

CAD-CAM

General Assessment Information

Blueprint Contents

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Test Type: The CAD-CAM industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of Kentucky, Missouri, Pennsylvania, and South Carolina.



15.1302- CAD/CADD Drafting and/or Design Technology/Technician



Career Cluster 13- Manufacturing



17-3013.00- Mechanical Drafters

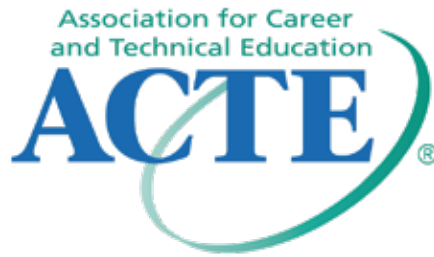


NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE
University of the State of New York - Regents Research Fund

In the lower division
baccalaureate/associate degree
category, 3 semester hours in
Computer Aided Drafting or Design
Technology

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General Assessment Information (continued)



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!

Written Assessment

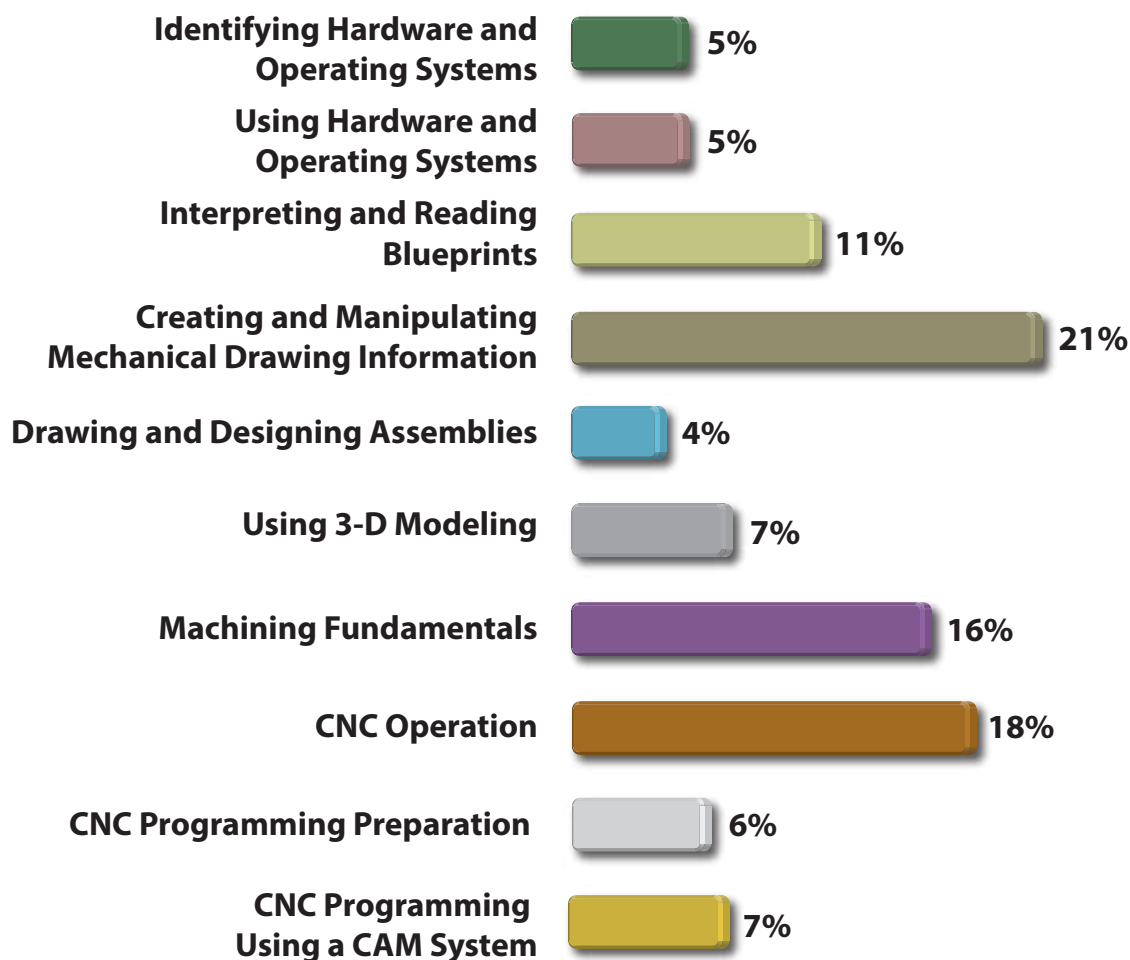
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 190

