basic designs. Differentiate between CAD and other drawing tools. 	<ul style="list-style-type: none"> Quiz on Terminology Written Critique: Pros and Cons of CAD Application of CAD Software in Project Design 	Career Ready Practices CRP 1,2,4,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1	Math N-Q.1
					Science HS-PS3-1
Weeks 28-29 Hydraulics	<ul style="list-style-type: none"> What is fluid power? Why are hydraulics used? What are Pascal's laws? What is viscosity? 	<ul style="list-style-type: none"> Describe hydraulics. Explain the principles of hydraulics. List and explain the components used in a hydraulic system. Utilize the principles of Pascal's Laws. Explain viscosity. 	<ul style="list-style-type: none"> Lesson Review Sheets Component Identification Worksheet 	Career Ready Practices CRP 1,2,4,8,9	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 3	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 1,2,3	Math A-CED.4 A-REI.1 G-GMD.3,4 G-MG.2,3
					Science HS-PS2-6
Weeks 30-32 Introduction to Problem Solving Failure Analysis	<ul style="list-style-type: none"> What is the importance of problem-solving and how do engineers apply problem-solving skills? Why is failure analysis important to engineers and what is its impact? What is Rapid Root Cause Analysis (RRCA)? How is data analysis applied to failure analysis? 	<ul style="list-style-type: none"> Explain the application of problem solving to the design process. Analyze and troubleshoot designs. Analyze structural integrity. Explain why structures fail. Explain Rapid Root Cause Analysis (RRCA). Describe how data analysis is applied to failure analysis. 	<ul style="list-style-type: none"> Technical Drawings for Bridge Project Summary Report: Bridge Project 	Career Ready Practices CRP 1,2,4,7,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 1,2	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 5	Math SIC.1 SID.1.2.4.6 S-CP.1 F-LE.1
					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
					HS-ETS1-2 HS-ETS1-3
Weeks 33-34 Simple Machines	<ul style="list-style-type: none"> What are the six classic machines? How are the six machines similar and different? How can I apply what I know in a final project? 	<ul style="list-style-type: none"> Identify the six classic machines and explain their use. Distinguish similarities and differences of the six simple machines Apply collaborative and critical thinking skills to project planning and development. Develop a final project proposal. 	<ul style="list-style-type: none"> Group Projects: Construct a Functioning Simple Machine- Written Final Project Proposal 	Career Ready Practices CRP 1,2,3,4,8,9,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 2,5	Math G-SRT.6,.8 A-CED.4 Science HS-PS3-3 HS-PS2-1 HS-ETS1-2 HS-ETS1-3
Week 35 Computer Programs	<ul style="list-style-type: none"> What are the common programs used in engineering? How have programs improved today's production processes? 	<ul style="list-style-type: none"> Compare and contrast traditional technical drawing and CAD. Explain how computer engineering software aids in the production process. 	<ul style="list-style-type: none"> Application of Engineering Software in Product Design Exercises 	Career Ready Practices CRP 1,2,4,7,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 1,2	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 2,5	Math A-CED.1,4 Science HS-ETS1-2 HS-ETS1-3
Week 36 Collecting and Analyzing Data, Statistics	<ul style="list-style-type: none"> What methods of data collection are used in product and production analysis? What is Statistical Process Control (SPC) and how is it used by engineers? How is the data analyzed? 	<ul style="list-style-type: none"> Explain the importance of Statistical Process Control (SPC). Analyze product data to predict product outcomes. Compose product outcomes for sets of data. 	<ul style="list-style-type: none"> Written Report: Root Cause of Failure Through Analysis of Given Problem and Data 	Career Ready Practices CRP 1,2,4,7,8,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 1,2	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-SM 4	Math SIC.1 SID.1.2.4.6 S-CP.1 F-LE.1 Science
Week 37 Ethics	<ul style="list-style-type: none"> What are ethics? What are the ethical obligations of engineers? 	<ul style="list-style-type: none"> Explain how engineering decision are based on ethical decisions. Explain the relationship between ethical decisions and product safety. 	<ul style="list-style-type: none"> Research Paper: Ethical Impact of Product Failures 	Career Ready Practices CRP 1,2,4,9,10	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 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
	<ul style="list-style-type: none"> What are the results of non-ethical practices? 			Cluster Standards ST 3	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 6	Math
					Science HS-ETS1-1
Weeks 38-39 Final Project Presentations	<ul style="list-style-type: none"> How can I apply what I know in a final project? 	<ul style="list-style-type: none"> Apply engineering principles and knowledge to a topic as a final project. Evaluate peer projects and provide growth-producing feedback. 	<ul style="list-style-type: none"> Final Project with Peer and Instructor Rubrics 	Career Ready Practices CRP 1,2,4,7,8,9,11	ELA
				Cluster Standards ST 6	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Pathway Standards ST-ET 5	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
					Math
					Science HS-ETS1-2 HS-ETS1-3
Week 40 Course Wrap-Up and Evaluation	<ul style="list-style-type: none"> How can I apply what I know in a final project? What have I learned? 	<ul style="list-style-type: none"> Apply engineering principles and knowledge to a final project topic. Review for final exam. 	<ul style="list-style-type: none"> Final Exam 	Career Ready Practices CRP 1,2,4,7,8,9,11	ELA 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards ST-ET 5	Math
					Science

Syracuse City School District
Career and Technical Education Program
Course Syllabus
MET 300: Mechanical Technology 300



Program Overview

The PTECH Mechanical Technology program provides students with the opportunity to learn the fundamentals of engineering toward the goal of earning college credits and an Associate's degree in Mechanical Technology from Onondaga Community College. Students in the Mechanical Technology program will gain hands-on experience in using measuring tools, simple machines, machine tools, and computer software to analyze and design mechanical systems. Students will explore and utilize the latest technological advancements in computer drafting, computer-aided design and automated manufacturing. Student will learn techniques for data collection and analysis, and the process of failure analysis. Students will also learn about the importance of ethical conduct and will develop the critical and analytical thinking, troubleshooting and problem-solving skills necessary for success in the engineering field. Students will explore the different career pathways available within the field of Mechanical Technology and have the opportunity to apply and enhance their skills through multiple work-based experiences.

Course Description

In this course students will learn about the role of technology in society and learn and apply skills in digital and information technologies, concepts, and terminologies. Students will demonstrate the skills needed to be an informed digital citizen, achieve academic and workplace success, and participate in an increasingly globalized environment. Students will use web applications, word-processing, spreadsheet, database, presentation, and other software to learn, search and organize their research, and then present and communicate their findings. Students will also learn the necessary skills to interpret and construct engineering drawings, including drawing interpretation, orthographic projection systems, dimensioning, geometric dimensioning and tolerancing. In addition, students will study the basic theory and have hands-on experiences with lathes, milling, drilling, grinding, bench work and shaping operations. Students will learn about cutting speeds, and surface finishes, as well as machine capabilities. Students will be introduced to the fundamental concepts and techniques of machine tool practices including the use of hand tools, dimensional measurement, materials, layout, and various machining operations. Students will learn and begin to apply fundamental right triangle trigonometry utilizing geometric relations. Students will work collaboratively as part of a team to create, problem-solve and present projects that address authentic issues in the community and will learn and apply standard engineering nomenclature within the context of their projects. Professionalism, critical thinking and problem-solving skills, and accurate and appropriate oral and written communication will continue to be emphasized and developed.

Work-Based Learning

Students will be connected with working mechanical engineering professionals through field trips, job shadowing and Career Coaching, leading to opportunities for direct job training and real-world experiences. 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

MET 100, MET 200, Regents Math

Course Objectives

Students will:

- Demonstrate the ability to use appropriate digital tools and software to organize, analyze and present information in a variety of structures.
- Apply basic skills, search techniques, and research methodologies in authentic situations.
- Manipulate operating systems and application programs.
- Organize files and folders on a computer, and make use of network storage resources and other cloud-based services.
- Interpret and construct engineering drawings.
- Utilize safety practices pertaining to a machine tools lab.
- Safely and effectively use various hand tools, precision, and semi-precision measurement tools.
- Safely and effectively use tools for sawing, drilling, vertical and horizontal milling, grinding, turning, threading, and knurling.

Integrated Academics

1 CTE Integrated Science Credit

Concurrent Enrollment College Credit

Upon successful completion of MET 300, students will earn 3 college credits for each of the following courses from Onondaga Community College:

- CIS 100: Computer and Information Literacy
- MET 161: Engineering Drawing
- MET 151: Machine Tools 1

Equipment and Supplies

- **School will provide:** Computer hardware and software, all necessary instruments and equipment
- **Student will provide:** Necessary school supplies

Textbook

Giesecke, F. E., Mitchell, A. E., Spencer, H. C., Dygdon, J. T., Hill, I. L., Novak, J. E., Loving, R. O., Lockhart, S. E. Johnson, C. (2016). *Technical Drawing with Engineering Graphics 15th Edition*. Hoboken, NJ: Peachpit Press.

Hoffman, P. J., & Hopewell, E. S. (2019). *Precision Machining Technology*. Boston, MA: Cengage.

Parsons, J. J., Oja, D., Beskeen, D. W., Cram, C. M., & Duffy, J. (2012). *Computer Concepts and Microsoft Office 2010 Illustrated*. Boston: Cengage.

Grading

Quarters 1 and 2		Quarters 3 and 4	
• Assigned Coursework	25%	• Assigned Coursework	25%
• Lab Projects	25%	• Lab Projects	25%
• Quizzes and Assessments	25%	• Quizzes and Assessments	25%
• Professionalism and Participation	25%	• Professionalism and Participation	25%

Additional Course Policies

- Missed Classes: You are responsible for the activities of each class period. If you know of a conflict ahead of time, you are welcome to submit projects early. If you do not take a test on the scheduled day, contact the instructor for a makeup.
- Assignments: All assignments are due at the end of class on the date due. Late assignments receive partial credit.
- Academic Dishonesty: Plagiarism and cheating are serious offenses and may be penalized by a failing grade.

Course Calendar

Quarter	Units of Study
1 and 2	<ul style="list-style-type: none">• Classroom Practices: Being Successful• Personal and Professional Characteristics in Mechanical Technology• Workplace Safety: OSHA 10 Certification• CIS 100: Computer and Information Literacy<ul style="list-style-type: none">○ Society, Digital Citizenship and Ethical Computing○ Safe Use of the Internet, Social Media, and other Digital Tools○ File Management, Storage and Backups○ Word Processing and Microsoft Word○ Presentation Software and Microsoft PowerPoint○ Technical Reports and PowerPoint Presentations○ Spreadsheets and Microsoft Excel○ Inputting and Modifying Data, Basic Formatting and Formulas○ Using Averages, Percent Weighting, and IF Statements○ Percent Error, Elementary Statistics, and Plotting Data Results○ Formulas and Plots in Excel• MET 161: Engineering Drawing• Work-Based Learning: Career Coaching, Job Shadowing
3 and 4	<ul style="list-style-type: none">• CIS 100: Computer and Information Literacy<ul style="list-style-type: none">○ Conversions and Calculation○ Engineering Lists and Historical Logs○ Intermediate Formulas and Mechanical Analysis in Excel○ Product Proposals and Marketing○ Advanced Statistics and Data Analysis in Excel○ Engineering Functions in Excel○ Curve Fitting and Plotting in Excel○ Tables and Selecting Data for Engineering Calculation• MET 151 Machine Tools 1<ul style="list-style-type: none">○ Shop Safety, Reading Drawings, and Hand Tools○ Dimensional Measurement○ Materials and Layout○ Introduction to Machine Tools○ Sawing and Drilling

	<ul style="list-style-type: none">○ Turning and Milling○ Grinding and Right Triangle Trigonometry• Work-Based Learning: Career Coaching, Job Shadowing
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Syracuse City School District
Career and Technical Education Program
Scope and Sequence
MET 300: Mechanical Technology 300



First Quarter and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Classroom Practices: Being Successful Personal and Professional Characteristics in Mechanical Technology	<ul style="list-style-type: none"> What are the expectations for the classroom and hands-on mechanical technology lab? How can students be successful in this class? What strategies can students use to manage their time? How can students use technology appropriately and effectively? What strategies can students use to study effectively to prepare for tests? What are the essential personal and professional characteristics of a mechanical engineer? What are the professional characteristics necessary for success in the engineering field? How do personal habits influence others? 	<ul style="list-style-type: none"> Explain and follow classroom procedures. List and follow rules for general classroom safety. Evaluate ways to manage time. Investigate various study skills for test taking and identify two effective skills. Describe the roles and responsibilities a mechanical engineer has in a professional workplace. Describe personal and professional attributes. Reflect and self-assess personal habits and attitudes. Develop employability goals appropriate for the profession. 	<ul style="list-style-type: none"> Career Exploration Research Project Safety Quiz Self-Assessment Lab Procedure Practical Poster and Presentation Demonstration of Classroom Procedures and Safety Practices Employability Profile 	Career Ready Practices CRP 1,2,4,7,10,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 1,4 ST 3,4,5	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 4 ST-SM 3	Math Science
Workplace Safety OSHA 10 Certification	<ul style="list-style-type: none"> What are the causes and consequences of the most common types of workplace incidents? How is personal protective equipment (PPE) used to protect workers from different types of injuries? What are the guidelines for the safe use of hand and power tools? 	<ul style="list-style-type: none"> Demonstrate the use of shop safety equipment, including eye wash stations, hand wash stations, first aid kits, and fire extinguishers. Demonstrate the use and care of appropriate personal protective equipment, including safety glasses, face shields, respirators, hard hats, gloves, hearing protection and protective clothing and footwear. Dispose of hazardous materials and wastes appropriately. 	<ul style="list-style-type: none"> Research Project Self-Assessment Professional Portfolio Class Presentation 	Career Ready Practices CRP 1,2,3,4,5,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,5 ST 3	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 3 MN-PRO 2,3,4,5 ST-ET 1,4 ST-SM 4	Math Science

First Quarter and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> What is the role of the OSHA in job-site safety? 	<ul style="list-style-type: none"> Use common hand and power tools safely. Use a lockout/tagout/blockout program to properly disable a system. Demonstrate basic safety protocols for working with mechanical systems. Identify, activate and deactivate internal machine safety devices, including emergency stops and deadman switches. Explain how to interact safely with work envelopes including assessing risks associated with the movements of machine and automated components. Pursue OSHA 10 certification. 			
CIS 100: Computer and Information Literacy Society, Digital Citizenship and Ethical Computing	<ul style="list-style-type: none"> What is the impact of digital technologies on society? What does it mean to be a good digital citizen? What is the proper use of social media? How can technology be used ethically to avoid hurting others and oneself? How can information be verified as accurate and true? Should outdated technology equipment be recycled? 	<ul style="list-style-type: none"> Summarize the historical development of digital technologies and ascent of the internet. Describe how digital technologies are used and influence various aspects of society and workforce environments. Explain the concept of digital divide and propose ethically and socially responsible solutions. Demonstrate professionalism while exchanging their ideas and interests over the internet or through social media. Describe the potential risks to personal privacy and security posed by current and emerging technologies, and identify ways to minimize and mitigate these risks. Identify positive social and ethical behaviors when using digital technologies and the likely consequences and penalties for misuse or misapplication. Explain and abide by Intellectual Property (IP), Copyright, Creative Commons (CC), and Fair Use principles. 	<ul style="list-style-type: none"> Research Project Tests and Quizzes Self-Assessment Professional Portfolio 	Career Ready Practices CRP 1,2,4,7,8,9,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 3,4	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math
					Science
				Career Ready Practices	ELA

First Quarter and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> How is data protected from loss, damage, or attack? How is data restored? 	<ul style="list-style-type: none"> Explain the importance of folder creation in order to keep files organized and easy to find. Explain how data is transferred and shared. Explain how data is protected from loss, damage, or attack. Explain how data is restored. 			
CIS 100: Computer and Information Literacy Word Processing and Microsoft Word	<ul style="list-style-type: none"> What is word processing and what is it used for? How are documents edited for errors? What types of professional documents can be created? How are documents manipulated to improve the professional appearance? 	<ul style="list-style-type: none"> Explain the importance of word processing. Use keyboarding skills to create word processing documents. Navigate, highlight, format and edit word processing documents. Use document templates to create commonly used text documents. Create resumes, memos, business letters, and other professional documents. 	<ul style="list-style-type: none"> Tests and Quizzes Self-Assessment Professional Portfolio 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science
CIS 100: Computer and Information Literacy Presentation Software and Microsoft PowerPoint	<ul style="list-style-type: none"> What is a presentation and what is its purpose? What makes an effective presentation? What tools can be used to improve the appearance and effectiveness of a presentation? What can be done to deliver a presentation in a way that engages and informs the audience? 	<ul style="list-style-type: none"> Explain what a presentation is and what it is used for. Describe the qualities of an effective presentation. Explain how to deliver a presentation that will engage and inform people about the subject. 	<ul style="list-style-type: none"> Tests and Quizzes Self-Assessment Professional Portfolio 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science
CIS 100: Computer and Information Literacy Technical Reports and PowerPoint Presentations	<ul style="list-style-type: none"> How can advanced skills in Microsoft Office programs save time? What are important attributes of a good public speaker? 	<ul style="list-style-type: none"> Demonstrate use of title page templates. Create an auto updating table of contents, citations, and bibliography in Microsoft Word. Create and present a PowerPoint presentation on selected subject. 	<ul style="list-style-type: none"> PowerPoint Presentations Self-Assessment Technical Reports List of Works Cited In MLA or APA Style 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science
			<ul style="list-style-type: none"> Tests and Quizzes 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9

