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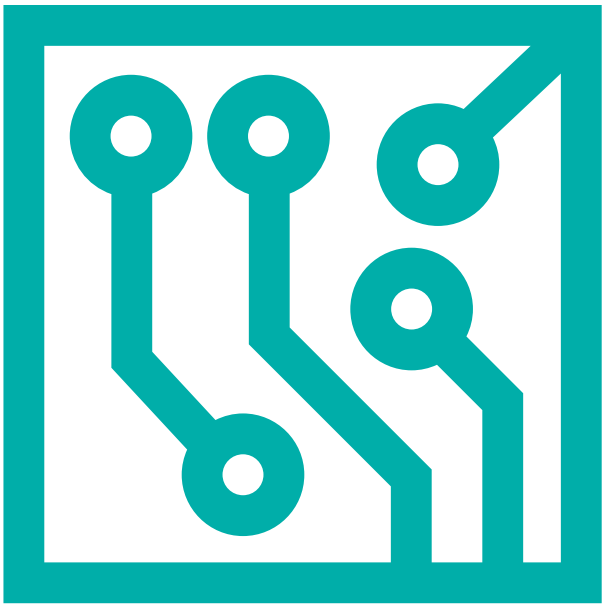
Credential Blueprint



Engineering (GA)

Code: 7773 / Version: 01

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General Assessment Information

Blueprint Contents

General Assessment Information
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Sample Written Items

Test Type: The Engineering assessment was developed based on standards used in the state of Georgia and contains a multiple-choice and performance component. This assessment is meant to measure technical skills at the occupational level and includes items which gauge factual and theoretical knowledge.

Revision Team: The assessment content is based on input from Georgia educators who teach in career and technical education programs.

CIP Code

15.9999
Engineering Technologies/Technicians, Other

Learning that works for America CTE™

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

O*NET™ in*it

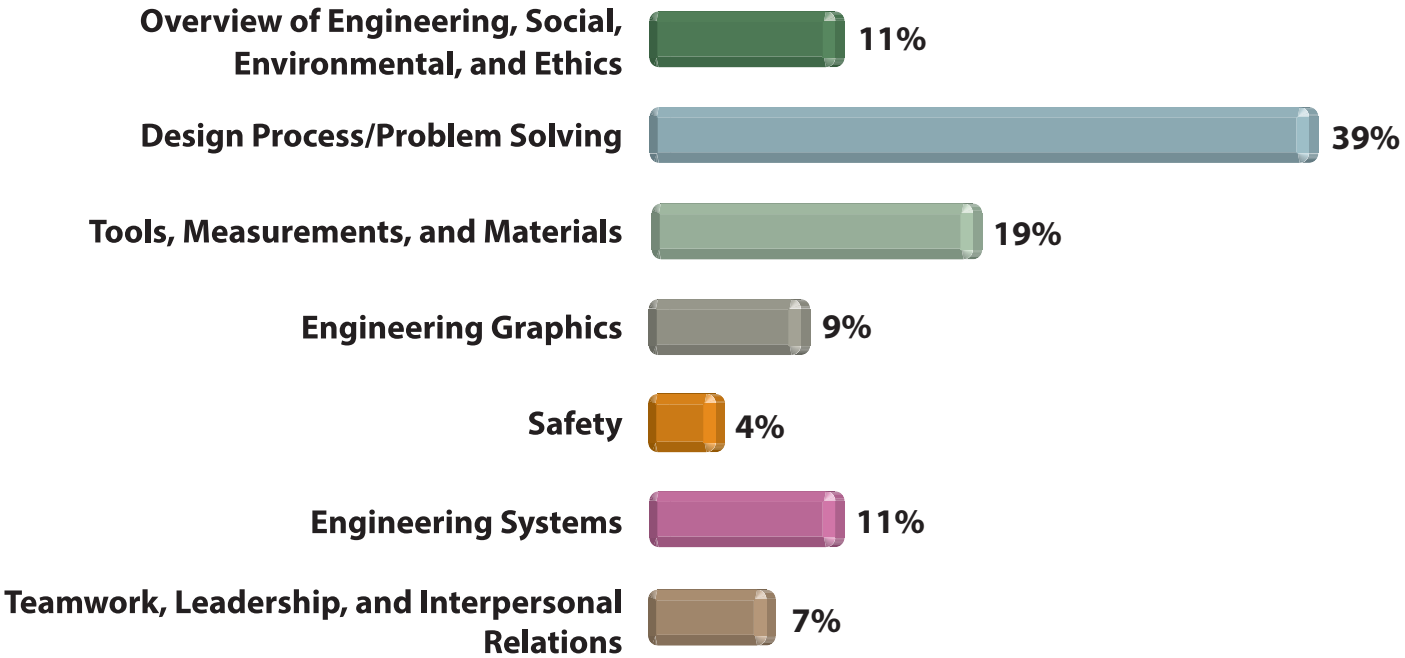
17-3027.00
Mechanical Engineering
Technicians

Written Assessment

This written assessment consists of questions to measure an individual's factual theoretical knowledge.

