

Job Ready Assessment Blueprint

Electronics Technology



Test Code: 4035 / Version: 01

General Assessment Information

Blueprint Contents

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Test Type: The Electronics Technology 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 California, Connecticut, Kentucky, North Carolina, and Pennsylvania.



15.0303- Electrical, Electronic and Communications Engineering Technology/Technician



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



17-3023.01- Electronics Engineering Technicians

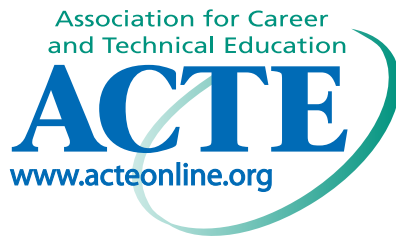


NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE
University of the State of New York - Regents Research Fund

In the lower division baccalaureate/associate degree category, 3 semester hours in Electronics or General 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!



Electronics Technicians Association® International (ETA®) represents and supports electronics professionals with over 80 industry-recognized and accredited technical certifications. An ETA certification validates the technical knowledge and hands-on skills necessary to be successful in today's electronics industry. Employers worldwide choose ETA-certified professionals because of ETA's certification programs' competency criteria and testing benchmarks that conform to the highest international electronics standards. Students passing NOCTI assessments in the area of electronics, industrial electronics and electronics technology are prime candidates to achieve success earning ETA certifications and will be qualified to enter today's workforce. www.eta-i.org



INTERNATIONAL SIGN ASSOCIATION

www.signs.org

The International Sign Association (ISA) represents manufacturers, suppliers and users of on-premise signs and sign products from all 50 states and around the globe. The sign and visual communications industry is a \$37.5 billion business that employs more than 200,000 individuals. One of ISA's long term goals is to showcase and promote the many exciting and diverse career opportunities that exist within the sign and visual communications industry and to apprise students of the abundant employment opportunities that are present to skilled and qualified candidates. ISA strongly encourages and supports students that work to enhance their educational achievements by completing NOCTI assessments.

Written Assessment

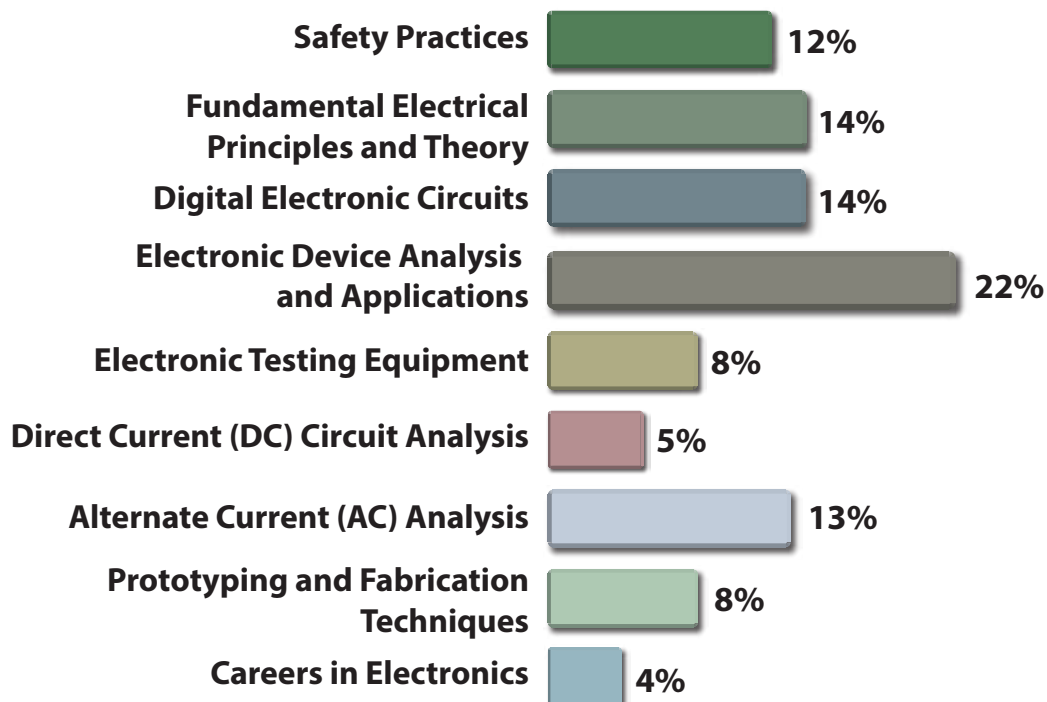
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 155