First Quarter and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
CIS 100: Computer and Information Literacy Spreadsheets and Microsoft Excel	<ul style="list-style-type: none"> What is a spreadsheet and what is its purpose? What makes an effective spreadsheet? What tools can be used to share data and information from a spreadsheet? 	<ul style="list-style-type: none"> Describe what a spreadsheet is and what it can be used for. Explain the different parts of a spreadsheet. Create a spreadsheet and add data. Perform basic calculations using spreadsheet formulas. Sort and filter data. Create visual representations of spreadsheet data. Explain the relationship between spreadsheets and databases. 	<ul style="list-style-type: none"> Self-Assessment Professional Portfolio 		11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science
CIS 100: Computer and Information Literacy Inputting and Modifying Data, Basic Formatting and Formulas	<ul style="list-style-type: none"> How are percentages converted to decimals? How can unit conversion be important to engineers utilizing complex equations in calculations? In what ways does a graphical plot assist data or engineering analysts perform tasks more effectively? 	<ul style="list-style-type: none"> Utilize basic math calculations and percentages in Excel. Create linear equation plots. Explore Excel as it applies to data and chart plotting. Plot results as a graphical representation. Explain how data analysis affects the choices applied to engineered designs or processes. 	<ul style="list-style-type: none"> Formatting Assignments Lab: Assigned Application Projects Submission to Office 365 One Note 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science
CIS 100: Computer and Information Literacy Using Averages, Percent Weighting, and IF Statements	<ul style="list-style-type: none"> How are averages calculated? How can percentages be used to weight data? What is the purpose or benefit of organized data tables, summary tables, and auto updating formulas? How is an Excel template useful for engineers who frequently perform similar data analyses? 	<ul style="list-style-type: none"> Create formulas for average and weighted final average. Utilize IF statements to return a text string from a conditional formula. Input information into organized Excel spreadsheet. Identify and use shortcut keys, Excel tools, ribbon functions. Describe the advantages of using templates for analyzing data in daily engineering operations. 	<ul style="list-style-type: none"> Project/Lab: Functions and Tools Cloud Computing Assignment Summary: Use of Electronic Data Analysis 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science
CIS 100: Computer and Information Literacy Percent Error, Elementary Statistics and Plotting Data Results	<ul style="list-style-type: none"> What is a histogram? What is percent error used for? What is the difference between SORT and FILTER in Excel? Why is data analysis important in engineering and industry? 	<ul style="list-style-type: none"> Generate simple experimental data. Examine error or differences between theoretical and experimental data. Utilize Excel to SORT results, generate a scatter plot and a frequency histogram plot. 	<ul style="list-style-type: none"> Project/Lab: Application of Excel Functions to Assigned Documents Vocabulary Quiz 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science

First Quarter and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
CIS 100: Computer and Information Literacy Formulas and Plots in Excel	<ul style="list-style-type: none"> What is amortization plotting used for? How could a loan payment schedule be important to manufacturing facilities? How could amortization plotting be used to finance a purchase? 	<ul style="list-style-type: none"> Explain the variables of an amortization plot and generate loan payment schedules. Assess and analyze data. Use and apply math formulas to analyze data tables in Excel. 	<ul style="list-style-type: none"> Project/Lab: Application of Assigned Formulas and Plotting Activities Terminology Quiz 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science
MET 161: Engineering Drawing	<ul style="list-style-type: none"> What is the alphabet of lines? What techniques are used for sketching and lettering in technical drawing? What drawing instruments are used in engineering drawings? How are engineering drawings interpreted? How are multi-view drawings constructed utilizing orthographic principles? How are sectional views constructed? How are assembly drawings produced from working drawings ? How are basic engineering drawings dimensioned? How are engineering drawings that utilize geometric dimensioning and tolerancing principles analyzed? 	<ul style="list-style-type: none"> Explain the alphabet of lines. Explain and demonstrate the are used for sketching and lettering in technical drawing. Utilize appropriate drawing instruments in engineering drawings. Interpret engineering drawings. Construct multi-view drawings utilizing orthographic principles. Construct sectional views. Produce assembly drawings from working drawings. Dimension basic engineering drawings. Analyze engineering drawings that utilize geometric dimensioning and tolerancing principles. 	<ul style="list-style-type: none"> Homework Assignments. CAD Labs Assignments Quizzes and Final Exam 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 1,2,3,5,6 ST-SM 1,2,3,4	Math Science
Work-Based Learning: Career Coaching, Job Shadowing	<ul style="list-style-type: none"> What can be learned from mechanical technology professionals? 	<ul style="list-style-type: none"> Participate in Career Coaching process. Participate in Job Shadowing process with local mechanical technology professionals. 	<ul style="list-style-type: none"> Career Coaching Self-Assessment Job Shadow Reflection Professional Portfolio 	Career Ready Practices CRP 1,2,4,7,8,10,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 1,4 ST 4,5,6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards	Math

First Quarter and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
				MN-PRO 4 ST-ET 1,4 ST-SM 1,2,4	
					Science

Third Quarter and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
CIS 100: Computer and Information Literacy Conversions and Calculation	<ul style="list-style-type: none"> How can Excel be used as a quick unit conversion calculator? What are common equations that utilize unit conversion? 	<ul style="list-style-type: none"> Perform fundamental unit conversion and utilize Excel for basic multivariable calculations. Identify where unit conversion is required or necessary. Formulate a plan to convert units using Excel application. 	<ul style="list-style-type: none"> Project/Lab: Conversions and Calculations Word Problem and Unit Conversion Assignments 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math A-CED.4 N-Q1 Science HS-PS2-1 HS-PS3-5 HS-PS3-6
CIS 100: Computer and Information Literacy Engineering Lists and Historical Logs	<ul style="list-style-type: none"> What is the purpose of an engineering log template? Why would a manufacturing facility need an Approved Vendor List? What issues would occur if products are designed and built without a proper Bill of Materials? How could an engineer be more effective using a Lessons Learned Log? 	<ul style="list-style-type: none"> Apply key terms and engineering vernacular. Create important engineering lists and historical data logs commonly created in industry. Retrieve important information from engineering databases. Utilize the FILTER and FREEZE PANES tools in Excel. 	<ul style="list-style-type: none"> Creation of Excel Database Project/Lab: Application of Excel Functions and Tools Terminology Quiz 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science HS-ETS 1-3 HS-ETS 1-4
CIS 100: Computer and Information Literacy Intermediate Formulas and Mechanical Analysis in Excel	<ul style="list-style-type: none"> What is a spring constant? Why are material selections important to engineers during the design process? What is oscillation? What is resonance and how could it be catastrophic to engineering design? What is a dampening system? How can civil engineers use calculations in project design to prevent structural damage? 	<ul style="list-style-type: none"> Mathematically model spring constant data. Analyze critical information for solution of the model. Solve for the differential equation variables provided. Explain how civil engineers use calculations in project design. 	<ul style="list-style-type: none"> Application of Intermediate Formulas in Excel Project/Lab with Write Up and Excel Plots Analysis of Mechanical Data Using Excel Terminology Quiz 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math A-SSE.1 Science HS-PS2-1
CIS 100: Computer and	<ul style="list-style-type: none"> What is included in an engineer's Career Profile? 	<ul style="list-style-type: none"> Create an all-inclusive career profile. Develop a technical product proposal. 	<ul style="list-style-type: none"> Presentations of Product Proposals 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7

Third Quarter and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Information Literacy Product Proposals and Marketing	<ul style="list-style-type: none"> What is the difference between technical and commercial proposals? Why does a company that manufactures engineered products provide customers with a technical product proposal? 	<ul style="list-style-type: none"> Compare the difference between technical and commercial information. 	<ul style="list-style-type: none"> Self-Evaluation Development of Career Profiles 		11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math Science HS-ETS 1-3
CIS 100: Computer and Information Literacy Advanced Statistics and Data Analysis in Excel	<ul style="list-style-type: none"> What is regression analysis used for? What is P Value? What is a significant indicator? What is the difference between overhead (fixed) costs and variable costs? 	<ul style="list-style-type: none"> Model, develop, interpret, and evaluate regression analysis of actual industry data. Calculate and predict future electrical consumption in a manufacturing facility. 	<ul style="list-style-type: none"> Project/Lab: Advanced Concepts/Functions in Excel Electrical Consumption Analysis of Manufacturing Facility with Empirical Data 	Career Ready Practices CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math N-Q.3 S-IC.2 S-ID.1,2,4 Science HS-ETS 1-3 HS-ETS 1-4
CIS 100: Computer and Information Literacy Engineering Functions in Excel	<ul style="list-style-type: none"> What is a Bessel Function? What is the VLOOKUP function used for? How is normalization used in data analysis? 	<ul style="list-style-type: none"> Build tables in Excel utilizing the BESSEL function. Perform a VLOOKUP of data. Develop plots after normalizing data sets. 	<ul style="list-style-type: none"> Project/Lab with Write Up and Excel Plots 	Career Ready Practice CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math S-ID.4 S-CP.1 Science
CIS 100: Computer and Information Literacy Curve Fitting and Plotting in Excel	<ul style="list-style-type: none"> What is array curve fitting used for? What is a 2nd order polynomial equation? What are the slope and y-intercept variables in a linear equation? 	<ul style="list-style-type: none"> Identify the difference between linear and non-linear equations. Create a best fit equation for differing order equations. Utilize the LINEST function in Excel. 	<ul style="list-style-type: none"> Project/Lab with Write Up and Excel Plots Applied Engineering Math Assignments 	Career Ready Practice CRP 1,2,4,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math A-CED.2 F-LE.1,2,5 Science HS-PS3-5
				Career Ready Practices	ELA

Third Quarter and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
CIS 100: Computer and Information Literacy Tables and Selecting Data for Engineering Calculation	<ul style="list-style-type: none"> Where do reference tables come from? Why would engineers use reference tables? What information is found on Steam Tables? 	<ul style="list-style-type: none"> Read and pull critical information from reference tables. Solve for missing reference information using interpolation. Explain the importance of engineering reference tables. 	<ul style="list-style-type: none"> Quiz: Excel Functions Project/Lab Skill Application Extracting Important Data from Text Strings of Raw Unfiltered Data 	CRP 1,2,4,5,6,8,9,11	11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 2,3 ST-SM 1,2,4	Math N-Q.1 Science HS-PS1-9
MET 151: Machine Tools 1 Shop Safety, Reading Drawings, and Hand Tools	<ul style="list-style-type: none"> What safety practices pertain to a machine tools shop? What are the three basic elements of a drawing? What are commonly used abbreviations and terminology in shop drawings? What are the seven main steps in reading a print? How are common hand tools used? How are necessary work holding devices and hand tools selected? 	<ul style="list-style-type: none"> Explain and demonstrate safety practices pertaining to a machine tools lab including personal protective equipment (PPE). Identify the three basic elements of a print. Interpret commonly used abbreviations and terminology. Identify the types of dimensions. Identify general note symbols and locate them on a print. List the seven main steps in reading a print. Identify common hand tools and describe their basic applications. Demonstrate proper use of hand tools. Select necessary work holding devices and hand tools as dictated by the size and shape of the part and the machining to be done. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Projects 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science
MET 151: Machine Tools 1 Dimensional Measurement	<ul style="list-style-type: none"> How is precision measurement equipment used and maintained? What are some basic semi-precision and precision measuring tools? How are semi-precision and precision measuring tools read? What factors affect accurate measurement? What is the difference between accuracy and precision? What is the main purpose of calibration? 	<ul style="list-style-type: none"> Demonstrate the proper selection, use, and care of precision measurement equipment. Identify basic semi-precision measuring tools and describe their major applications. Demonstrate proper reading of semi-precision measuring tools to their finest graduation. Identify precision measuring tools and describe their major applications. Demonstrate accurate reading of precision measuring tools to their finest graduation. Justify the use of a particular measuring tool based on tool and part characteristics. Describe factors affecting accurate measurement, including dirt, temperature, improper measuring, and tool calibration. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Projects 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science

Third Quarter and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> What are the key factors that affect calibration? 	<ul style="list-style-type: none"> Describe how measurement tool selection can contribute to part accuracy and inaccuracy. Distinguish between accuracy and precision. Describe the main purpose of calibration. Identify the key factors that affect calibration 			
MET 151: Machine Tools 1 Materials and Layout	<ul style="list-style-type: none"> What are four types of manufacturing materials and how are they used? What are the physical, mechanical and chemical properties of materials and how do they relate to manufacturing applications? How are materials classified? What are the layout practices using a precision surface plate? 	<ul style="list-style-type: none"> Identify four types of manufacturing materials and their common uses in manufacturing processes. Define physical, mechanical and chemical properties. Explain the physical properties of materials, including density, specific heat, melting and boiling point, thermal expansion and conductivity, electrical and magnetic properties. Describe how physical properties of materials relate to manufacturing applications. Explain the mechanical properties of materials, including strength, toughness, hardness, ductility, elasticity, fatigue and creep. Describe how mechanical properties of materials relate to manufacturing applications. Explain the chemical properties of materials, including oxidation, corrosion, flammability, and toxicity. Describe how chemical properties of materials relate to manufacturing applications. Explain the classification system for metals, plastics and polymers, and ceramics and glass. Describe the physical, mechanical and chemical properties of metals, plastics and polymers, and ceramics and glass. Explain layout practices using a precision surface plate. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Projects 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science
MET 151: Machine Tools 1			<ul style="list-style-type: none"> Homework Assignments 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9

Third Quarter and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Introduction to Machine Tools	<ul style="list-style-type: none"> What common machine tools are used in an industrial setting? How were machine tools developed? What is the importance and use of measurement and calibration when using machine tools? What is the importance of watching gauges, dials or other indicators? How are tools and equipment selected to do a specific job? How are causes of operating errors determined? Why is it important to conduct tests and inspections of products, services, or processes? What is the importance of performing routine maintenance on equipment? What is the purpose and use of the Machinery's Handbook? What safety rules are important in the machine shop? How are work holders used in machine tool operation? 	<ul style="list-style-type: none"> List and describe common machine tools used in an industrial setting. Summarize the history and development of machine tools. Explain the importance and use of measurement and calibration when using machine tools. Explain the importance of watching gauges, dials or other indicators to make sure a machine is working properly. Explain the importance of determining the kind of tools and equipment needed to do a job. Explain the importance of determining causes of operating errors and deciding what to do about it. Explain the importance of conducting tests and inspections of products, services or processes to evaluate quality or performance. Explain the importance of performing routine maintenance on equipment and determining when and what kind of maintenance is needed. Explain the purpose and use of the Machinery's Handbook. Observe appropriate safety rules pertaining to general machine shop practices. Explain the use of work holders in machine tool operation. 	<ul style="list-style-type: none"> Quizzes/Tests Shop Projects 		11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science
MET 151: Machine Tools 1 Sawing and Drilling	<ul style="list-style-type: none"> How are different types of sawing equipment used? What are different types of drill presses found in the machine shop and how are they used? How is a drill press used and maintained? 	<ul style="list-style-type: none"> Explain the process of sawing using different types of sawing equipment. Identify the different types of drill presses found in the machine shop and describe their major applications. Identify the standard drilling and reaming tools and describe their characteristics and major applications. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Projects 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3	Math

Third Quarter and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> How are drill speeds accurately calculated for specific drill press operations? 	<ul style="list-style-type: none"> Demonstrate the proper cleaning, and care of the drill press. Properly set up the drill press and demonstrate the selection of the most appropriate and sharp drilling tool(s). Demonstrate proper use of drilling machines. Use applicable reference material to accurately calculate speeds for assigned drill press operations. 		MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Science
MET 151: Machine Tools 1 Turning and Milling	<ul style="list-style-type: none"> How is a lathe used and maintained? What are the sizes and applications of common types of metal cutting lathes? What are turning, threading, and knurling? How are lathe speeds and depths of cuts calculated? How are vertical and horizontal milling machines used and maintained? What are common cutters and their applications? How are speeds and feeds calculated for an assigned vertical or horizontal milling machine operation? 	<ul style="list-style-type: none"> Demonstrate proper use of metal lathes. Demonstrate the proper cleaning, lubrication, and care of the metal lathe. Identify and describe the sizes and applications of common types of metal cutting lathes. Explain and demonstrate the processes of turning, threading, and knurling using a lathe. Identify common parts and demonstrate the proper use of all controls and adjustments on the lathe. Identify and demonstrate the proper installation and application of standard tools and tool holders for the lathe. Identify common work holding devices and demonstrate proper procedure for changing and installing them. Use appropriate reference material to accurately calculate relevant lathe speeds and depths of cuts as required for an assigned application. Demonstrate proper use of vertical and horizontal milling machines. Demonstrate the proper setup, operation, care, cleaning, and lubrication of vertical and horizontal milling machines. Correctly identify common cutters and explain their basic applications. Identify and demonstrate the proper use of all controls and adjustments on vertical and horizontal milling machines. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Projects 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science

