

Teacher Assessment Blueprint

Pre-Engineering/Engineering Technology



Test Code: 5915 / Version: 01

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## General Assessment Information

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**Test Type:** The Pre-Engineering/Engineering Technology assessment is included in NOCTI's Teacher assessment battery. Teacher assessments measure an individual's technical knowledge and skills in a proctored proficiency examination format. These assessments are used in a large number of states as part of the teacher licensing and/or certification process, assessing competency in all aspects of a particular industry. NOCTI Teacher tests typically offer both a written and performance component that must be administered at a NOCTI-approved Area Test Center. Teacher assessments can be delivered in an online or paper/pencil format.

**Revision Team:** The assessment content is based on input from subject matter experts representing the following states: Kentucky, New York, Pennsylvania, and Virginia.



15.9999- Engineering  
Technologies/Technicians,  
Other



Career Cluster 15-  
Science, Technology,  
Engineering,  
and Mathematics



17-3027.00- Mechanical  
Engineering Technicians



**NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE**  
University of the State of New York - Regents Research Fund

In the lower division  
baccalaureate/associate degree  
category, 3 semester hours in  
Introduction to Engineering or  
Engineering Technology

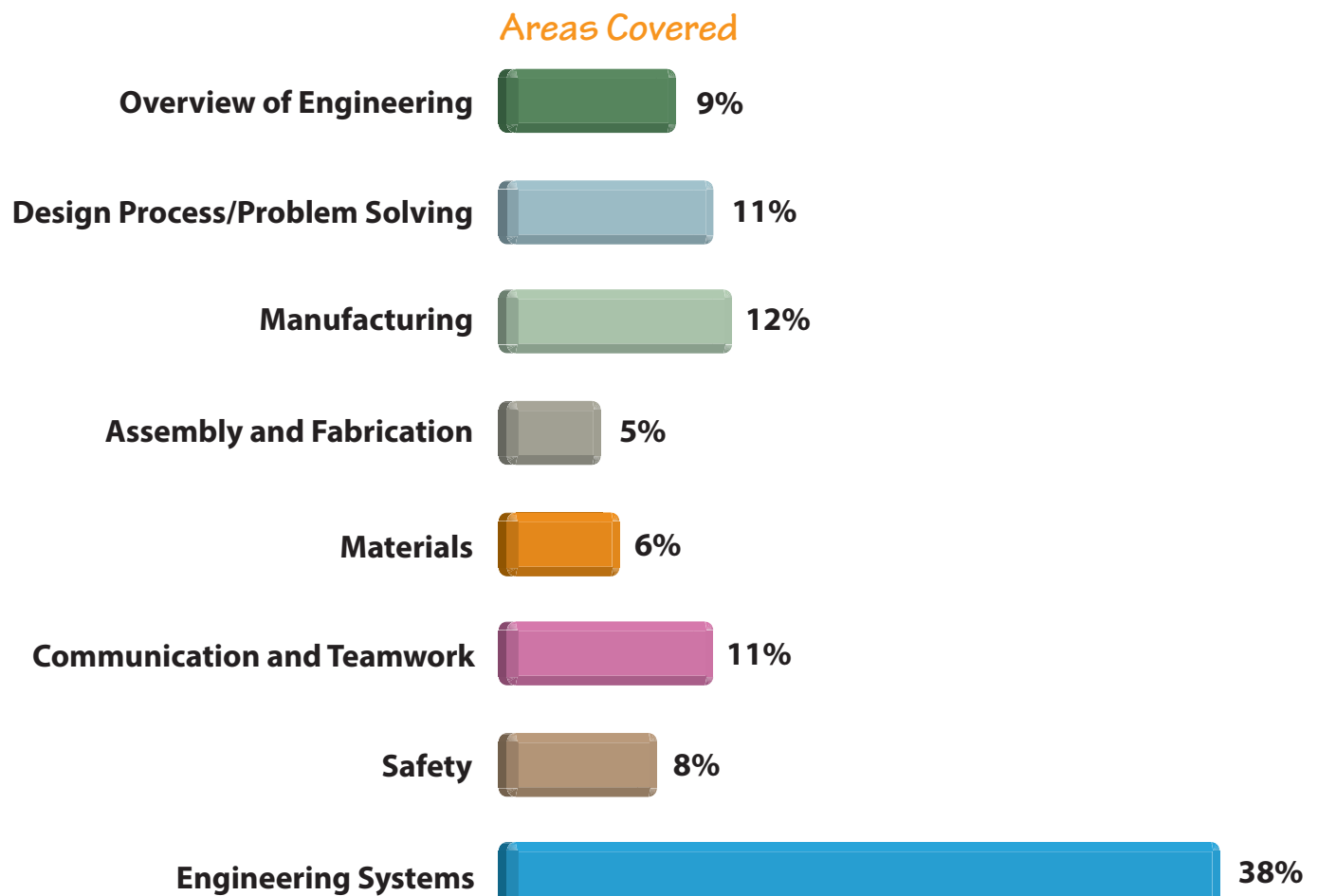
## Written Assessment

NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

**Administration Time:** 3 hours

**Number of Questions:** 197

**Number of Sessions:** This assessment may be administered in one, two, or three sessions.



## Specific Standards and Competencies Included in this Assessment

### Overview of Engineering

- Describe major engineering fields
- Identify functions that an engineer performs
- Describe education required to be an engineer
- Identify ethics related to engineering situations
- Describe relationships between the engineer and other technical personnel
- Identify the progression of the engineering field