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

Areas Covered



Specific Standards and Competencies Included in this Assessment

Safety Practices

- Demonstrate safe working procedures
- Explain the purpose of OSHA and how it promotes safety on the job
- Identify electrical hazards and how to avoid or minimize them in the workplace
- Explain safety issues concerning lockout/tagout procedures
- Safely discharge electronic equipment
- Explain the chemical and environmental hazards of electronics equipment

Fundamental Electrical Principles and Theory

- Explain basic electrical theory, including Ohm's Law and Watt's Law
- Describe magnetism and electromagnetism
- Identify schematic symbols
- Identify sources of electricity, including renewable sources
- Interpret color codes
- Describe conductors, resistors, and insulators
- Apply proper scientific and engineering notations

Digital Electronic Circuits

- Demonstrate knowledge of fundamental logic gates and functions
- Demonstrate knowledge of Boolean logic
- Demonstrate knowledge of sequential logic (flip flops)
- Demonstrate knowledge of digital circuitry
- Demonstrate knowledge of different number systems
- Convert between different number systems



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Please note, due to a shift in OSHA terminology, that any references to "Material Safety Data Sheets (MSDS)" will be changed to "Safety Data Sheets (SDS)" during the next scheduled revision.

Specific Standards and Competencies (continued)

Electronic Device Analysis and Applications

- Identify diodes, rectifier, and power supply circuits
- Identify bipolar transistors and bipolar transistor circuits
- Demonstrate knowledge of Field Effect Transistors (FETs) and FET circuits
- Demonstrate knowledge of thyristors and control circuits
- Identify optoelectronic devices and light functions
- Identify Op-Amps, principles, and applications (including oscillators)
- Demonstrate knowledge of Electromagnetic Interference (EMI)
- Describe circuit protection methods
- Interpret a manufacturer's data sheet

Electronic Testing Equipment

- Identify, select, and demonstrate proper hand tool use
- Display knowledge and proper use of multimeters
- Display knowledge and proper use of oscilloscopes
- Display knowledge and proper use of function generators, frequency counters, testers, etc.

Direct Current (DC) Circuit Analysis

- Analyze and troubleshoot DC series circuits
- Analyze and troubleshoot DC parallel circuits
- Analyze and troubleshoot DC combination/complex circuits



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Specific Standards and Competencies (continued)

Alternate Current (AC) Analysis

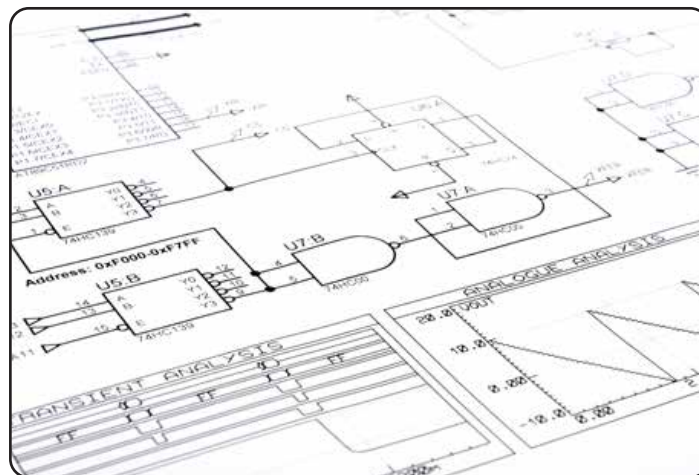
- Analyze AC circuits and waveforms
- Troubleshoot an AC circuit
- Demonstrate knowledge of inductance, capacitance, and resonance
- Explain current and voltage phase relationships
- Describe the operation of transformers, including troubleshooting