Third Quarter and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<ul style="list-style-type: none"> Identify the common work holding devices and select the most appropriate device based on part shape and type of machining to be done. Select the proper cutter and work holding device and demonstrate their proper installation and setup for an assigned vertical or horizontal milling operation. Use applicable reference material to accurately calculate speeds and feeds for an assigned vertical or horizontal milling machine operation. 			
MET 151: Machine Tools 1 Grinding and Right Triangle Trigonometry	<ul style="list-style-type: none"> What are the benefits of grinding? What are the differences and applications of common types of grinding machines? What are the processes of off-hand grinding and surface grinding? How are grinding machines used and maintained? How are grinding wheels and grinding fluids selected and used? What are common problems and solutions in surface grinding? What are types of automatic protections built into grinding machines? How are trigonometric formulas used for solving problems with right triangles and how are these applied in the machine shop? 	<ul style="list-style-type: none"> Describe the benefits of grinding. Identify common types of grinding machines and describe the major differences and applications. Explain and demonstrate the processes of off-hand grinding and surface grinding. Demonstrate proper use of grinding abrasive machines. Describe and demonstrate the proper cleaning, lubrication, and care of precision grinding machines. Explain the identification, selection and application of common grinding wheels. Describe the proper selection and application of grinding fluids. Describe common problems and solutions in surface grinding. Describe the importance of safety during grinding. Identify types of automatic protections built into grinding machines. Explain and apply trigonometric formulas for solving problems with right triangles in the machine shop. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Projects 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science
Work-Based Learning:	<ul style="list-style-type: none"> What can be learned from mechanical technology professionals? 	<ul style="list-style-type: none"> Participate in Career Coaching process. Participate in Job Shadowing process with local mechanical technology professionals. 	<ul style="list-style-type: none"> Career Coaching Self-Assessment Job Shadow Reflection Professional Portfolio 	Career Ready Practices CRP 1,2,4,7,8,10,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6

Third Quarter and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Career Coaching, Job Shadowing				Cluster Standards MN 1,4 ST 4,5,6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PRO 4 ST-ET 1,4 ST-SM 1,2,4	Math
					Science

Syracuse City School District
Career and Technical Education Program
Course Syllabus
MET 400: Mechanical Technology 400



Program Overview

The PTECH Mechanical Technology program provides students with the opportunity to learn the fundamentals of engineering toward the goal of earning college credits and an Associate's degree in Mechanical Technology from Onondaga Community College. Students in the Mechanical Technology program will gain hands-on experience in using measuring tools, simple machines, machine tools, and computer software to analyze and design mechanical systems. Students will explore and utilize the latest technological advancements in computer drafting, computer-aided design and automated manufacturing. Student will learn techniques for data collection and analysis, and the process of failure analysis. Students will also learn about the importance of ethical conduct and will develop the critical and analytical thinking, troubleshooting and problem-solving skills necessary for success in the engineering field. Students will explore the different career pathways available within the field of Mechanical Technology and have the opportunity to apply and enhance their skills through multiple work-based experiences.

Course Description

In this final course of the pathway, students will use mechanical technologies to apply their knowledge and skills to real-life processes and problems. There will be an ongoing focus on workplace safety and the application of skills in measurement and the use of machine tools. Students will focus on areas of particular interest to develop and implement two research projects. Students will work collaboratively as part of a team to create, problem-solve and present projects that address authentic issues in the community and will learn and apply standard engineering nomenclature within the context of their projects. Students will also participate in field-based internships where they will work with industry professionals to apply engineering theory in authentic industry environments. Professionalism, critical thinking, design theory, problem-solving and analysis, and accurate and appropriate oral and written communication will continue to be emphasized and developed.

Work-Based Learning

Students will be connected with working mechanical engineering professionals through field trips, job shadowing Career Coaching and job internships, leading to opportunities for direct job training and real-world experiences. 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

MET 100, MET 200, MET 300

Course Objectives

Students will:

- Develop employability goals appropriate for the profession.
- Obtain general industry OSHA 10 certification.
- Complete two comprehensive research projects that addresses an authentic problem or issue.
- Analyze technical data and apply engineering theory.
- Demonstrate knowledge and skills learned in MET 151: Machine Tools 1.
- Demonstrate knowledge and skills learned in MET 152: Machine Tools 2.
- Participate in Career Coaching process.
- Participate in Job Shadowing processes with local mechanical technology professionals.
- Complete an Internship with local mechanical technology professionals.
- Demonstrate professionalism in an industry environment with professionals.

Integrated Academics

1 CTE Integrated Math Credit
1 CTE Integrated ELA Credit

Concurrent Enrollment College Credit

Upon successful completion of MET 400, students will earn 3 college credits for MET 152: Machine Tools 2 from Onondaga Community College:

Equipment and Supplies

- **School will provide:** Computer hardware and software, all necessary instruments and equipment
- **Student will provide:** Necessary school supplies

Textbook

Hoffman, P. J., & Hopewell, E. S. (2019). *Precision Machining Technology*. Boston, MA: Cengage.

Grading

Quarters 1 and 2	Quarters 3 and 4
<ul style="list-style-type: none">• Assigned Coursework. 25%• Independent Project 25%• Quizzes and Assessments 25%• Professionalism and Participation 25%	<ul style="list-style-type: none">• Assigned Coursework 20%• Independent Project 20%• Employability Skills 20%• Quizzes and Assessments 20%• Professionalism 20%

Additional Course Policies

- Missed Classes: You are responsible for the activities of each class period. If you know of a conflict ahead of time, you are welcome to submit projects early. If you do not take a test on the scheduled day, contact the instructor for a makeup.
- Assignments: All assignments are due at the end of class on the date due. Late assignments receive partial credit.
- Academic Dishonesty: Plagiarism and cheating are serious offenses and may be penalized a failing grade.

Course Calendar

Quarter	Units of Study
1 and 2	<ul style="list-style-type: none">• Classroom Practices: Being Successful• Personal and Professional Characteristics in Mechanical Technology• Workplace Safety: OSHA 10 Certification• Senior Project #1• Review of MET 151: Machine Tools 1• MET 152: Machine Tools 2• Work-Based Learning: Career Coaching, Job Shadowing
3 and 4	<ul style="list-style-type: none">• MET 152: Machine Tools 2 (Continued)• Senior Project #2• Work-Based Learning: Internship

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
MET 400: Mechanical Technology 400



First and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Classroom Practices: Being Successful Personal and Professional Characteristics in Mechanical Technology	<ul style="list-style-type: none"> What are the expectations for the classroom and hands-on mechanical technology lab? How can students be successful in this class? What strategies can students use to manage their time? What are the essential personal and professional characteristics of a mechanical engineer? What are the professional characteristics necessary for success in the engineering field? 	<ul style="list-style-type: none"> Explain and follow classroom procedures. List and follow rules for general classroom safety. Evaluate ways to manage time. Describe the roles and responsibilities a mechanical engineer has in a professional workplace. Discussion of personal and professional attributes. Reflect and self-assess personal habits and attitudes. Develop employability goals appropriate for the profession. 	<ul style="list-style-type: none"> Career Exploration Research Project Safety Quiz Self-Assessment Lab Procedure Practical Demonstration of Classroom Procedures and Safety Practices Employability Profile Professional Portfolio 	Career Ready Practices CRP 1,2,4,7,10,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 1,4 ST 3,4,5	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards ST-ET 4 ST-SM 3	Math Science
Workplace Safety OSHA 10 Certification	<ul style="list-style-type: none"> What are the causes and consequences of the most common types of workplace incidents? How is personal protective equipment (PPE) used to protect workers from different types of injuries? What are the guidelines for the safe use of hand and power tools? What is the role of the OSHA in job-site safety? 	<ul style="list-style-type: none"> Demonstrate the use of shop safety equipment, including eye wash stations, hand wash stations, first aid kits, and fire extinguishers. Demonstrate the use and care of appropriate personal protective equipment, including safety glasses, face shields, respirators, hard hats, gloves, hearing protection and protective clothing and footwear. Dispose of hazardous materials and wastes appropriately. Use common hand and power tools safely. Use a lockout/tagout/blockout program to properly disable a mechanical system. Demonstrate basic safety protocols for working with mechanical systems. 	<ul style="list-style-type: none"> Research Project Self-Assessment Professional Portfolio Class Presentation Teacher Observation Checklist 	Career Ready Practices CRP 1,2,3,4,5,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,5 ST 3	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 3 MN-PRO 2,3,4,5 ST-ET 1,4 ST-SM 4	Math Science

First and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<ul style="list-style-type: none"> Identify, activate, and deactivate internal machine safety devices, including emergency stops and deadman switches. Interact safely with work envelopes including assessing risks associated with the movements of machine and automated components. Obtain general industry OSHA 10 certification. 			
Independent Senior Project #1	<ul style="list-style-type: none"> How can a mechanical technology research project address and authentic problem or issue? 	<ul style="list-style-type: none"> Develop a comprehensive individual research project that addresses an authentic problem or issue. Present project proposal to instructor for approval. Implement research and complete research project. Present completed research project. 	<ul style="list-style-type: none"> Research Project Journal Rubric-Based Evaluation of Project 	Career Ready Practices CRP 1,2,4,6,7,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 6 ST 1,2,3,6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PRO 5 ST-ET 1,2,3,4,5,6 ST-SM 1,2,4	Math Science
Review of MET 151: Machine Tools 1	<ul style="list-style-type: none"> What machine tools are common in manufacturing and how are they used? 	<ul style="list-style-type: none"> Demonstrate knowledge and skills learned in MET 151 Machine Tools 1, including shop safety, reading drawings, hand tools, dimensional measurement, materials, layout, sawing, drilling, turning, vertical and horizontal milling, grinding, and right-angle trigonometry. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Lab Assignments 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science
MET 152: Machine Tools 2	<ul style="list-style-type: none"> What is taper turning? How is a dividing or index head used? What is broaching? What is the importance of reading and machining to print? What are the different classes of fits and how are they related to tolerances? How are trigonometric formulas used for solving 	<ul style="list-style-type: none"> Explain and demonstrate taper turning. Explain and demonstrate using a dividing or index head. Explain and demonstrate broaching. Explain and demonstrate reading and machining to print. Explain the different classes of fits and how they are related to tolerances. Explain and apply trigonometric formulas for solving problems with non-right triangles in the machine shop. Explain and demonstrate the use of milling attachments. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Lab Assignments 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science

First and Second Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<p>problems with non-right triangles and how are these applied in the machine shop?</p> <ul style="list-style-type: none"> • How are milling attachments used? • What is heat treating? • How is metal finished? • How are processes and products inspected? • How is numerical control equipment programmed and operated? • How are jigs and fixtures used? • What is EDM? • How are cutting feeds and speeds determined? • What are different types of surface finishes? 	<ul style="list-style-type: none"> • Explain and demonstrate heat treating. • Explain and demonstrate metal finishes. • Explain and demonstrate inspection of processes and products. • Explain and demonstrate basic programming and operations of numerical control equipment. • Explain and demonstrate applications of jigs and fixtures. • Explain and demonstrate EDM (Electrical Discharge Machining). • Explain and demonstrate cutting feeds and speeds. • Explain and demonstrate surface finishes. 			
Work-Based Learning: Career Coaching, Job Shadowing	<ul style="list-style-type: none"> • What can be learned from mechanical technology professionals? 	<ul style="list-style-type: none"> • Participate in Career Coaching process. • Participate in Job Shadowing process with local mechanical technology professionals. 	<ul style="list-style-type: none"> • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio 	Career Ready Practices CRP 1,2,4,7,8,10,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 1,4 ST 4,5,6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-MIR 2,3,4 MN-PRO 4 ST-ET 1,4 ST-SM 1,2,4	Math
					Science

Third and Fourth Quarters

Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
MET 152: Machine Tools 2 (Continued)	<ul style="list-style-type: none"> What is taper turning? How is a dividing or index head used? What is broaching? What is the importance of reading and machining to print? What are the different classes of fits and how are they related to tolerances? How are trigonometric formulas used for solving problems with non-right triangles and how are these applied in the machine shop? How are milling attachments used? What is heat treating? How is metal finished? How are processes and products inspected? How is numerical control equipment programmed and operated? How are jigs and fixtures used? What is EDM? How are cutting feeds and speeds determined? What are different types of surface finishes? 	<ul style="list-style-type: none"> Explain and demonstrate taper turning. Explain and demonstrate using a dividing or index head. Explain and demonstrate broaching. Explain and demonstrate reading and machining to print. Explain the different classes of fits and how they are related to tolerances. Explain and apply trigonometric formulas for solving problems with non-right triangles in the machine shop. Explain and demonstrate the use of milling attachments. Explain and demonstrate heat treating. Explain and demonstrate metal finishes. Explain and demonstrate inspection of processes and products. Explain and demonstrate basic programming and operations of numerical control equipment. Explain and demonstrate applications of jigs and fixtures. Explain and demonstrate EDM (Electrical Discharge Machining). Explain and demonstrate cutting feeds and speeds. Explain and demonstrate surface finishes. 	<ul style="list-style-type: none"> Homework Assignments Quizzes/Tests Shop Lab Assignments 	Career Ready Practices CRP 1,2,4,8,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 3,6 ST 6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PPD 1,3 MN-PRO 2,3,5 ST-ET 1,2,3,6 ST-SM 1,2,4	Math Science
Senior Project #2	<ul style="list-style-type: none"> How can a mechanical technology research project address an authentic problem or issue? 	<ul style="list-style-type: none"> Develop a comprehensive individual research project that addresses an authentic problem or issue. Present project proposal to instructor for approval. Implement research and complete research project. Present completed research project. 	<ul style="list-style-type: none"> Research Project Journal Rubric-Based Evaluation of Project 	Career Ready Practices CRP 1,2,4,6,7,8,11	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 6 ST 1,2,3,6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-PRO 5 ST-ET 1,2,3,4,5,6 ST-SM 1,2,4	Math Science

Third and Fourth Quarters					
Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Work-Based Learning: Internship	<ul style="list-style-type: none"> How does an employee convey professionalism in the workplace? Why are internships necessary? How does an internship experience contribute to a professional portfolio? What are areas of improvement and challenge during the internship experience? 	<ul style="list-style-type: none"> Apply job search techniques to seek out, evaluate and obtain internship opportunities. Communicate with industry/potential employers through the internship experience. Apply learned knowledge and skills to workplace situations. Explain the importance of professionalism and ethics in the workplace. Comply with workplace policies and regulations. Communicate effectively both verbally and in writing. Explain the importance of being prompt, being able to take directions and being motivated to accomplish assigned tasks. Analyze and resolve problems that arise in completing assigned tasks. 	Self-Assessment Reflection Summary: Internship Experience Professional Portfolio Employability Profile Internship Checklist <ul style="list-style-type: none"> Employer/Mentor Observation Checklist 	Career Ready Practices CRP 1,2,4,6,8,10,11,12	ELA 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards MN 1,3,4,5,6 ST 1,2,3,5,6	Literacy 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards MN-MIR 2,3,4 MN-PRO 1,2,3,4,5 ST-ET 1,2,3,5,6 ST-SM 1,2,4	Math Science

B. Teacher Certification

The self-study team reviews the teacher certification and training of the school or BOCES' instructional, paraprofessional, and support staff who deliver services within the CTE program seeking approval. New York State teacher certification review should include both CTE teachers and teachers of academic content within the proposed program.

Process

- Reviewers confirm that all CTE teachers hold appropriate New York State teacher certification for the program in which they will teach.
- Reviewers confirm that all teachers of academic content hold appropriate New York State teacher certification for the program in which they will teach.
- Reviewers confirm the appropriate NCLB highly-qualified status for the CTE teachers in programs offering academic credit.
- Reviewers confirm that staff delivering instruction in programs where certification, licensure, or registration by an external entity have acquired the necessary credentials.
- Reviewers confirm that professional development opportunities exist within the school district or BOCES for instructional, paraprofessional, and support staff to acquire and improve skills and knowledge related to instructional enhancement of the CTE program.

Documentation

Recommendations from the review of teacher certification should be included in the self-study report and reviewed by the external committee. A list of all teachers for the program and the New York State teacher certification(s) held by each must be attached to the Application for Career and Technical Education Program Approval.