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

Areas Covered



Specific Standards and Competencies Included in this Assessment

Identifying Hardware and Operating Systems

- Identify hardware and software
- Identify operating system components
- Identify and apply computer terminology

Using Hardware and Operating Systems

- View file names of a storage device
- Store, copy, move, and retrieve information to/from various drives
- Rename and backup files

Interpreting and Reading Blueprints

- Interpret basic views and dimensions in a working drawing
- Interpret bilateral, unilateral, and limit dimensions
- Identify geometric tolerance symbols
- Interpret drawings, pictures, and symbols

Creating and Manipulating Mechanical Drawing Information

- Understand Cartesian Coordinate System
- Set and manipulate drawing elements
- Create and manipulate line types and layers/levels
- Create and edit basic geometry by inputting coordinates
- Insert and manipulate text and fonts
- Create single and multiple auxiliary views of surfaces and objects
- Create and insert cells/blocks
- Insert and manipulate dimensions
- Specify geometric tolerancing on a drawing
- Generate a 2-D multiview drawing
- Generate a pictorial drawing
- Scale and print hard copy on output device

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Specific Standards and Competencies (continued)

Drawing and Designing Assemblies

- Create an assembly in 2-D geometry
- Create a bill of materials

Using 3-D Modeling

- Create and manipulate construction planes
- Generate and modify geometric components on construction planes
- Create a 2-D drawing from a 3-D model
- Create a 3-D model from a 2-D drawing
- Create a 3-D model



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Specific Standards and Competencies (continued)

Machining Fundamentals

- Demonstrate machine tool safety
- Identify personal and environmental safety considerations
- Identify the properties of metals
- Identify the parts of machine tools
- Identify precision measurement techniques
- Measure an existing part to generate a drawing
- Select and set appropriate speeds and feeds
- Identify various cutting tools for machine operations
- Estimate time to manufacture a part

CNC Operation

- Perform safety check and pre-start up machine inspection
- Identify various machine and axes configurations
- Determine basic workholding system
- Secure and align workpiece to table
- Read and interpret diagrams, drawings, and set-up instructions
- Determine program reference zero
- Set up tool length and diameter offsets
- Set up and identify fixture offsets
- Verify and edit program prior to machining the first part
- Edit program to reduce cycle time
- Manufacture and inspect part

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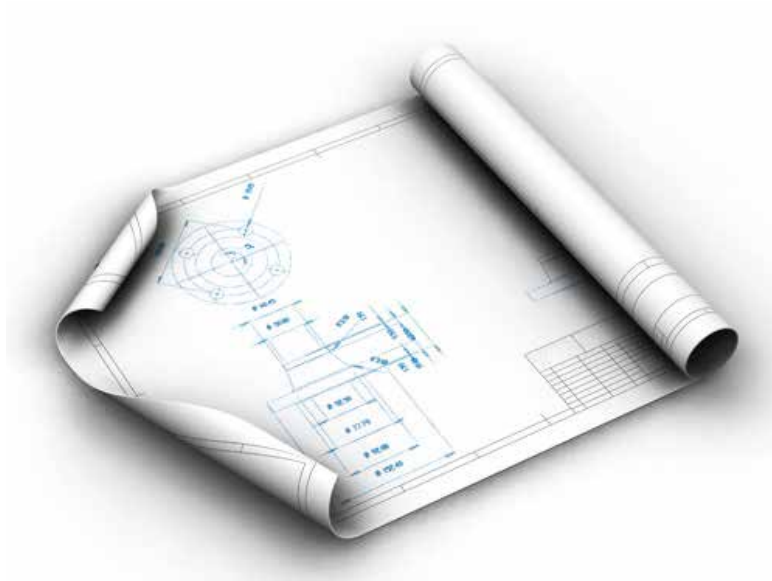
Specific Standards and Competencies (continued)

