

Engineering Technology
Level IV Outline

Unit I: Review of Shop Rules / Shop Safety

- Student agenda book
- General overview of course and requirements
- General shop safety rules and procedures
- Location and use of shop safety equipment
- Physics: Describing Motion

Unit II: Fits and Tolerances

- Fits
- Allowance
- Description of fits
- Interchangeability of parts
- Standard inch fits
- Basic hole system
- Basic shaft system
- Preferred metric limits and fits

Unit III: Computer Aided Engineering (CAE) Tools

- Simulation Environment in Siemens NX[®]
- Structural simulations (stress/strain/displacement)
- Fluid flow/heat transfer simulations
- Motion simulations

Unit IV: Welding Technology

- Welding symbols
- Fillet welds
- Groove welds
- Plug welds
- Slot welds
- Spot welds
- Seam welds
- Surfacing welds
- Flanged welds
- Stud welds

Unit V: Jigs and Fixtures

- Drill jigs
- Drill bushings
- Jig body
- Cap screws and dowel pins
- Locating devices
- Clamping devices
- Locking pins
- Milling fixtures
- Fixture components
- Sequence of laying out a fixture

Unit VI: Modern Composite Materials

- Composite basics
- Matrices and reinforcements
- Health and safety
- Composite molding basics
- Composite fabrication techniques
- Composite demolding techniques
- Composite finishing techniques

Unit VII: Rapid Prototyping

- Review history of rapid prototyping
- Available rapid prototyping technologies
- Limitations of rapid prototyping

Engineering Technology
New Jersey Student Learning Standards (NJSLS)

NJSLS CTE.9.3

CONTENT AREA:	9.3 CAREER AND TECHNICAL EDUCATION
SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS CAREER CLUSTER®	
Number	Standard Statement
By the end of Grade 12, Career and Technical Education Program completers will be able to:	
CAREER CLUSTER®:	SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS (ST)
9.3.ST.1	Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.2	Use technology to acquire, manipulate, analyze and report data.
9.3.ST.3	Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
9.3.ST.4	Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.
9.3.ST.5	Demonstrate an understanding of the breadth of career opportunities and means to those opportunities in each of the Science, Technology, Engineering & Mathematics Career Pathways.
9.3.ST.6	Demonstrate technical skills needed in a chosen STEM field.
PATHWAY:	ENGINEERING & TECHNOLOGY CAREER PATHWAY (ST-ET)
9.3.ST-ET.1	Use STEM concepts and processes to solve problems involving design and/or production.
9.3.ST-ET.2	Display and communicate STEM information.
9.3.ST-ET.3	Apply processes and concepts for the use of technological tools in STEM.
9.3.ST-ET.4	Apply the elements of the design process.
9.3.ST-ET.5	Apply the knowledge learned in STEM to solve problems.
9.3.ST-ET.6	Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner.
PATHWAY:	SCIENCE & MATHEMATICS CAREER PATHWAY (ST-SM)
9.3.ST-SM.1	Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.
9.3.ST-SM.2	Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.3.ST-SM.3	Analyze the impact that science and mathematics has on society.
9.3.ST-SM.4	Apply critical thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data.