Resources

New York State Office of Teaching Initiatives
<http://www.highered.nysed.gov/tcert/certificate/certprocess.htm>

Source: <http://www.p12.nysed.gov/cte/ctepolicy/guide.html>

Search Results

Select	First Name	Last Name	MI	City	State	Registration Status
<input checked="" type="radio"/>	JULIA	HALLQUIST	K	SYRACUSE	NY	Registered

[View Detail](#)

Certificate Information for New York State Teaching Certificate Holder

Certificate Title	Issue / Effective Date	Expiration Date	Status
Mathematics 7-12 Permanent Certificate	09/01/2005		Issued
School District Leader Internship Certificate	09/16/2014	08/28/2015	Expired
School Building Leader Internship Certificate	09/16/2014	08/28/2015	Expired
Mathematics 7-12 Provisional Certificate	09/01/2002	08/31/2007	Expired
School Building Leader Initial Certificate	10/09/2015	01/31/2021	Expired
School District Leader Professional Certificate	11/07/2015		Issued
Physics 7-12 Professional Certificate	09/01/2006		Issued
School Building Leader Initial Reissuance	01/15/2022	01/31/2027	Issued

Search Results

Select	First Name	Last Name	MI	City	State	Registration Status
<input checked="" type="radio"/>	KRISTY	GLENN		HASTINGS	NY	Registered Active

[View Detail](#)

Certificate Information for New York State Teaching Certificate Holder

Certificate Title	Issue / Effective Date	Expiration Date	Status
Mathematics 7-12 Provisional Certificate	09/01/1994	08/31/1999	Expired
Mathematics 7-12 Permanent Certificate	09/01/1999		Issued
Mathematics 7-12 CQ	09/01/1994	08/31/1999	Expired

Certified by the State of New York solely for purposes of employment by the City School District of the City of New York and the operation of the School District.

Search Results

Select	First Name	Last Name	MI	City	State	Registration Status
<input checked="" type="radio"/>	NICHOLAS	LISI		SYRACUSE	NY	Registered Active

View Detail

Certificate Information for New York State Teaching Certificate Holder

Certificate Title	Issue / Effective Date	Expiration Date	Status
Media Communications 7-12 Initial Certificate	09/01/2011	08/31/2016	Expired
Coordinator of Work-Based Learning Programs for Career Development Extension Initial Extension Annotation	12/19/2013	08/31/2016	Expired
Media Communications 7-12 Professional Certificate	03/17/2016		Issued
Coordinator of Work-Based Learning Programs for Career Development Extension Professional Ext/Anno	03/17/2016		Issued

C. Technical Assessments Based on Industry Standards

The self-study team reviews the selection of a technical assessment for the program seeking approval. The selected technical assessment must be nationally-recognized and based on industry standards. It must be available to students enrolled in the approved program and must consist of three parts: written, student demonstration, and student project. Successful completion of the technical assessment is not a requirement for high school graduation, but is required for a student to earn a technical endorsement on the high school diploma

The New York State Education Department does not approve, endorse, or certify any technical assessment.

Process

- The school district or BOCES selects an appropriate industry standard technical assessment to measure student proficiency in the technical field for the program. The school district or BOCES may select a New York State licensing examination as the technical assessment.
- The school district or BOCES determines the scheduling and administration of technical assessments. It is not required that the technical assessment be administered at the conclusion of the program. Parts may be administered throughout a student's learning experience.
- The school district or BOCES determines the number of times a student may take a particular technical assessment.
- The school district or BOCES must comply with existing laws and regulations related to administration of technical assessments to students with disabling conditions and provide appropriate testing modifications. Restrictions on student eligibility for testing are the responsibility of the test producer.
- In the absence of an appropriate nationally-recognized industry standard based assessment, a consortium of local, regional, state, business and industry representatives may be formed to produce such an instrument.
 - Technical assessments must meet generally recognized psychometric criteria. Therefore, the consortium approach may be expensive because of the many steps required to insure assessment validity, reliability, and security.
 - An existing CTE advisory committee or craft committee is not a technical assessment consortium. The school district or BOCES must ensure that the assessment consortium adequately represents current business and industry standards for the specific career area for the program.
- Where an appropriate technical assessment exists, but consists of only one or two parts, a consortium must be formed to develop the missing part(s).
- The school district or BOCES must develop a system to collect student-level and program-level data on performance on the technical assessment.

Documentation

Recommendations on the technical assessment selection should be included in the self-study report and reviewed by the external committee.

Resources

New York State graduation requirements: <http://www.emsc.nysed.gov/part100/pages/1005.html>

Information on the Technical Endorsement: <http://www.emsc.nysed.gov/cte/ctepolicy/endorsement.html>

Source: <http://www.p12.nysed.gov/cte/ctepolicy/guide.html>

Engineering Principles II

EXAM INFORMATION	DESCRIPTION																		
Exam Number 602 Items 33 Points 49 Prerequisites ENGINEERING PRINCIPLES I Recommended Course Length ONE SEMESTER National Career Cluster ARCHITECTURE & CONSTRUCTION MANUFACTURING SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS Performance Standards INCLUDED (OPTIONAL) Certificate Available YES	<p>The second in a sequence of “hands on” courses that tie observations and concepts common to a variety of different engineering disciplines in order to develop a better understanding of basic math and science principles used in engineering. By utilizing problem-solving skills in a laboratory environment, students will develop skills and attitudes that impact and expand occupational opportunities.</p> <p>This is a foundation course in the Engineering pathway.</p>																		
	EXAM BLUEPRINT <table> <tr> <th>STANDARD</th><th>PERCENTAGE OF EXAM</th></tr> <tr> <td>1. Safety Practices</td><td>8%</td></tr> <tr> <td>2. Career Opportunities</td><td>10%</td></tr> <tr> <td>3. Ethics, Communication, Leadership Skills</td><td>8%</td></tr> <tr> <td>4. Engineering Design</td><td>8%</td></tr> <tr> <td>5. Electrical Engineering</td><td>12%</td></tr> <tr> <td>6. Chemical Engineering</td><td>18%</td></tr> <tr> <td>7. Materials Science</td><td>18%</td></tr> <tr> <td>8. Mechanical Engineering</td><td>16%</td></tr> </table>	STANDARD	PERCENTAGE OF EXAM	1. Safety Practices	8%	2. Career Opportunities	10%	3. Ethics, Communication, Leadership Skills	8%	4. Engineering Design	8%	5. Electrical Engineering	12%	6. Chemical Engineering	18%	7. Materials Science	18%	8. Mechanical Engineering	16%
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4. Engineering Design	8%																		
5. Electrical Engineering	12%																		
6. Chemical Engineering	18%																		
7. Materials Science	18%																		
8. Mechanical Engineering	16%																		

STANDARD 1

Students will follow safety practices

- Objective 1** Identify potential safety hazards and follow general laboratory safety practices.
1. Assess workplace conditions regarding safety and health.
 2. Identify potential safety issues and align with relevant safety standards to ensure a safe workplace/jobsite.
 3. Locate and understand the use of shop safety equipment.
 4. Select appropriate personal protective equipment.
- Objective 2** Use safe work practices.
1. Use personal protective equipment according to manufacturer rules and regulations.
 2. Follow correct procedures when using any hand or power tools.
- Objective 3** Complete a basic safety test without errors (100%) before using any tools or shop equipment.

STANDARD 2

Students will investigate career opportunities within the world of Engineering

- Objective 1** Identify occupations related to Engineering.
- Objective 2** Differentiate among various Engineering disciplines.
1. Bioengineering
 2. Chemical Engineering
 3. Computer Engineering
 4. Electrical Engineering
 5. Civil & Environmental Engineering
 6. Mechanical Engineering
 7. Materials Science
- Objective 3** Investigate different types of occupational training and educational opportunities.

STANDARD 3

Students will understand and develop positive work ethics, communication skills, and leadership skills

- Objective 1** Demonstrate positive work ethics and leadership skills.
1. Responsibility
 2. Reliability
 3. Dependability
 4. Effective Communication
 5. Delegation
 6. Cooperation
 7. Teamwork
 8. Integrity
- Objective 2** Employ the Technology Student Association (TSA) student organization's program as an integral element of the curriculum.
- Objective 3** Participate in problem-solving, both individually and as part of a team.
- Objective 4** Understand the importance of inter-disciplinary teams.
- Objective 5** Take minutes of a team meeting.
- Objective 6** Make accurately proportioned sketches using correct drawing conventions.
1. Notes are neat and legible.
 2. Objects should be drawn to correct proportions.
 3. Dimensions are used appropriately.
 4. Views can be isometric, orthogonal, sections, or assemblies.
- Objective 7** Create and utilize an engineering notebook per established conventions.
1. Sequential and chronological.
 2. Accurate and complete reflection of the progress being recorded.
 3. Sketches or pictures are included where appropriate.
 4. No loose entries or pages.
 5. Each page is dated and witnessed.
 6. Unused spaces are identified and lined out.
 7. Errors are not erased or obliterated.
 8. Test data and calculations are included.

STANDARD 4

Students will identify the qualities of successful engineering design, recognize its role in society, and develop projects using an engineering design process

- Objective 1 Identify the qualities of good design and their relationship to the design's user.
 1. Examine a design with respect to its quality and usability.
 2. Understand that these qualities are the result of choices made and constraints applied during the design process.
- Objective 2 Recognize and identify the role of engineering and engineered products in society.
- Objective 3 Identify the requirements for and role of intellectual property in design.
- Objective 4 Recall education requirements for professional success as a designer/engineer.
- Objective 5 Identify and explain the elements of an engineering design process.
 1. Identify & define the design problem
 2. Brainstorm solutions
 3. Create models & build a prototype
 4. Test the prototype
 5. Redesign and optimize
- Objective 6 Understand the concept of a problem statement and design requirements.
- Objective 7 Create design specifications considering such factors as:
 1. Performance
 2. Time and financial constraints
 3. Ergonomics
 4. Safety
 5. The state-of-of the art
- Objective 8 Translate design requirements into a design solution.
- Objective 9 Use brainstorming methods to identify solutions to a design problem.
- Objective 10 Recognize and demonstrate that there are many possible successful designs and that a design process does not always result in a single best design.
- Objective 11 Explain the role of and be able to utilize mathematical and functional modeling in the creation and assessment of a design.
- Objective 12 Perform a design-of-experiments.
- Objective 13 Build and test designs against design specifications, evaluate the results of those tests, and present their analyses.

Objective 14 Demonstrate that design is an iterative process, subject to continuous evolutionary improvement.

STANDARD 5

Students will understand ways in which Electrical Engineering can enhance health and wellbeing of individuals

Objective 1 Identify several different careers that support the electrical or electronics industry.

1. Control
2. Electronics
3. Microelectronics
4. Signal Processing
5. Power
6. Telecommunications
7. Instrumentation
8. Mechatronics

Objective 2 Define and explain the following electronic terms and concepts:

1. Electricity
2. Electronics
3. Conductor
4. Insulator
5. Semi-Conductor
6. Series Circuit
7. Parallel Circuit
8. Voltage
9. Resistance
10. Current

Objective 3 Explore the fundamentals of atomic theory as it relates to electricity.

1. The electron's role in electricity.
2. The difference between an insulator and a conductor and be able to identify common examples of each.

Objective 4 Use idealized equations that are fundamental to Electrical Engineering.

1. Ohm's law to calculate current, voltage or resistance in simple circuits.
2. Kirkhoff's voltage law and understand how it applies to simple circuits.
3. Kirkhoff's current law and understand how it applies to simple circuits.
4. Watt's law to calculate current, voltage or power.

Objective 5 Assemble an electronic circuit and understand the use of schematics, function of basic electronic components, and electronic measurement.

Objective 6 Work in teams to design and build a project related to Electrical Engineering.

1. LED Light Display

Objective 7 Write a reflection of the project.

1. What was the objective?
2. What worked?
3. What didn't work and why didn't it work?
4. How did the design compare with the best and worst performers?
5. What you would do differently?
6. Was the objective accomplished?

Objective 8 Give a brief presentation on an existing or an emerging Electrical Engineering technology.

STANDARD 6

Students will understand ways in which Chemical Engineering can enhance the lives of individuals

Objective 1 Identify several different careers that support the chemical industry.

1. Petroleum
2. Pharmaceutical
3. Plastics
4. Biomaterials
5. Food Production
6. Mining & Minerals
7. Environmental Engineering

Objective 2 Understand the concepts of a process flow diagram.

1. Batch process
2. Continuous process

Objective 3 Understand the concepts of material balances and energy balances.

- Objective 4** Work in teams to design and build a project related to Chemical Engineering.
1. Photobioreactor to grow algae for biodiesel.
 2. Know the needs of algae in a bioreactor.
 3. Build and use a spectrophotometer to track the concentration of algae.
 4. Describe the transesterification reaction process of converting algae oil to biodiesel.
 5. Characterize the resulting product of the transesterification reaction.
- Objective 5** Write a reflection of the project.
1. What was the objective?
 2. What worked?
 3. What didn't work and why didn't it work?
 4. How did the design compare with the best and worst performers?
 5. What you would do differently?
 6. Was the objective accomplished?
- Objective 6** Give a brief presentation on an existing or an emerging Chemical Engineering technology.

STANDARD 7

Students will understand ways in which Materials Science can enhance health and well-being of individuals

- Objective 1** Identify several different careers related to materials science.
1. Ceramics
 2. Polymers
 3. Metals
 4. Semiconductors
 5. Composites
- Objective 2** Identify and explain the importance of material properties.
1. Materials have different properties based on their composition and chemical structure.
 2. Specialized materials form the basis of many engineering designs.
 3. Composite materials possess the material properties of their constituent materials.

- Objective 3** Use idealized equations that are fundamental to Statics.
1. Tension and compression stresses.
 2. Hooke's Law and how it applies to bending.
 3. A beam under a load perpendicular to the axis of the beam is under both tensile and compressive stress.
- Objective 4** Work in teams to design and build a project related to Materials Science.
1. Composite beam using supplied materials as agglomerates.
 2. Perform a design of experiments to determine optimal plaster to water mix ratio to give the desired properties of plaster.
- Objective 5** Write a reflection of the project.
1. What was the objective?
 2. What worked?
 3. What didn't work and why didn't it work?
 4. How did the design compare with the best and worst performers?
 5. What you would do differently?
 6. Was the objective accomplished?
- Objective 6** Give a brief presentation on an existing or an emerging Materials Science.

STANDARD 8

Students will understand ways in which Mechanical Engineering can enhance the lives of individuals

- Objective 1** Identify sub-disciplines of Mechanical Engineering and explain what each involves:
1. Robotics
 2. Biomechanics
 3. Aerospace Engineering
 4. Ergonomics and Safety
 5. Fluid Mechanics
 6. Micro and nanoscale engineering
- Objective 2** Use CAD to model a simple 3D object.
1. Trebuchet arm
- Objective 3** Understand the concept of design optimization; balancing competing design requirements to create an optimal design.

1. Adjusting the release pin on a trebuchet to maximize its throwing distance.
2. Using simulations to predict performance.

Objective 4 Demonstrate design optimization by maximizing design performance while working within constraints.

1. Limiting the amount of material used.
2. Limiting the overall project cost.
3. Limiting the types of materials that can be used.
4. Limiting the dimensions of the design.

Objective 5 Work in teams to design and build a project related to Mechanical Engineering.

1. Trebuchet

Objective 6 Write a reflection of the project.

1. What was the objective?
2. What worked?
3. What didn't work and why didn't it work?
4. How did the design compare with the best and worst performers?
5. What you would do differently?
6. Was the objective accomplished?

Objective 7 Give a brief presentation on an existing or an emerging Mechanical Engineering technology.

Engineering Principles II

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of 8 or higher on the rating scale. Students may be encouraged to repeat the objectives until they average 8 or higher.

Student's Name: _____ Class: _____

PERFORMANCE STANDARDS RATING SCALE



- ☐ Create and utilize an engineering notebook per established conventions.
- ☐ Demonstrate practice of the Technology & Engineering Professional Workplace Skills.
- ☐ Participate in a significant activity that provides each student with an opportunity to render service to others, employ leadership skills, or demonstrate skills they have learned through this course, preferably through participation in a Career & Technical Student Organization (CTSO) such as the Technology Student Association (TSA).

PERFORMANCE STANDARD AVERAGE SCORE:

Evaluator Name: _____

Evaluator Title: _____

Evaluator Signature: _____ Date: _____

Machining I

EXAM INFORMATION	DESCRIPTION
Exam Number 580 Items	This course is the first in a sequence that will use technical knowledge and skills to plan and manufacture projects using machine lathes, mills, drill presses, and other equipment in safe working conditions to promote the manufacturing industries.

50

Points

55

Prerequisites

NONE

Recommended Course

Length

ONE YEAR

National Career Cluster

AGRICULTURE, FOOD &

NATURAL RESOURCES

MANUFACTURING

Performance Standards

INCLUDED (OPTIONAL)

Certificate Available

YES

EXAM BLUEPRINT

STANDARD

PERCENTAGE OF EXAM

1- Personal Development	2%
2- Workplace Readiness	2%
3- Safe Practices and Procedures	9%
4- Mathematical Concepts	15%
5- Engineering Documents	5%
6- Measurement Inspections	11%
7- Manufacturing Materials and Processes	18%
8- Use of Grinding Machines/Band Saws	5%
9- Use of Milling Machines	15%
10- Use of Metal Lathes	18%

STANDARD 1

Student will participate in personal and leadership development activities through SkillsUSA or another appropriate career and technical student organization.