Administration Time: 90 minutes
Number of Questions: 93
Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

Overview of Engineering, Social, Environmental, and Ethics

- Identify potential career opportunities related to engineering and technology
- Explain educational requirements and professional expectations associated with a chosen technical career path
- Explain the interaction between technological development and social change
- Explain a contemporary definition of engineering
- Describe the history and development of engineering
- Explain what engineers do
- Describe the principal fields of engineering specialization and identify associated career tracks
- Identify education requirements for engineer occupations and locations where programs of study are available
- Describe how external issues constrain the engineering design process
- Describe the social, economic, and environmental impacts of a technical process, product, or system

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Specific Standards and Competencies (continued)

Design Process/Problem Solving

- Demonstrate fundamental principles of design
- Design and conduct experiments along with analysis and interpretation of data
- Identify and consider realistic constraints relevant to the design of a system, component, or process
- Describe the process of input, output, and feedback that comprise the universal systems model
- Demonstrate applications of the universal systems model across the spectrum of technologies
- Describe role of time, people, tools and machines, materials, information within the universal systems model
- Describe the role of mathematics and science in technological development
- Construct a mathematical model for a known technological system
- Explain the scientific principles behind a basic machine
- Explain the problem solving processes used by engineers, designers, and other technologists
- Create a solution to a given problem
- Test and evaluate a problem solution
- Describe role of problem identification, search, criteria, and communication as activities in the engineering design process
- Organize the interactive processes necessary to develop and optimize a design solution
- Apply engineering design to the solution of a problem
- Apply mathematical models and calculations necessary to complete predictive analysis
- Modify a design plan to accommodate unforeseen constraints
- Identify appropriate modeling techniques
- Evaluate effectiveness of prototyped solution and modify as needed
- Develop cost analysis and return on investment calculations
- Describe the core concepts of technology
- Prepare a report of engineering design activities, including analysis, optimization, and final solution

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Specific Standards and Competencies (continued)

Tools, Measurements, and Materials

- Identify appropriate modeling techniques
- Select and apply appropriate materials, tools, and processes for prototype development
- Use laboratory tools and equipment to determine the properties of materials
- Explain the criteria for selection of appropriate materials, tools, and processes
- pply appropriate care and maintenance in the use of tools and machines
- Describe strategies for selecting materials and processes for developing a technical system or artifact
- Demonstrate fundamental materials processing and assembly techniques
- Apply analytical tools to the development of optimal solutions for technological problems
- Demonstrate techniques, skills, and knowledge necessary to use and maintain technical products and systems
- Demonstrate fundamental materials processing and assembly techniques

Engineering Graphics

- Demonstrate fundamentals of technical sketching
- Present a technical design using computer-generated visuals
- Use multi-view projection and pictorial drawings to communicate design specifications
- Apply described geometry and graphical vector analysis to the analysis of engineering design problems
- Apply accurate dimensions to a technical drawing, including size and geometric tolerances
- Prepare a proposal for an engineering design project
- Document engineering design processes using an engineering design notebook

Safety

- Safely and effectively manipulate materials, tools, and processes
- Apply appropriate care and maintenance in the use of tools and machines

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Specific Standards and Competencies (continued)

Engineering Systems

- Describe the role of mathematics and science in technological development
- Construct a mathematical model for a known technological system
- Explain the scientific principles behind a basic machine
- Describe strategies, select materials and processes necessary to develop a technical system or artifact
- Evaluate interdependence of components in a technical system and identify elements critical to correct function
- Apply analytical tools to the development of optimal solutions for technological problems

Teamwork, Leadership, and Interpersonal Relations

- Explain engineer's responsibility as a team member in design and development of technical products and processes
- Demonstrate team approach in applying engineering design to solution of a technological problem
- Demonstrate effective communication skills
- Demonstrate cooperation and understanding with persons who are ethnically and culturally diverse
- Work cooperatively in multi-disciplinary teams
- Demonstrate oral communication skills in reporting results of an engineering design activity

Sample Questions

The boundary of a property is shown on a plot plan with a _____ line.

A. hidden
B. center
C. break
D. phantom

Evaluation is an important step because

A. it helps determine if the product is of value
B. it provides a cost analysis
C. the product can be sold based on the outcome
D. the product design is easier to reproduce after a good evaluation

Which of the following actions should be taken if a prototype power supply is running hot in a test within the enclosure?

A. remove the power supply from its enclosure
B. redesign the circuit to increase the power drawn
C. place an auxiliary fan to blow across the enclosure
D. increase the fan capacity of the power supply

What type of coating is <u>best</u> on an outdoor catwalk made of low carbon steel and used in a refinery?

A. anodized
B. galvanize
C. oil based paint
D. latex based paint

Which of the following is a critical component of an Automatic Vehicle Identification (AVI) system?

A. HOV lanes
B. vehicle headlights
C. AVI antennas
D. interstate signs