CNC Programming Preparation

- Develop a process plan
- Review drawing to determine stock and tooling required to produce part
- Determine machine process(es) needed
- Determine equipment needed

CNC Programming Using a CAM System

- Determine and manipulate geometry to be used for programming
- Identify methods and applications of file management
- Generate a program using the CAM system
- Verify the program graphically



Sample Questions

The conventional views on a working drawing are set up by _____ projection.

- A. perspective
- B. orthographic
- C. first angle
- D. isometric

A symbol (or block) library is helpful to

- A. create dimensions
- B. recall lost information
- C. establish ground or families
- D. avoid repetitive drawing

The primary purpose of an assembly drawing is to

- A. describe the shape of parts
- B. show the parts as they fit together
- C. show the types of materials
- D. describe the parts in 3-D

The most commonly used workholding device on the vertical milling machine is the

- A. table vise
- B. magnetic chuck
- C. rotary table
- D. V-block

Being able to graphically verify the program, either on CAM software or on a CNC machine, is known as

- A. simulation
- B. graphic design
- C. plotting
- D. uploading

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Sample Questions (continued)

The smallest acceptable diameter of a shaft when dimensioned as $1.0625 \pm .0004$ is

- A. 1.0615
- B. 1.0620
- C. 1.0621
- D. 1.0630

Coordinates for a drawing may be entered by

- A. using the drop and drag method
- B. inputting the values directly from the keyboard
- C. inputting values using the stretch command
- D. inserting values through the use of the offset command

A construction plane on a CAD system

- A. allows for creation of geometry
- B. adjusts the drawing scale
- C. produces mass quantities of objects
- D. adjusts the dimension scale properties

The generation of a 2-D drawing from a 3-D model requires

- A. a valid 3-D model
- B. preset view ports
- C. a valid isometric view
- D. preset line types and layers

A text parameter that can be set is

- A. a font
- B. a stylus
- C. an increment
- D. spell check

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

Number of Jobs: 3 CAD jobs and 1 CAM job

Areas Covered:

23% Create a 2-D Orthographic Drawing on CAD with a Section View

Participants will print and plot to correct scale, write the correct title block, crosshatch correctly, with correct views, dimensions and placement, and save the file.

17% Create a 3-D Solid Model

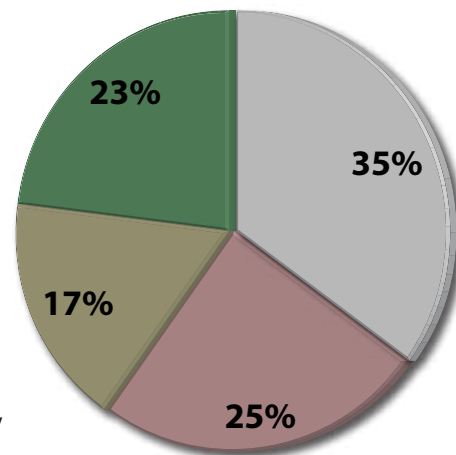
Participants will build a model with correct radius corners and holes with correct mass properties and save the file.

25% Create Two Parts to be Mated and Mate the Parts

Participants will create two parts with correct feature geometry and volume properties, and mate the two parts and save the file.

35% Manufacture a Part from an Existing Drawing

Participants will correctly and safely measure pocket lengths, widths, and depths, as well as the depths and distances between drilled holes to create a finished, quality work.



Sample Job

Create a 3-D Solid Model

Maximum Time: 30 minutes

Participant Activity: The participant will use the CAD system that is provided, creating a complete 3-D solid model and will save the job to the storage media, determine and print out the mass properties of the model.