- Objective 1** Student will use communication skills to effectively communicate with others.
1. Understand when it is appropriate to listen and to speak.
 2. Understand and follow verbal and written instructions for classroom and laboratory activities.
- Objective 2** Student will effectively use teamwork to respectfully work with others.
1. Identify and understand different roles in working with a team.
- Objective 3** Student will use critical thinking and problem-solving skills.
1. Analyze the cause of the problem.
 2. Develop a solution to address the problem.
 3. Implement the plan.
 4. Evaluate the effectiveness of the plan.
- Objective 4** Student will be dependable, reliable, steady, trustworthy, and consistent in performance and behavior.
1. Set and meet goals on attendance and punctuality.
 2. Prioritize, plan, and manage work to complete assignments and projects on time.
- Objective 5** Student will be accountable for results.
1. Use an achievement chart for activities and behaviors in class that encourages a personal evaluation of classroom performance.
 2. File a regular written report on progress toward completion of assignments and projects.
- Objective 6** Be familiar with the legal requirements and expectations of the course.
1. Be familiar with the course disclosure statement and all requirements for successful completion of the course.
 2. Demonstrate workplace ethics, e.g., fair, honest, disciplined.

Standard 1 Performance Evaluation included below (Optional)

STANDARD 2

Student will participate in work-place readiness activities.

- Objective 1** Student will demonstrate employability skills.
1. Use a career search network to find career choices.
 2. Write a resume including a list of demonstrated skills.
 3. Write a letter of application.
 4. Complete a job application.
 5. Participate in an actual or simulated job interview.
- Objective 2** Student will participate in a work-based learning experience outside the classroom.
1. Student will plan and implement a work-based learning experience aligned with their career goal.

Standard 2 Performance Evaluation included below (Optional)

STANDARD 3

Students will be able to understand safe practices and professional machine shop procedures.

- Objective 1** Follow safety manuals and all safety regulations and requirements.
- Objective 2** Use PPE (personal protective equipment) and protective shields.
1. Wear PPE as recommended by OSHA, UOSHA, and the Utah State Risk Management Office.
 2. Maintain and use appropriate protective guards and equipment on machinery.
- Objective 3** Follow safe operating procedures for hand and power machine tools.
1. Identify and understand safe machine operating procedures.
 2. Demonstrate safe machine operations at all times.
- Objective 4** Maintain a clean and safe work environment.
1. Keep work areas clean.
 2. Clean machine and hand tools when work is completed.
 3. Put tools away when work is finished.
 4. Keep aisles clear of equipment and materials.
 5. Perform preventive maintenance as required.
 6. Understand chemical hazards and the use of Material Safety Data Sheets (MSDS).
 7. Keep storage rooms well organized and free of clutter.

Objective 5 Each student should earn a score of 100% on a required safety exam relating to general shop safety and each machine tool he/she will be operating.

Standard 3 Performance Evaluation included below (Optional)

STANDARD 4

Students will be able to apply mathematical concepts.

Objective 1 Perform basic arithmetic functions.

1. Add, subtract, multiply, and divide whole numbers.
2. Add, subtract, multiply, and divide fractions.
3. Add, subtract, multiply, and divide decimals.

Objective 2 Convert fractions/decimals.

1. Convert fractions to decimal equivalents.
2. Convert decimal values to nearest fractional equivalent.
3. Use decimal equivalent chart for conversions.

Objective 3 Calculate speeds and feeds for machining.

1. Given appropriate reference materials calculate RPM for various metals and tools.
2. Given appropriate reference materials, calculate the proper feed for various metals, tools, and depths of cut.

Objective 4 Locate basic machining points from a Datum Point.

1. Identify points using the Cartesian coordinate system.
2. Identify points using the absolute dimensioning system.
3. Identify points using the incremental dimensioning system.

Standard 4 Performance Evaluation included below (Optional)

STANDARD 5

Students will be able to interpret engineering drawings and control documents.

Objective 1 Identify basic layout of drawings.

1. Identify types of lines within a drawing.

Objective 2 Identify basic types of drawings.

1. Identify orthographic views.
2. Identify positions of views (top, front, side, and auxiliary).
3. Identify and describe the purpose of orthographic (three views) drawings.
4. Identify and describe the purpose of isometric drawings.
5. Identify and describe the purpose of exploded isometric drawings.
6. Identify and describe the purpose of assembly drawings.
7. Determine the scale of the view or section.
8. Check for revisions and describe the current specifications.
9. Recognize out-of-date blueprints and know appropriate related procedures.

Standard 5 Performance Evaluation included below (Optional)

STANDARD 6

Students will be able to properly perform measurement/inspection.

- Objective 1** Select proper measurement tools as they best relate to part characteristics and specified accuracy.
1. Discuss how measurement tool selection can contribute to part accuracy/inaccuracy.
 2. Demonstrate proper manipulation and care of precision measuring tools.
- Objective 2** Apply proper measuring techniques.
1. Discuss factors affecting accurate measurement (dirt, temperature, improper measuring, basic tool calibration, etc.).
 2. Demonstrate how to check calibration of various precision instruments.
- Objective 3** Accurately perform measurements with hand-held instruments.
1. Read a tape measure to 1/16".
 2. Read a micrometer to .001".
 3. Read a 3R machinist steel rule.
 4. Read a dial/digital caliper to .001".

Standard 6 Performance Evaluation included below (Optional)

STANDARD 7

Students will be able to understand planning, hand tools, and recognize different manufacturing materials and processes.

- Objective 1** Prepare and plan for machining operations.

1. Read and interpret blueprints.
2. Plan machining operations, write a plan of procedure.

- Objective 2** Demonstrate proper use of hand tools.
1. Select the most appropriate hand file and properly demonstrate its use.
 2. Correctly identify and use hand taps.
 3. Demonstrate the proper use of thread-cutting dies.
 4. Identify common hands tools and layout tools and describe their basic applications.
 5. Identify the parts of a drill bit e.g., margin, lip, flutes, point angle, and helical angle.

- Objective 3** Identify common materials and explain basic properties.
1. Discuss the classification systems for metals.
 2. Describe general characteristics for carbon steels, tool steels, stainless steels, structural steels, cast irons, aluminum, and other commonly used metal.

Standard 7 Performance Evaluation included below (Optional)

STANDARD 8

Students will be able to demonstrate the proper use of grinding machines and band saws.

- Objective 1** Demonstrate proper use of grinding abrasive machines.
1. Identify common types of grinding machines and discuss the major differences and applications.
 2. Discuss the variety and describe the proper selection and application of grinding fluids.
 3. Demonstrate the proper use and care of bench and pedestal grinders.

- Objective 2** Demonstrate proper use of band saws.

Standard 8 Performance Evaluation included below (Optional)

STANDARD 9

Students will be able to understand and demonstrate the use of milling machines.

- Objective 1** Demonstrate proper use of a vertical milling machine.

1. Identify the parts of a milling machine e.g., motor, speed indicator, quill feed, hand brake, gear selector, knee, and table.
2. Demonstrate the proper setup, operation, care, cleaning, and lubrication of the vertical milling machine.
3. Correctly identify common cutters and explain their basic applications.
4. Identify and demonstrate the proper use of all controls and adjustments on the vertical milling machine.
5. Properly set up the milling machine and demonstrate the use of an edge finder. Locate a point with- in .001".
6. Select the proper cutter and work holding device, demonstrate their proper installation and setup to machine a part (This may include end mills, fly cutter, etc.).
7. Having properly installed a drill chuck and an appropriate work holding device, demonstrate how to locate and drill a hole.
8. Demonstrate the ability to use the Machinery Handbook as a reference for milling.

Standard 9 Performance Evaluation included below (Optional)

STANDARD 10

Students will be able to understand and demonstrate the use of metal lathes.

- Objective 1** Demonstrate proper use of metal lathes.
1. Demonstrate the proper cleaning, lubrication, and care of the metal lathe.
 2. Identify common parts and demonstrate the proper use of basic controls and adjustments on the engine lathe.
 3. Identify and demonstrate the proper installation and application of standard tools and tool holders for the lathe.
 4. Identify common chucks and demonstrate proper procedure for changing and installing them.
 5. Demonstrate proper procedure for facing one end of a part.
 6. Demonstrate proper setup and procedure for center drilling parts.
 7. Demonstrate proper setup and procedure while drilling a hole.
 8. Demonstrate proper setup and technique for tapping a through hole on a metal cutting lathe.
 9. Demonstrate proper setup and procedure for turning a part to diameter.
 10. Demonstrate proper setup and procedure for turning a 90-degree shoulder.
 11. Using the compound rest demonstrate the proper setup and procedure for turning a diameter and a taper.
 12. Demonstrate proper setup and procedure for turning between centers.
(Optional)

13. Demonstrate proper setup and procedure while single point cutting threads to standard pitch diameter and shape specifications.
14. Demonstrate the proper procedure for grinding a HSS cutter bit

Standard 10 Performance Evaluation included below (Optional)

Machining I

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of 8 or higher on the rating scale. Students may be encouraged to repeat the objectives until they average 8 or higher.

Student's Name: _____ Class: .

PERFORMANCE STANDARDS RATING SCALE



- | | |
|--|---------------|
| <input type="checkbox"/> Use PPE – personal protective equipment. | Score: |
| <input type="checkbox"/> Maintain a clean and safe work environment. | Score: |
| <input type="checkbox"/> Perform basic arithmetic functions. | Score: |
| <input type="checkbox"/> Convert fractions to decimal equivalents. | Score: |
| <input type="checkbox"/> Calculate speeds and feeds for machining. | Score: |
| <input type="checkbox"/> Accurately perform measurements with hand-held instruments. | Score: |
| <input type="checkbox"/> Demonstrate proper use of hand tools. | Score: |
| <input type="checkbox"/> Demonstrate proper use of grinding abrasive machines. | Score: |
| <input type="checkbox"/> Demonstrate proper use of band saws. | Score: |
| <input type="checkbox"/> Demonstrate proper use of a vertical milling machine. | Score: |
| <input type="checkbox"/> Demonstrate proper use of metal lathes. | Score: |

PERFORMANCE STANDARD AVERAGE SCORE:

Evaluator Name: _____	Evaluator Title: _____
_____	Evaluator Signature: _____
_____	Date: _____



SCSD CTE Student Portfolio

Definition: Student portfolios are a collection of personal documents, which showcase an individual's learning experiences, goals and achievements. Student portfolios are created and controlled by the student, facilitated by the instructor, and evaluated by outside entities.

Purpose: Students should be able to leave a program with as many tools in their toolbox as possible. Student portfolios are a way to assist students in marketing themselves in future interviews, by using the portfolio to illustrate his or her skills and/or talents.

SCSD CTE Student Portfolio Requirements

<input type="checkbox"/>	Table of Contents:	This should list each section and piece of the portfolio in the order it appears
<input type="checkbox"/>	Cover letter	A cover letter introducing the student to a potential employer about a specific job in his or her chosen pathway. Should focus on why the student is the best candidate for the job. It should compliment the resume, not repeat it.
<input type="checkbox"/>	Resume	Should be professionally formatted. Usually a one-page document listing the student's name, personal information (address, phone, and email), an objective, work history or extracurricular/community involvement, education, certifications/credentials, personal skills/interests, and references.
<input type="checkbox"/>	Letters of Recommendation	Students must include at least two (2) reference letters, provided by people outside the school who are familiar with his or her work or character. The reference letters can be employment-related, personal, or they can attest to the character of the student.
<input type="checkbox"/>	Certifications/Credentials	Students should include copies of any credentials and/or certifications they have earned as a result of their program.
<input type="checkbox"/>	Transcript	Student provides a copy of his or her full academic transcript.
<input type="checkbox"/>	Employability Profile	<p>Per NYSED: The work skills employability profile is intended to document student attainment of technical knowledge and work-related skills. Documents to validate skills reported on the profile could include, but are not limited to, an employer/teacher review of student work based on learning standards and expectations in the workplace, performance evaluations and observations.</p> <p>Students must have at least one employability profile completed within one year prior to school exit. If a student is involved in a number of work-based learning experiences and/or is employed part time, he/she may also have additional employability profiles as completed by others knowledgeable about his or her skills (e.g.,</p>

		employer and/or job coach).
<input type="checkbox"/>	College Research	A written research assignment focusing on three colleges offering programs in the student's chosen career pathway.
<input type="checkbox"/>	Career Plan	Per NYSED: "Career Plans are an important mechanism to add relevance and meaning to learning experiences across subject areas. The career development model used to create the Career Plan aligns with the CDOS standards." A Career Plan document can be found here: http://www.p12.nysed.gov/cte/careerplan/docs/SecondaryCommencLvl.pdf
<input type="checkbox"/>	Student Awards	This section is completely open ended. Students should use this section to illustrate any awards, projects, exemplars, service learning, or scholarships, they participated or earned during their high school years. They can show evidence through pictures, project documentation, news articles, program agendas, meeting minutes, videos, etc.
<input type="checkbox"/>	Work Samples	Examples highlighting <i>only the student's best work</i> , demonstrating the skills and competencies he or she has mastered. These should be presented professionally and be clearly captioned. <i>Should not be thought as a scrapbook.</i> Potential employers are only interested in the very best examples.

[Return to TOC](#)

D. Postsecondary Articulation

The self-study team reviews the postsecondary articulation agreement for the program seeking approval. Postsecondary articulation agreements help students prepare for the transition from high school to advanced study in a particular career area. Articulation agreements provide direct benefits to students such as dual credits, college credits, advanced standing, or reduced tuition at a postsecondary institution. Articulation agreements may include several school districts and/or BOCES and multiple postsecondary institutions. The school district or BOCES may enter into multiple articulation agreements for a program seeking approval.

Process

- Reviewers confirm that the postsecondary articulation agreement is designed to prepare students for the transition from high school study to postsecondary study in the career area of the program seeking approval.
- Reviewers confirm that a postsecondary articulation agreement has been obtained that offers direct benefits to students in the program seeking approval.
- Reviewers confirm that the postsecondary articulation agreement includes the
 - prerequisite skills, knowledge, or coursework required of students to participate in the agreement
 - roles and responsibilities of each institution
 - duration of the agreement
 - endorsement by officials of each institution
- Signed articulation agreements must be on file within the school district or BOCES.

Documentation

Documentation of the postsecondary articulation agreement is maintained by the school district or BOCES and updated whenever modifications are made. Recommendations on the technical assessment selection should be included in the self-study report and reviewed by the external committee. A copy of the signed postsecondary articulation agreement must be attached to the Application for Career and Technical Education Program Approval.

Source: <http://www.p12.nysed.gov/cte/ctepolicy/guide.html>

E. Work-based Learning

Work-based learning (WBL) is the “umbrella” term used to identify activities which collaboratively engage employers and schools in providing structured learning experiences for students. These experiences focus on assisting students to develop broad, transferable skills for postsecondary education and the workplace. A quality WBL experience can make school-based learning more relevant by providing students with the opportunity to apply knowledge and skills learned in the classroom to real world situations.

Time requirements that students in an approved program may devote to work-based learning experiences are set by administrators of the approved program. This time should be an outcome of the self-study report and external review phases of the approval process. Work-based learning experiences must be sufficient in length and rigor to contribute to student achievement of the State learning standards as well as specific technical competencies.

Process

- The school district/BOCES and the employer cooperatively plan all work experiences.
- The school district/BOCES set up a formal procedure for the supervision/coordination of all work-based learning experiences and must ensure that work-based learning coordinators are appropriately certified.
- The school district/BOCES provide work-based learning experiences for students with disabilities
- The school district/BOCES and employer must ensure compliance with federal and state labor laws, and the State Department of Labor regulations and guidelines.
- The school district/BOCES must explore and develop work-based learning experiences in settings that are relevant to the program.
- The school district/BOCES must comply with Commissioner’s Regulations and Department policy where credit towards graduation is being awarded.

Documentation

Recommendations for work-based learning should be included in the self-study report and reviewed by the external committee.

Resources

New York State Education Department Work Experience Manual <http://www.emsc.nysed.gov/cte/wbl/>

Source: <http://www.p12.nysed.gov/cte/ctepolicy/guide.html>



SYRACUSE CITY SCHOOL DISTRICT
Career and Technical Education

CTE

Internship Handbook

Preparing today's students for tomorrow's careers.