### Design Process/Problem Solving

- Identify principles of the problem solving process
- Outline the steps in the design process
- Translate word problems into mathematical statements
- Analyze solutions, identifying strengths and weaknesses
- Develop details of a solution
- Develop, test, and redesign prototypes

### Manufacturing

- Explain components of set up, machining, casting, molding, welding, and finishing
- Identify and use common hand tools
- Identify and properly use fasteners
- Estimate and measure the size of objects using SI and US units
- Explain the role of quality control in manufacturing
- Measure with precision tools and instruments



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## Specific Standards and Competencies (continued)

### Assembly and Fabrication

- Explain the role of quality control in assembly and fabrication
- Identify situations of supplying and outsourcing
- Identify the order and methodology of the assembly process

### Materials

- Identify common materials
- Compare and contrast physical properties of materials
- Select correct materials for specific functions
- Test materials for specific characteristics

### Communication and Teamwork

- Read and understand design documentation and technical manuals
- Write technical reports
- Make an oral presentation
- Interpret critical aspects and/or types of engineering drawings and plans
- Express data in tables, graphs, and charts
- Contribute to a team project

### Safety

- Exhibit knowledge of appropriate personal safety procedures
- Describe the role of OSHA in the technical workplace
- Describe and use safety equipment
- Describe the function of safety devices

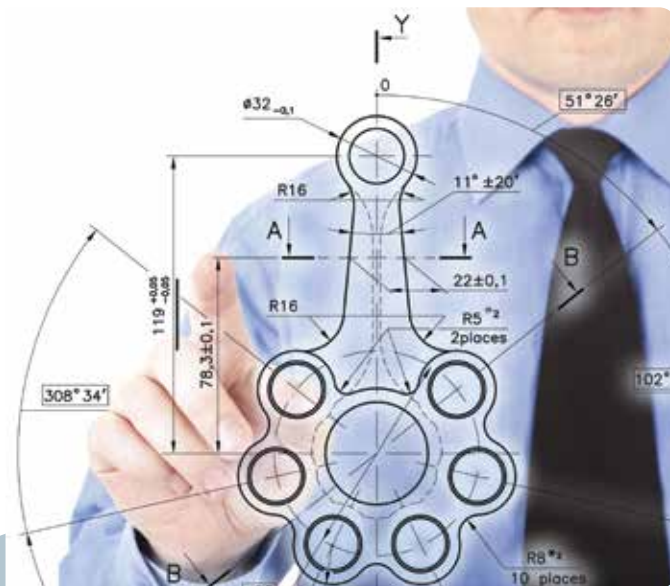


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## Specific Standards and Competencies (continued)

### Engineering Systems

- Solve problems using vectoring, predict resultant forces
- Demonstrate the effect of resistance
- Apply Ohm's Law, Watt's Law, and Kirchoff's Law
- Identify series, parallel, and combination circuits
- Apply knowledge of AC and DC systems
- Identify what causes resistance in a fluid system
- Apply knowledge of hydraulic and pneumatic systems
- Identify the three ways heat is transferred
- Explain the difference between Celsius and Fahrenheit scales
- Describe heat conductors and insulators
- Solve thermal problems using appropriate units
- Identify the six simple machines and their applications
- Solve problems using appropriate units in engineering systems
- Identify the uses and types of inductors and capacitors
- Use appropriate electrical units to solve problems
- Draw a circuit diagram and lay out the circuit
- Identify the difference between analog and digital signals
- Identify direction of heat flow given differences in temperature
- Understand the use of insulation to minimize heat flow
- Identify electrical components and their functions



## Sample Questions

**Which of the following is a method of prototype testing?**

- A. destructive
- B. visualization
- C. brainstorming
- D. manufacturing

**What is the approximate piston area for a 5-inch diameter cylinder?**

- A. 3.93 square inches
- B. 15.7 square inches
- C. 19.6 square inches
- D. 78.5 square inches

**A protractor can measure**

- A. volume
- B. angles
- C. polygons
- D. area

**Which of the following is a ferrous metal?**

- A. aluminum
- B. copper
- C. magnesium
- D. mild steel

**Winds blowing west at a speed of 10 to 15 mph are called**

- A. scalars
- B. vectors
- C. directions
- D. magnitudes

## Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

**Administration Time:** 3 hours and 30 minutes

**Number of Jobs:** 2

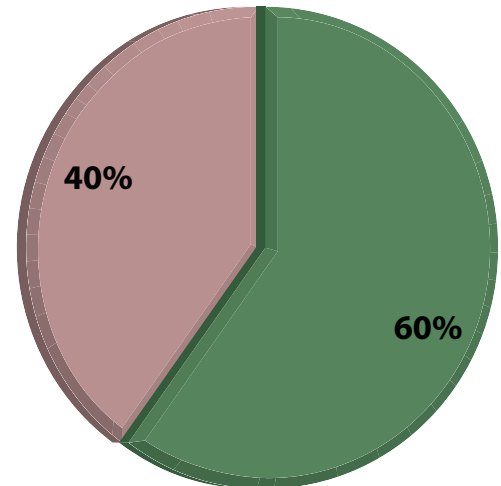
### Areas Covered:

#### 60% Technical Writing

Identify problem and/or need, evaluate alternatives, design a solution, test the solution, analyze results, draw conclusions, and format.

#### 40% Oral Presentation

Presentation time, headings followed the technical report, number or slides, slide with chart, question/answer period, and overall presentation.





## Sample Job

### Oral Presentation

**Maximum Time:** 1 hour

**Participant Activity:** The participant will prepare and present an oral presentation on the previously prepared technical report.