Syracuse City School District

Career and Technical Education Internship

Introduction to Career & Technical Education Work Based Learning

Introduction to Syracuse City School District CTE Internship

Career & Technical Education Program/Teacher Guidelines

1. Legal requirements of Internship Program
2. Career & Technical Education Program/Teacher Checklist

Employer Internship Partner Guidelines

1. Employer Safety Requirements
2. Expectations and responsibilities of the employer partner
3. Worksite/Employer Internship Partner Checklist

Student Intern Guidelines

1. Student Intern expectations and responsibilities
2. Student Internship Checklist

FORMS

NYSED Application for Employment Certificate (NYSED form attached)
SCSD Certificate of insurance to cover student liability (sample attached)
SCSD Memorandum of Agreement (Form #1)
SCSD Internship Program Application (Form #2)
SCSD Internship Ready to Work Assessment (Form #3)
SCSD Internship Training Plan (Form #4)
SCSD Notification of unpaid internship (Form #5)
SCSD Internship Safety Certification (Form #6)
SCSD Worksite Orientation (Form #7)
SCSD Weekly Time Log/Record of Attendance (Form #8)
SCSD Student Evaluation (Form #9)
SCSD Mentor Program Evaluation (Form #10)

Forms are available on SCSD CTE website www.syracusecityschools.com/cte



Introduction

Syracuse City School District Career and Technical Education Work Based Learning

Learning in the workplace is not a new concept. Informal, on-the-job training is an integral part of all workforce development. Work based learning (WBL) provides structured learning experiences for students through exposure to a range of occupations. The Harvard University report, Pathways to Prosperity (February, 2011) suggested that "Work-linked learning should play an especially important role in the new American system of pathways to prosperity. There is mounting evidence that this would be an effective strategy for encouraging young adults to complete both high school and post-secondary degrees. Co-operative education is a tested model that provides students with extensive work experience that is monitored by the school."

Learning in the workplace is connected to and supports learning in the classroom. Work based learning also helps students achieve established academic standards. Properly developed and supported, work based learning provides a practical context for school subject matter and enhances the traditional classroom learning. Work based learning activities promote the development of broad, transferable skills and are a key element of a rigorous and relevant education for students. It enables students to acquire the attitudes, skills and knowledge needed to succeed in today's workplace.

Employer partners can develop and support work based learning experiences that promote the attainment of workplace knowledge and skills. In doing so, they can support academic achievement and personal growth by designing, structuring, supporting and connecting work based learning experiences. Work based learning also supports professional, technical, and work-readiness skills development. Quality work based learning should:

- Be designed to enhance the learning of skills and workplace knowledge in all aspects of the industry
- Be structured to be safe, legal and measurable
- Be developmentally appropriate
- Have identified learning objectives and assess student performance
- Develop career ready practices and provide opportunities for reflection
- Be supported and documented by appropriate planning and training; and
- Comply with State and Federal labor laws

Syracuse City School District Career and Technical Education Internship

A Career and Technical Education Internship provides an important link between the classroom and the workplace for students age 16 and older. It is a structured, time-limited, career preparation activity in which students are assigned to a workplace for a defined period of time to participate in and observe firsthand within a given industry. The internship enhances and adds relevance to classroom learning. The internship may provide the opportunity to work in teams, rotate through a number of departments and job functions, or work on a project of interest to the student. It is essentially a partnership that links school, community, and business/industry to provide a real-world environment in which students are given the opportunity to apply, and thereby enhance, the knowledge and skills obtained in the classroom. The internship is related to the student's CTE program of study, with the primary goals of promoting:

- The exploration of and experience in a field of interest
- Exposure to a wide range of careers and jobs within an industry
- Opportunities to develop, practice and demonstrate new skills
- The acquisition of occupational knowledge and awareness of the skills and education needed to be successful in the industry



Career & Technical Program/ Teacher Guidelines

Legal Requirements of SCSD CTE Internship Program

All Career and Technical Education Internship Programs have the common objective of providing opportunities for students to develop and demonstrate job skills at a supervised worksite. They are supported by training plans developed cooperatively by the employer, instructor, and student. There should be ongoing communication between the job mentors and the CTE teacher or work based learning coordinator concerning students' performance and needs.

Each internship program needs to have the following:

- New York State Education Department (NYSED) approval of the CTE program
- The employer understands that the student placement is governed by NYSED, New York State Workers' Compensation Board (NYSWCB), New York State Department of Labor (NYSDOL), and United States Department of Labor (USDOL) labor laws and regulations
- Employer is provided a Certificate of Insurance from school where school liability insurance protects the employer from any damage student may do in the workplace
- Students are given written notification that this program is unpaid and they are not due any wages per NYSDOL regulations
- Per NYS, students are required to receive coverage under the employer's Workers' Compensation Insurance if student is interning for a for-profit company. If student is interning at a non-profit entity, the student is required to be covered by the employer's visitors or volunteer insurance.
- Worksite must be in compliance with Occupational Safety and Health Administration (OSHA) regulations. Health and safety instruction/training appropriate for the job is provided by the SCSD and employer specific training is provided by the employer on the worksite.
- Memorandum of Agreement is in effect between the cooperating business and the education agency and outlines the responsibilities of the student, employer, parent/guardian, and school/coordinator, all of whom must sign to confirm their support of the agreement.
- Students complete an Internship Application indicating their understanding of, and agreement to, all rules and regulations of the program.
- Students receive instruction embedded within their CTE curriculum relating to the technical and career ready practices.
- An Internship Training Plan (ITP) is developed and used for each participating student. The plan identifies the general and specific job tasks the student will perform on the job, the desired learning outcomes of the experience, and the time frame the student will spend at each task. The training plan should be designed to ensure that the student will have a progressive learning experience.
- All participating students are meeting, or have met, academic requirements of their CTE programs and academic subjects. No students on academic probation will participate in the internship.
- Employment Certificate (Working Papers) for students provide verification that a student under age 18 is eligible for employment. The student, employer, and school must complete the form. Employment certificates are obtained at the high school – typically the main office, health office, or guidance office.
- Time Log/Record of Attendance provides an official record of the weekly and cumulative hours the student has worked during the experience. It must be maintained for each student.
- An intern evaluation will be done by the CTE teacher before the internship, at the midpoint of the internship and at the end of the internship. This same form will be completed by the on-site supervisor in the midpoint and at the end of the internship.



SCSD CTE Internship Program Checklist (To be completed by CTE teacher or WBL coordinator)

- ☐ NYSED has approved the CTE program
- ☐ The employer understands that the student placement is governed by NYSED, NYSWCB, NYSDOL, and USDOL labor laws and regulations
- ☐ NYSED Application for Employment certificate (working papers, usually available in school counseling office) has been verified (NYSED form attached)
- ☐ Employer is provided with a Certificate of Insurance from school to cover liability (sample attached)
- ☐ A written Memorandum of Agreement is in effect between the cooperating business and the education agency (**Form #1**)
- ☐ Students complete an Internship Application indicating their understanding of, and adherence to all rules and regulations set forth by the program. (**Form #2**)
- ☐ Students receive instruction embedded within their CTE curriculum relating to the technical and Career Ready Practices. The CTE teacher and the student have completed the SCSD CTE Internship Ready to Work Assessment (**Form #3**)
- ☐ An Internship Training Plan (ITP) is developed and used for each participating student (**Form #4**)
- ☐ Students are given written notification that this program will be unpaid and they are not due any wages per NYS DOL regulations (**Form #5**)
- ☐ All SCSD internship candidates have received appropriate safety certification for the industry provided by the school before internship and employer specific training and orientation is provided by the employer on the worksite (**Form #6 & Form #7**)
- ☐ All participating students are meeting, or have met, academic requirements of their CTE programs and academic subjects
- ☐ Review Time Log/Record of Attendance which serves as an official record of the hours the student has worked during the experience (**Form #8**)

REQUIRED FORMS

NYSED Application for Employment Certificate

Certificate of Insurance

SCSD Memorandum of Agreement
(**Form #1**)

SCSD Internship Program Application
(**Form #2**)

SCSD Internship Ready to Work
Assessment
(**Form #3**)

SCSD Internship Training Plan
(**Form #4**)

SCSD Notification of unpaid internship
(**Form #5**)

SCSD Internship Safety Certification
(**Form #6**)

SCSD Worksite Orientation
(**Form #7**)

SCSD Weekly Time Log/Record of
Attendance
(**Form #8**)

Forms are available online at the SCSD CTE website : www.syracusecityschools.com/cte

CTE Teacher/WBL Coordinator

Date

Employer Internship Partner Guidelines

SCSD CTE Internship Employer Requirements

Safety

At all times, both school personnel and the employment site personnel must take appropriate steps to ensure that safe practices are stressed and followed. However, it is impossible to guarantee that no injuries resulting in medical expenses and liability will occur. The following prudent steps are encouraged:

1. In-school course content must include training related to safety at the worksite. Appropriate safety certification should be offered if possible. SCSD internship candidates will have received appropriate safety training before beginning their internship.
2. Any sites used for SCSD CTE internships will be reviewed by school personnel prior to placing a student at the worksite.
3. Employers must provide safety training information to interns as they would a new employee. Safety training must be provided if the employer engaged in a particularly hazardous occupation for minors as defined by the USDOL.
4. Provisions for student safety must be included as part of the training agreement signed by the employer, student, parent, and school representative.

Types of Liability Insurance and Risk Management

Workers' Compensation and Employer Liability Insurance

All employers will have a policy that provides coverage for the Workers' Compensation statutory benefits as well as liability coverage for certain employment-related situations. Verification of employer's Workers Compensation insurance will be included in the Memorandum of Agreement. The SCSD will also have insurance that covers the student participating in a school-related internship experience.



SCSD CTE Internship Expectations & Responsibilities of Employer

Before

- Determine projects or activities that would be appropriate for your student intern
- Communicate with staff that an intern will be at the workplace and identify mentors
- Designate one employee, the on-site supervisor, to work with coordinator/teacher to develop and define successful student objectives and experiences and record on the student Internship Training Plan

During

- Provide student with a Work Site Orientation to organization and any required training
- Train student intern for your work site, including all work site safety training
- Maintain a quality, safe and legal learning experience; provide effective supervision
- Use the Internship Training Plan as a guide for the internship; hold intern to employee standards/expectations; oversee, direct, and provide adequate tasking to maximize learning
- Meet with coordinator/teacher and student to decide on an ongoing communications strategy
- Evaluate intern work and provide constructive criticism
- Assist student in working toward learning outcomes
- Coordinate student schedule, approve weekly timesheets
- Communicate successes and opportunities at the workplace that the teacher can use to enhance the value of classroom connections
- Complete a student evaluation midway through internship and discuss with student

After

- Complete a final evaluation of the student
- Hold debriefing session and review performance with the student and teacher
- Complete a Program Evaluation



SCSD CTE Internship Employer Internship Partner Checklist (To be completed by On-Site Supervisor/Mentor)

- ☐ Meet with coordinator/teacher and student to agree on ongoing communication strategy (e-mail, text, telephone, etc.)
- ☐ A written Memorandum of Agreement is in effect between the cooperating business and the education agency ([Form #1](#))
- ☐ Work with coordinator/teacher to develop and define successful student objectives and experiences and record on the student Internship Training Plan ([Form #4](#))
- ☐ Coordinate student schedule, approve weekly time log/record of attendance ([Form #8](#))
- ☐ Communicate with staff that an intern will be at the workplace and identify on-site supervisor and/or mentor

On-Site Supervisor _____

Mentor Name _____

- ☐ Provide student with Work Site Orientation to organization and any required training (Form #7)
- ☐ Create and maintain a quality, safe and legal learning experience
- ☐ Hold intern to employee standards/expectation; provide student support and candid feedback
- ☐ Communicate successes and opportunities at the workplace that the teacher can use to enhance the value of classroom connections
- ☐ Complete an interim SCSD CTE Internship Ready to Work Assessment of student performance and discuss with student ([Form #3](#))
- ☐ Provide effective supervision
- ☐ Complete a final assessment of the student ([Ready to Work Assessment, Form #3 and Student Training Plan, Form #4](#))
- ☐ Complete a program evaluation ([Form #10](#))

REQUIRED FORMS

SCSD Memorandum of Agreement
(Form #1)

SCSD Internship Ready to Work
Assessment
(Form #3)

SCSD Internship Training Plan
(Form #4)

SCSD Worksite Orientation
(Form #7)

SCSD Weekly Time Log/Record of
Attendance
(Form #8)

SCSD Mentor Program Evaluation
(Form #10)

*Forms are available online at the SCSD CTE
website : www.syracusecityschools.com/cte*

Employer/ Mentor

Date

Student Intern Guidelines

Expectations and Responsibilities of Students

Before

- Obtain working papers (if under 18)
- Return Internship Application and all permission slips with appropriate signatures
- Meet with your teacher/coordinator and worksite supervisor to finalize an Internship Training Plan

During

- Attend Orientation at the worksite
- Observe all workplace rules and regulations particularly those applicable to safety and security concerns
- Perform all duties, jobs and assigned tasks; treat internship like a real job
- Maintain regular work schedule and notify supervisor in advance of any vacation/appointments
- Track your hours as instructed on Weekly Timesheet
- Develop skill specific learning outcomes with your worksite supervisor
- Participate in ongoing reflection journal activities and skill building classroom assignments
- Communicate with your teacher/coordinator and worksite supervisor if issues arise
- Keep copies of all necessary paperwork (work journal, training plan, Weekly Time Log/Record of Attendance, and evaluations)

After

- Participate in self-evaluation and reflection activities
- Update your resume based upon new skills and experiences gained
- Send thank you note to employer

to do...



SCSD CTE Internship Student Checklist (To be completed by student)

- ☐ Obtain NYSED Application for Employment Certificate (usually available in school counseling office, application attached)
- ☐ A written Memorandum of Agreement is in effect between the cooperating business, the education agency, and signed by student and parents (**Form #1**)
- ☐ Return Internship Application (**Form #2**) and all permission slips with appropriate signatures
- ☐ Develop skill specific learning outcomes with your worksite supervisor
- ☐ Meet with your teacher/coordinator and worksite supervisor to finalize an Internship Training Plan for the internship (**Form #4**)
- ☐ Attend orientation at the worksite (**Form #7**)
- ☐ Observe all workplace rules and regulations particularly those applicable to safety and security concerns
- ☐ Perform all duties, jobs and assigned tasks; treat internship like a real job
- ☐ Maintain regular work schedule and notify supervisor in advance of any vacation/appointments
- ☐ Track your hours as instructed on time log/record of attendance (**Form #8**)
- ☐ Participate in ongoing reflection activities and skill building classroom assignments
- ☐ Communicate with your teacher/coordinator and worksite supervisor, if issues arise and keep copies of all necessary paperwork (work journal, training plan, Weekly Time Log/Record of Attendance, and evaluations)
- ☐ Participate in self-evaluation and reflection activities (**Forms #3 & #9**)
- ☐ Update your resume based on new skills and experiences gained
- ☐ Send thank you note to employer

REQUIRED FORMS

SCSD Memorandum of Agreement
(Form #1)

SCSD Internship Program Application
(Form #2)

SCSD Internship Ready to Work
Assessment
(Form #3)

SCSD Internship Training Plan
(Form #4)

SCSD Worksite Orientation
(Form #7)

SCSD Weekly Time Log/Record of
Attendance
(Form #8)

SCSD Student Evaluation
(Form #9)

*Forms are available online at the SCSD CTE
website: www.scsdusd.org/cte*

Student

Date

SCSD CTE Internship Forms

NYSED Application for Employment Certificate

SCSD Certificate of Insurance to Cover Student Liability

(Sample) Form #1 SCSD Memorandum of Agreement

Form #2 SCSD Internship Program Application

Form #3 SCSD Internship Ready to Work

Assessment Form #4 SCSD Internship Training Plan

Form #5 SCSD Notification of unpaid

internship Form #6 SCSD Internship Safety

Certification Form #7 SCSD Worksite

Orientation

Form #8 SCSD Weekly Time Log/Record of

Attendance Form #9 SCSD Student Evaluation

Form #10 SCSD Mentor Program Evaluation

Forms are available on SCSD CTE website at www.syracusecityschools.com/cte



THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
ALBANY, NY 12234

APPLICATION FOR EMPLOYMENT CERTIFICATE

See reverse side of this form for information concerning employment of minors.

All signatures must be handwritten in ink, and applicant must appear in person before the certifying official.

PART I - Parental Consent - (To be completed by applicant and parent or guardian)

Parent or guardian must appear at the school or issuing center to sign the application for the first certificate for full-time employment, unless the minor is a graduate of a four-year high school and presents evidence thereof. For all other certificates, the parent or guardian must sign the application, but need not appear in person to do so.

Date.....

I, Age

[Applicant]

Home Address , apply for a certificate as checked below

[Full Home Address Including Zip Code]

- ☐ Nonfactory Employment Certificate - Valid for lawful employment of a minor 14 or 15 years of age enrolled in day school when attendance is not required.
- ☐ Smdent General Employment Certificate - Valid for lawful employment of a minor 16 or 17 years of age enrolled in day school when attendance is not required.
- ☐ Full-Time Employment Certificate - Valid for lawful employment of a minor 16 or 17 years of age who is not attending day school.

I hereby consent to the required examination and employment certification as indicated above.

[Signature of Parent or Guardian]

PART II- Evidence of Age - (To be completed by issuing official only)

..... - Check evidence of age accepted - Document# (if any) .

[Date of Birth]

Birth Certificate State Issued Photo I.D Driver's License Schooling Record Other..

[Specify]

PART III - Certificate of Physical Fitness

Applicant shall present documentation of physical exam from a school or private physician, physician's assistant or nurse practitioner licensed to practice within New York State. Said examination must have been given within 12 months prior to issuance of the employment certificate. Date of physical exam on file with school..... If physical exam is over 12 months, provide student with certificate of physical fitness to be completed by school medical director or private health care provider.

If the physical exam or Certificate of Physical Fitness is limited with regards to allowed work/activity, the issuing official shall issue a Limited Employment Certificate (valid for a period not to exceed 6 months unless the limitation noted by the physician is pennanent, then the certificate will remain valid until the minor changes jobs. Enter the limitation on the employment certificate. THE PHYSICIAN'S CERTIFICATION SHOULD BE RETURNED TO THE APPLICANT.

PART IV - Pledge of Employment- (To be completed by prospective employer)

Part IV must be completed only for: (a) a minor with a medical limitation; and (b) for a minor 16 years of age or legally able to withdraw from school, according to Section 3205 of the Education Law, and must show proof of having a job.

The undersigned will employ residing at .

[Applicant]

as at.....

[Description of Applicant's Work]

[Job Location]

for.... days per week hours per day, beginning.....a.m.p.m.

[Name of Firm]

Factory

ending...

..... a.m.

..... p.m.

Nonfactory

[Address of Firm]

Starting date

[Telephone Number]

[Signature of Employer]

PART V - Schooling Record- (To be completed by school official)

Part V must be completed only for a minor 16 years of age who is leaving school and resides in a district (New York City and Buffalo) which require a minor 16 years of age to attend school, according to Section 3205 of the Education Law.

I certify that the records of.....

[Name of School]

.....

[Address]

Show that whose date of birth is .

[Name of Applicant]

THIS APPLICATION DOES NOT AUTHORIZE EMPLOYMENT

Is in grade....

[Signature of Principal or Designee]

PART VI- Employment Certification - (To be completed by issuing official only)

Certificate Number .

Date Issued

[School or Issuing Center]

[Address]

[Signature of Issuing Official]

GENERAL INFORMATION

An employment Certificate (Student Nonfactory, Smdent General, or Full Time) may be used for an unlimited number of successive job placements in lawful employment pemuted by the particular type of ce1tificate.

A Nonfactory Employment Certificate is valid for 2 years from the date of issuance or until the student turns 16 years old, with the exception of a Limited Employment Certificate. A Limited Employment Certificate is valid for a maximum of 6 months unless the limitation noted by the physician is permanent, then the certificate will remain valid until the minor changes job. It may be accepted only by the employer indicated on the certificate.

A new Certificate of Physical Fitness is required when applying for a different type of employment certificate, if more than 12 months have elapsed since the previous physical for employment.

An employer shall retain the certificate on file for the duration of the minor's employment. Upon termination of employment, or expiration of the employment certificate's period of validity, the certificate shall be returned to the minor. A certificate may be revoked by school district authorities for cause.

A minor employed as a Newspaper Carrier, Street Trades Worker, Farmworker, or Child Model, must obtain the Special Occupational Permit required.

A minor 14 years of age and over may be employed as a caddy, babysitter, or in casual employment consisting of yard work and household chores when not required to attend school. Employment certification for such employment is not mandatory.

An employer or a minor in an occupation which does not require employment certification should request a Certificate of Age.

PROHIBITED EMPLOYMENT

Minors 14 and 15 years may not be employed in, or in connection with a factory (except in delivery and clerical employment in an enclosed office thereof), or in certain hazardous occupations such as: construction work; helper on a motor vehicle; operation of washing, glinding, cutting, slicing, pressing or mixing machinery in any establishment; painting or exterior cleaning in connection with the maintenance of a building or structure; and others listed in Section 133 of the New York State Labor Law.

Minors 16 and 17 years of age may not be employed in certain hazardous occupations such as: construction worker; helper on a motor vehicle, the operation of various kinds of power-driven machinery; and others listed in Section 133 of the New York State Labor Law.

HOURS OF EMPLOYMENT

Minors may not be employed during the hours they are required to attend school.

Minors 14 and 15 years of age may not be employed in any occupation (except farmwork and delivering, or selling and delivering newspapers):

When school is in session:

more than 3 hours on any school day, more than 8 hours on a nonschool day, more than 6 days in any week, for a maximum of 18 hours per week, or a maximum of 23 hours per week if enrolled in a supervised work study program approved by the Commissioner.

after 7 p.m. or before 7 a.m.

When school is not in session:

more than 8 hours on any day, 6 days in any week, for a maximum of 40 hours per week.

after 9 p.m. or before 7 a.m.

This certificate is not valid for work associated with newspaper carrier, agriculture or modeling.

Minors 16 and 17 years of age may not be employed: --

When school is in session:

more than 4 hours on days preceding school days; more than 8 hours on days not preceding school days (Friday, Saturday, Sunday and holidays), 6 days in any week, for a maximum of 28 hours per week.

between 10 p.m. and 12 midnight on days followed by a school day without written consent of parent or guardian and a certificate of satisfactory academic standing from the minor's school (to be validated at the end of each marking period).
between 10 p.m. and 12 midnight on days not followed by a school day without written consent of parent or guardian.

When school is not in session:

more than 8 hours on any day, 6 days in any week, for a maximum of 48 hours per week.

EDUCATION LAW, SECTION 3233

"Any person who knowingly makes a false statement in or in relation to any application made for an employment certificate or permit as to any matter by this chapter to appear in any affidavit, record, transcript, certificate or permit therein provided for, is guilty of a misdemeanor."

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE: /-.-.n- FAX Nol:	
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC#
INSURED	INSURER A:	
	INSURERS:	
	INSURERC:	
	INSURERD:	
	INSURERE:	
	INSURERF:	

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	;; M% 1 , g J% Yv)	LIMITS
A	GENERAL LIABILITY COMMERCIAL GENERAL LIABILITY CLAIMS-MADE <input type="checkbox"/> OCCUR 500,000 Retained GEN'L AGGREGATE LIMIT APPLIES PER: POLICYn rgi,: nLOC					EACH OCCURRENCE \$ DAMAGE TO RENTED PREMISES /Ea occurrence\ \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COMP/OP AGG \$ \$
	AUTOMOBILE LIABILITY ANY AUTO ALLOWED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS					(Ea accident INGLI=LIM! \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ iP de t?AMAGE \$ \$
	UMBRELLA LIAB EXCESS LIAB HOCCUR CLAIMS-MADE OED I RETENTIONS\$					EACH OCCURRENCE \$ AGGREGATE \$ \$
	AND EMPLOYERS' LIABILITY WORKERS COMPENSATION <input type="checkbox"/> YIN ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below		N/A			IT", JT IOJ - E.L.EACH ACCIDENT \$ E.L.DISEASE- EA EMPLOYEE \$ E.L.DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS I LOCATIONS I VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER	CANCELLATION
	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

ACORD 25 (2010/05)

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Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

Memorandum of Agreement

(Form #1)

Type of Work Based Learning Experience: Non-Paid Internship

This Work Based Learning Experience Agreement is entered into by and between the Syracuse City School District (SCSD) _____ (Student), his/her Parents/Guardian, _____ (Parent/Guardian), and his/her Work Experience Employer, _____ (Employer), on the date indicated below, whereby the Student will participate in a CTE Internship (Program at the Employer's place of business located at _____, on _____, during the hours of _____).

THE STUDENT UNDERSTANDS THAT HIS/HER CONDUCT IS A REFLECTION UPON THE SCHOOL NAME AND AGREES THAT HE/SHE WILL:

1. Provide his/her own transportation to and from the Employer's place of business (the SCHOOL, the Student's home school, the SCHOOL and the Employer are in no way responsible for providing the Student with transportation to and/or from the Employer's place of business at any time or for any incidents or accidents which may occur while the Student is on route to or from the Employer's place of business)
2. Demonstrate a conscientious attitude and be honest, punctual, cooperative, courteous and willing to learn while at the Employer's place of business.
3. Keep regular attendance as agreed upon with the Employer, excluding Employer-observed holidays, days on which the Employer's place of business is closed or other legal absences and understands that his/her attendance will be taken from his/her weekly attendance reports.
4. Keep regular attendance at his/her home school.
5. Give the Employer as much advance notice as possible if unable to report for work or to do so in a timely manner and contact the CTE teacher at (315) _____.
6. Report to SCHOOL if the Internship location is closed for any reason during at time in which the student is scheduled to be at the Internship location and SCHOOL is in session.
7. Complete weekly time log/record of attendance (Form # 8) reports as required by SCHOOL.
8. Engage in only those work based learning experiences approved by the supervisor at the work-site.

THE EMPLOYER AGREES THAT IT WILL:

1. Not permit the Student to replace any paid employee (in the case of an Internship).
2. Advise the Student of all company rules, regulations and policies which relate to the Student.
3. Explain to the Student the responsibilities and duties of his/her internship and shall correlate on-the-job training with safety instructions given by the SCHOOL.
4. The work of the Student in occupations declared particularly hazardous by the U.S. Department of Labor shall be (i) incidental to the Student's training; (ii) intermittent and for short periods of time; and (iii) under the direct and close supervision of a qualified and experienced person.
5. Provide direct supervision by an authorized employee to the Student as needed.
6. Complete an accident report form and return to SCHOOL in the event of an accident.

7. Review the Student's performance with him/her on a weekly basis and sign a weekly time sheet, complete an evaluation of the Student on forms provided by the SCHOOL.
8. Inform the SCHOOL Instructor/Coordinator when the Student is absent or not performing adequately by calling (315)_____ .

(Form #1 Continued)

9. Observe any and all laws that may relate to the Student's work experience.

THE SCHOOL AGREES THAT IT WILL:

1. Carry the insurance listed for students during class activities including internships, job experiences and work placement.
2. Accident Insurance: SCHOOL carries tertiary accident insurance to cover medical expenses as a result of an accident. The parent's health insurance is primary and the home school district would be secondary. General Liability Insurance: SCHOOL carries general liability insurance to cover up to one million dollars for a single event. As added protection, a ten million dollar umbrella policy is also in effect.
3. Assist the Student in securing internship placement regardless of his/her sex, race, color, national origin or disability (all inquiries and/or complaints regarding discrimination should be directed to the compliance officer, Patty Clark, SCSD Central Office, 725 Harrison Street, Syracuse, New York 13210. Telephone: (315) 435-4131.
4. Provide the STUDENT with safety instructions correlated by the EMPLOYER with on-the-job training.
5. Review with the Student and the Employer their respective responsibilities and obligations while participating in the Program.

The parties/signatories hereby agree that good communication and understanding between them is vital if the objectives of this Program are to be met and that joint conferences between the Student, Employer, Parent/Guardian, Instructor, and others may be scheduled from time to time in order to discuss:

1. the student's progress
2. any misunderstandings
3. the reason for termination of the Agreement

This Agreement is not in effect until signed by all parties. This Agreement may be terminated at any time by any party upon written notice to the other parties.

We the undersigned, have reviewed and agreed to the terms and conditions set forth herein.

Date	<u> / / </u>	_____ Student
Date	<u> / / </u>	_____ Parent/ Guardian Daytime Phone Evening
Date	<u> / / </u>	_____ Phone

Date	<u> / / </u>	_____ Employer/ Supervisor
Date	<u> / / </u>	_____ CTE Teacher
Date	<u> / / </u>	_____ Home School Principal

The Syracuse City School District hereby advises students, parents, employees and the general public that it is committed to providing equal access to all categories of employment, programs and educational opportunities, including career and technical education opportunities, regardless of actual or perceived race, color, national origin, Native American ancestry/ethnicity, creed or religion, marital status, sex, sexual

orientation, age, gender identity or expression, disability or any other legally protected category under federal, state or local law.

Inquiries regarding the District's non-discrimination policies should be directed to:

Executive Director of Student Support Services, Civil Rights Compliance Officer, Syracuse City School District, 725 Harrison Street • Syracuse, NY 13210
(315) 435-4131, Email: CivilRightsCompliance@scsd.us



Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

CTE Internship Program Application Form

Personal Information

(Form #2)

Last Name	First Name	Age	Date of Birth
Street		Home Telephone Number	Cell Phone Number
City, State, Zip		Emergency Contact Name	Telephone Number
Email Address		Relationship to Emergency Contact	
Primary Parent/ Guardian Name		Parent/ Guardian's Telephone	
Primary Parent/ Guardian Email		Number Home	
		Cell	
Secondary Parent/ Guardian Name		Secondary Parent/ Guardian's Telephone Number	
		Home	
Secondary Parent/ Guardian Email		Cell	
Working Papers Certificate Number		SCSD Student schedule should be attached to this form	
		School Counselor	

School Year Training/ Work Schedule Availability

Please list the hours you can work during a typical weekly schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Please check applicable
box:

Fixed
Schedule

Schedule will vary

☐☐

Sports, Clubs, and Other Activities

Transportation

Please check the appropriate response

☐☐☐☐

Do you have a license?	Yes	No	If YES, which license do you have?	Full License	Junior License
Do you drive to school?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	License Number:		

If you do not have a license, how do you plan on getting to and from your internship?

☐ Public Transportation ☐ Other

Syracuse City School District CTE Internship

(Form #2 Continued)

INSURANCE COVERAGE IN CASE OF INJURIES TO STUDENT AT INTERNSHIP:**EMPLOYER'S WORKER'S COMPENSATION MUST COVER THE STUDENT IN CASE OF INJURIES AT TRAINING SITE.**PROGRAM AWARENESS STATEMENT TO BE CHECKED BY STUDENTS:

- ☐ In order to receive credit for my work-based learning experience, I must be training at a legal site approved by the school's CTE Teacher or work-based learning coordinator.
- ☐ I must notify my CTE teacher or work-based learning coordinator immediately if there is a change of work schedule or duties at the training site.
- ☐ Failure to report any disciplinary action, termination, or proper documentation of hours may result in the student not earning school credit.
- ☐ Students must present all daily attendance records to CTE teacher or work-based learning coordinator weekly and complete all assignments related to the program.
- ☐ I must immediately notify my work-based learning coordinator if I have or develop any medical condition(s) which affects my ability to participate in training, such as allergies, lifting heavy items, movement, standing, sitting, migraine headaches, etc. If there are any current conditions, please state them below. The presence of such a condition will not necessarily preclude me from participating in the internship and accommodations may be provided.

PARENTAL/GUARDIAN PERMISSION AND PICTURE/NEWS STORY RELEASE:

I give my child, _____ permission to participate in the work-based learning internship at the Syracuse City School District. By signing the parental permission form, it is understood that:

- All the information is accurate.
- In order to receive credit, students must work a minimum of 150 hours during the school year.
- All students must report to CTE teacher or work-based learning coordinator in the case of any change in employment.
- Failure to report any disciplinary action, termination, or proper documentation may result in the student not earning school credit.
- Students must present all daily attendance records to CTE teacher or work-based learning coordinator weekly and complete all assignments related to the program.
- A student with a junior license must only drive to school if they go directly to work following the school day and they must carry with them the proper paperwork as directed by the work-based learning coordinator.

In addition to agreeing with the above statements, please check off one:

- ☐ I give permission for my child's photograph or name to be used to promote the Work Experience Program.
- ☐ I do not want my child's photograph or name to be used to promote the Work Experience Program.

 Parent/ Guardian's Name

 Parent/ Guardian's Signature

 Date

 Relationship to Student

 / /

Student's Name

Student's Signature

Date

The Syracuse City School District hereby advises students, parents, employees and the general public that it is committed to providing equal access to all categories of employment, programs and educational opportunities, including career and technical education opportunities, regardless of actual or perceived race, color, national origin, Native American ancestry/ethnicity, creed or religion, marital status, sex, sexual orientation, age, gender identity or expression, disability or any other legally protected category under federal, state or local law. Inquiries regarding the District's non-discrimination policies should be directed to: Executive Director of Student Support Services, Civil Rights Compliance Officer, Syracuse City School District, 725 Harrison Street • Syracuse, NY 13210/ (315) 435-4131, Email: CivilRightsCompliance@scsd.us



Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

CTE Internship Ready to Work Assessment

(Form #3)

Teacher

Employer

Student

Name Program Date / /

Scale

1 = Seldom. 2 = Occasionally. 3 = Usually. 4 =

1	Actively participates			
2	Shows enthusiasm			
3	Invigorates others			
GRIT				
4	Finishes whatever he or she begins			
5	Tries very hard even after experiencing failure			
6	Works independently with focus			
SELF CONTROL SCHOOL WORK				
7	Comes to class prepared			
8	Pays attention and resists distractions			
9	Remembers and follows directions			
10	Gets to work right away rather than procrastinating			
SELF-CONTROL INTERPERSONAL				
11	Remains calm even when criticized or otherwise provoked			
12	Allows others to speak without interruption			
13	Is polite to adults and peers			
14	Keeps his/her temper in check			

OPTIMISM				
15	Gets over frustrations and setbacks quickly			
16	Believes that effort will improve his or her future			
GRATITUDE				
17	Recognizes and shows appreciation for others			
18	Recognizes and shows appreciation for his/her opportunities			
SOCIAL INTELLIGENCE				
19	Is able to find solutions during conflicts with others			
20	Demonstrates respect for feelings of others			
21	Knows when and how to include others			
CURIOSITY				
22	Is eager to explore new things			
23	Asks and answers questions to deepen understanding			
24	Actively listens to others.			
ACADEMIC PERFORMANCE				
25	Completes all assignments with quality and timeliness			
26	Uses tools appropriately and safely			
COMMITMENT				
27	Attends class with one or less absences per quarter			
28	Demonstrates loyalty and appreciation to the program and instructors			



Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

CTE Internship Training Plan

(Form #4)

Student's Name	Email	
Student's Address	Telephone	Date of Birth
CTE Program Career Cluster	Working Papers Certificate #	
School Coordinator		
Phone Number		
Fax Number		
Email		
Employer		
Phone Number		
Fax Number		
Email		
Immediate Job Supervisor		
Phone Number		
Email		
Corporate Address		

Training Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Insurance Coverage

- ☐ Student is a non-paid intern – Worker's Compensation
- ☐ Student is a non-paid observer – Worker's Compensation

Transportation Provided by

- ☐ Student/parent will provide own transportation
- ☐ School district will provide transportation during school hours

Goals for this Work-Based Learning Student:

1. To explore, learn and develop the skills necessary for this career.

2. To develop the Career Ready Practices necessary for success in the global, competitive world.
3. To be trained in the safe operations of this job title.
4. To be able to demonstrate positive behavior and appropriate dress.

(Form #4 Continued)

JOB TASKS AND LEARNING OUTCOMES (Determined by the Employer and Coordinator)	ACHIEVEMENT LEVEL AND COMMENTS 1. Mastered skill 2. Needs more training at the work site. 3. Needs more training at school. 4. Has not reached this training area.
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

CAREER READY PRACTICES	Always	Frequently	Occasionally	Rarely
1. Student works cooperatively as a team member?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Student is able to read instructions for information and application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Student can calculate and measure for information and application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Student can behave in a responsible manner without supervision.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Student can communicate verbally and in writing to evoke clear understanding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Student demonstrates good listening and follow through skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Student demonstrates critical thinking and problem solving skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Student can locate and manage resources for problem solving.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Student demonstrates a positive work ethic.				
10. Student demonstrates computer literacy.				



Syracuse City School District CTE Internship

(Form #4 Continued)

SAFETY TRAINING	DATE OF SAFETY TRAINING	ACHIEVEMENT LEVEL AND COMMENTS 1. Mastered safety training instruction. 2. Needs more safety training at work site. 3. Needs more safety training at school. 4. Has not reached this training area.
1. Safety precautions related to stairs, floors, office equipment and furniture.		
2. Safety precaution related to proper dress apparel, shoes, gloves, head, eye and ear protection.		
3. Safety precaution related to use of tools, machines, and chemicals.		
4. Safety precautions related to fire, weather and other natural disasters.		
5. Safety precautions related to sexual harassment and workplace violence.		

DRESS AND BEHAVIOR CODE FOR POSITION	ACHIEVEMENT LEVEL AND COMMENTS 1. Dresses/behaves appropriately 2. Needs to modify dress/behavior. 3. Needs personal consultation.

_____ Employer Name	_____ Employer Signature	_____ Date / /
_____ Work-based Learning Coordinator Name Coordinator	_____ Work Based Learning Signature	_____ Date / /
_____ Parent/ Guardian Name	_____ Parent/Guardian Signature	_____ Date / /
_____ Student Name	_____ Student Signature	_____ Date. / /

Thank you for your cooperation! _____, CTE Teacher

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Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD CTE Internship

Notification of Unpaid Internship

(Form #5)

This form serves as notification that the Syracuse City School District CTE Internship is an unpaid internship and students are not due any wages per New York State Department of Labor.

Student

/ /
Date

CTE Teacher/ WBL Coordinator

/ /
Date

Worksite Representative/ Mentor

/ /
Date



Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD Internship Safety Certification

(Form #6)

Student

Date / /

Mentor or Supervisor

CTE/ WBL Teacher

Student CTE Program SCSD Career and Technical Program:

Certifications

Date

OSHA 10	<input type="checkbox"/>	/ /
Safe Serv	<input type="checkbox"/>	/ /
First Aid	<input type="checkbox"/>	/ /
CPR	<input type="checkbox"/>	/ /
Other	<input type="checkbox"/>	/ /



Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD Internship Worksite Orientation

(Form #7)

Teacher
Employer
Student

Student

Date

Mentor or Supervisor

CTE/ WBL Teacher

Company Orientation

Directions: Be sure that your student employee obtains information about the factors listed below. Check the information on each item as it is completed. Return the completed form to the CTE Teacher or Work Based Learning Coordinator.

Tour of Workplace

- ☐ A tour of the workplace
- ☐ An overview of the company safety plan
- ☐ Introductions to co-workers

Tour of Employee Facilities

- ☐ Rest rooms
- ☐ Lunch room
- ☐ Where to store personal belongings

Other _____

Safety Plan

- ☐ Safety plan
- ☐ Stairwell/fire exits
- ☐ Fire Extinguishers
- ☐ Special hazards
- ☐ Accident prevention
- ☐ Safety Training Log, updated as needed

About the Company

- ☐ Discuss company organizational structure
- ☐ Review type of business, products, services
- ☐ Overview of who the customers are

Other _____

Department/Position Specifics

- ☐ Explanation of work schedule
- ☐ Review of dress and conduct code
- ☐ Review of hours, breaks and lunch policies
- ☐ Location of time clock or sign-in
- ☐ Attendance requirements, including procedures for calling in when absent
- ☐ Relationship to working with other departments or co-workers

Job Specific

- ☐ How to use the phones and office equipment
- ☐ Supplies, paper, pens, etc.
- ☐ Job description, Work-Based Learning Plan and evaluation process

Supervisors Expectations

- ☐ Dress code including clothing, hair and jewelry
- ☐ Work performance including productivity and work habits
- ☐ Company culture

Materials provided to intern

- ☐ Copy of personnel handbook
- ☐ Organizational charts
- ☐ Telephone directory
- ☐ Security procedures

Employer/training sponsor

Date

Student

Date

CTE Teacher/WBL Coordinator

_____/_____/_____
Date



Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

Weekly Time Log/Record of Attendance

(Form #8)

Student _____

Training Title _____

Worksite Supervisor _____

Time Log for the Week of: ____ / ____ / ____

	Date	Start Time	End Time	Hours Worked
Sunday				
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				

Total Weekly Hours: _____

Student please list any new tasks performed this week: _____

By signing this timesheet, you are certifying that it is correct and truthful.

Student's Signature _____

____ / ____ / ____
Date

Supervisor Name _____ Phone _____

____ / ____ / ____
Date

Supervisor's Signature _____

Attention Worksite Supervisor:

If you have any questions or concerns, please contact:

CTE Teacher

Phone _____

The Syracuse City School District hereby advises students, parents, employees and the general public that it is committed to providing equal access to all categories of employment, programs and educational opportunities, including career and technical education opportunities, regardless of actual or perceived race, color, national origin, Native American ancestry/ethnicity, creed or religion, marital status, sex, sexual orientation, age, gender identity or expression, disability or any other legally protected category under federal, state or local law. Inquiries regarding the District's non-discrimination policies should be directed to: Executive Director of Student Support Services, Civil Rights Compliance Officer, Syracuse City School District, 725 Harrison Street • Syracuse, NY 13210/ (315) 435-4131, Email: CivilRightsCompliance@scsd.us



Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD CTE Internship Student Evaluation (Form #9)

Name _____

CTE Program _____

_____/_____/_____
Dates of Internship

_____/_____/_____
Year to Graduate

Please complete this form upon completion of your internship.

	Strongly Strongly	Agree Disagree	Indifferent	Disagree	
Overall, I had a great experience					
I was actively involved in the team meetings and felt free to express my thoughts and opinions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My mentors encouraged and responded to my questions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have an increased appreciation for teamwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have a greater ability to ask good questions and synthesize information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was presented with opportunities to learn by doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I gained factual knowledge about careers throughout the internship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this opportunity to others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My time was well spent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would consider this employer as a future employer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My co-workers are generally positive about work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The best thing about my experience was... _____

The worst thing about my experience was... _____

Any suggestions on how we could improve the intern experience? _____

Other comments... _____



Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD CTE Internship Mentor Program Evaluation (Form #10)

Student Name _____

SCSD School _____

Interning Location _____

Supervisor/ Mentor Name _____

/ /
Date

Internship Preparation

- ☐ Exceptional
- ☐ Adequate
- ☐ Inadequate

Modes of Communication with SCSD Personnel

In-Person

- ☐ Email
- ☐ Phone
- ☐

Amount of Communication with SCSD Personnel

- ☐ Exceptionally good
- ☐ Appropriate
- ☐ Too much
- ☐ Too little

Suggestions for improvement: _____

Additional comments: _____

Return to CTE teacher: _____
CTE Teacher Email

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NOTICE OF NON-DISCRIMINATION

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F. Employability Profile

The employability profile is a record of student achievement. That may include documentation of the student's attainment of technical knowledge and work-related skills, endorsements, licenses, clinical experience, work experience, performance on core academic Regent's examinations, performance on industry based assessments, attendance, student leadership honors and achievements and other honors or accolades of student success.

Process

- An employability profile model is developed for the program
- A profile of student achievement is developed for each student in the program and is maintained in accordance with records and retention policies of the school district/BOCES.
- The profile of student achievement is reviewed and updated on a continuous basis by the student and the appropriate program/guidance personnel.
- The work skills to be mastered by students with disabilities should be aligned with the student's Individualized Education Program (IEP).

Documentation

Recommendations for the employability profile model should be included in the self-study report and reviewed by the external committee.

Source: <http://www.p12.nysed.gov/cte/ctepolicy/guide.html>



EMPLOYABILITY PROFILE

Mechanical Technology



Industry Based Skill Standards

Proficiency Definitions

NA = Not Applicable

1 = Developing

2 = Basic

3 = Proficient

4 = Mastery

History of Engineering	9th	10th	11th	12th
Identify the different professions associated with Engineering.				
Understands the origins and development of Engineering.				
Design Process	9th	10th	11th	12th
Define and apply the design process.				
Can create a sketch of a Multiview drawing given an isometric drawing				
Understands the factors involved in brainstorming, prototyping and reverse engineering.				
Manufacturing Math and Science Measurements	9th	10th	11th	12th
Demonstrates how to develop and interpret graphs and charts.				
Able to solve problems involving geometric shapes, using formulas				
Able to calculate torque, speed, voltage, and ratios using standard equations.				
Safety	9th	10th	11th	12th
Can use electrical power tools safely				
Can perform a Lockout and Tag out procedure				
Complete OSHA 10 safety course				
Knows basic industrial safety rules and how to report unsafe conditions.				
Can identify fire exits, fire fighting equipment, and evacuation procedures.				
Knows how to perform an equipment safety check.				
Knows the importance of ergonomics				
Knows how to find and interpret a MSDS document				
Can identify and wear proper personal protective gear				
Quality Assurance	9th	10th	11th	12th
Can Identify components of an effective quality system				
Knows how to apply continuous quality improvement				
Knows about customer service and the importance				
Can perform quality inspections				
Blueprint Production and Reading	9th	10th	11th	12th
Able to develop 2 dimensional drawings with AutoCAD				
Can interpret commonly used symbols from a drawing				
Able to determine dimensions and tolerances from a drawing				
Knows how to extract information from a title block				
Can identify the type of lines used on a drawing				

Manufacturing Fundamentals	9th	10th	11th	12th
Can demonstrate basic hand tool care and use (Drills, Saws, Wrenches, etc)				
Can perform basic troubleshooting maintenance procedures				
Can identify specific machine tools and their function				
Able to construct component from an assembly drawing				
Able to operate Mills, Drill Press, Lathe, Grinder				
Computer Use	9th	10th	11th	12th
Able to develop charts and graphs from data				
Able to develop documents using Microsoft Word processing software				
Able to describe different methods of tracking inventory				
Mastery of Microsoft Office Suite				
Process Control	9th	10th	11th	12th
Can explain how process control applications function				
Knows the advantages and disadvantages of "just-in-time" inventory				
Knows how time and motion studies are conducted and analyzed				
Electrical	9th	10th	11th	12th
Can use DVM and Analog Voltmeter to gather electrical measurements.				
Can calculate unknown values using Ohms law				
Can troubleshoot simple electric circuits				
Can identify electrical components and what they are used for				
Can interpret basic ladder diagrams				
Hydraulics	9th	10th	11th	12th
Can demonstrate the basic functions of how a hydraulic system work				
Can determine system pressure using gauges				
Can interpret hydraulic connections from a drawing				
Measuring tools	9th	10th	11th	12th
Demonstrate mastery of measuring instruments; scale and tape measure				
Can identify precision measuring devices. (Vernier Calipers, Micrometers, etc.)				
Demonstrate mastery of Vernier Calipers and Micrometers.				



Mechanical Technology

EMPLOYABILITY PROFILE

Student Name: _____

School Year: _____

Absences: _____

ID Number: _____

Teacher: _____

Final Grade: _____

Career Ready Practices / Career Development Standards

STANDARDS DEFINITIONS

NA = Not Applicable

1 = Developing

2 = Basic

3 = Proficient

4 = Mastery

	9th	10th	11th	12th
Acts as a responsible citizen/employee				
Is on time and prepared, follows workplace policies, demonstrates reliability and dependability, is polite and courteous to adults and peers, demonstrates appreciation, and is reliable and consistent in their actions				
Applies appropriate academic and technical skills				
Demonstrates an understanding of the academic knowledge and skills associated with their trade. Technical skills are developed with academic competencies including English language arts and science that are integrated within the CTE program.				
Attends to personal health and financial well-being				
Recognizes the benefits of physical, mental, social, and financial well-being to the importance of that success in their career. Accepts criticism and works towards self-improvement targets on a consistent basis.				
Communicates clearly, effectively, and with reason.				
Is able to communicate both verbally and in writing to express ideas and obtain information. Uses appropriate vocabulary to share information both verbally and in writing as well. Demonstrates active listening skills and verbal communication.				
Makes appropriate decisions				
Considers the environmental, social, and economic impacts of their decisions. Understands that their actions and decisions will impact other people directly. Works independently and responds positively to new ideas and suggestions.				
Demonstrates creativity and innovative thought				
Demonstrates creativity and new thinking to solve workplace problems as encountered. Is creative, innovative, and is eager to explore new ways of addressing issues and challenges that are encountered.				
Employs valid and reliable research strategies				
Seeks information to develop a deeper understanding of issues encountered. Uses technology as a tool to research, organize, and evaluate information critically incompetently. Interprets information and draws conclusions based on best analysis.				
Uses critical thinking skills and demonstrates perseverance				
Demonstrates problem-solving skills through the use of creative thinking, decision-making, and adaptability. Effectively reasons through difficult situations, and makes decisions even when faced with complex or challenging problems.				

	9th	10th	11th	12th
Models integrity, ethical behavior, and leadership				
Is accountable and transparent in all of their work and assignments. Consistently exhibits ethical behavior, and commitment to completing tasks as assigned. Develops and demonstrates leadership skills, assuming responsibility readily.				
Develops and implements a Career Plan				
Develops a career plan based on understanding of their personal goals and the career pathways that aligns to them. Develops resumes, cover letters, and examples of best work to aid in the job seeking process and/or entrepreneurial goals.				
Uses technology to enhance productivity				
Demonstrates an understanding of the use of technology related to their career pathway. Continually develops their ability to adapt to changing work environments using technology, including new tools and their associated applications.				
Works as a productive and respectful team member				
Actively participates as a member of a team recognizing and appreciating others skills and abilities. Adds to the collective value of the team, and invigorates others to add to the collective efforts and goals.				
Demonstrates reliability and dependability				
Regardless of tasks given, demonstrates reliable and dependable behaviors to meet the expectations as defined. Attendance and levels of participation meet expectations consistently. Take on additional responsibilities without prompting.				
Arrives on time and is prepared to work				
Consistently demonstrates promptness, reliability, and commitment to reporting for classes, work site experiences, and other assignments as defined. Reports prepared for work or education as requirements dictate, meets attendance requirements.				
Demonstrates safe working habits				
When engaging in worksite situations or learning labs, uses tools and equipment safely, observes general safety guidelines for material handling, and meets the expectations of maintaining a safe work environment for others.				
Demonstrates problem solving skills				
Addresses problems encountered using effective problem-solving strategies. Works to define potential solutions to problems, identifies and implements the best solution based on the information gathered and their skill and knowledge.				

Earned Technical Endorsement on Diploma

YES

NO

Industry Credential(s) Awarded

Special Recognitions or Scholarships

Student Leadership Organization

[Return to TOC](#)