Prototyping and Fabrication Techniques

- Layout components on a printed circuit board according to a schematic
- Demonstrate knowledge of proper soldering and de-soldering techniques
- Repair or replace a component or foil on a printed circuit board
- Prototype electrical circuits using schematics and breadboards

Careers in Electronics

- Identify available careers in electronics technology (i.e., Nanotechnology, Industrial Automation, Biomedical Electronics, Robotics, etc.)
- Describe entry level requirements for various electronics technology careers



Sample Questions

To ensure that a capacitor has been fully discharged, the technician should

- A. notice the spark at the tip of the shorting probe
- B. check for residual voltage with a voltmeter
- C. re-energize the equipment to see if it works
- D. use a voltage sensor at the top of the capacitor

A battery produces electricity by

- A. thermo energy
- B. proton potential
- C. electron potential
- D. chemical reaction

An 8 bit DAC has a resolution of

- A. 8
- B. 80
- C. 255
- D. 1024

What does an FET do?

- A. makes the silicon on PCBs
- B. amplifies weak signals
- C. maintains a stable voltage
- D. works in parallel with a capacitor

The phase relationship between voltage and current in a purely resistive circuit is

- A. 0 degrees
- B. 90 degrees
- C. 180 degrees
- D. 270 degrees

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Sample Questions (continued)

The change of mechanical pressure into electrical energy is called the

- A. armature reaction
- B. photovoltaic cell
- C. piezoelectric effect
- D. Lenz's Law

A switching mode that changes between two states, such as on and off, is called

- A. threshold
- B. triggered
- C. toggle
- D. stability

A Class C amplifier compared to a Class A amplifier

- A. has more distortion
- B. operates over a greater part of input cycle
- C. requires more driving power
- D. is less efficient

The acronym, "EMI," stands for

- A. electro-mechanical interface
- B. energized-material integration
- C. electro-magnetic interference
- D. energized-motor induction

When soldering or desoldering components that are made of sensitive material, use a/an _____ to prevent damage.

- A. damp cloth
- B. heat sink
- C. circuit cooler
- D. thermal sensor

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 15 minutes

Number of Jobs: 4

Areas Covered:

27% De-Soldering and Soldering

Participants will select components, de-solder and solder (re-solder) using appropriate tools, identify components, and adhere to safety procedures.

23% Power Supply Construction and Circuit Analysis

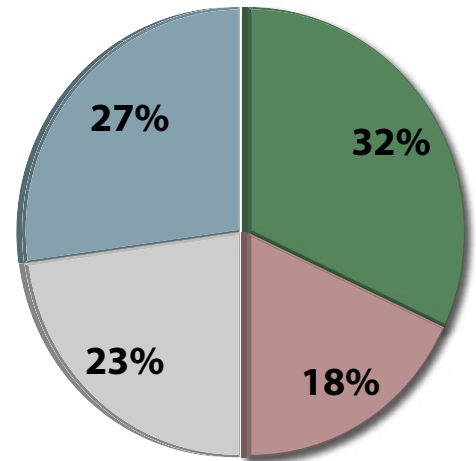
Participants will select components, use tools and equipment correctly following safety procedures, construct circuit with correct measurements, install capacitors, and measure voltages.

18% Op Amp Construction and Analysis

Participants will select correct components, use tools and equipment properly following safety procedures, measure output voltage, display input versus output, and calculate and measure gain.

32% Design and Build a Combinational Logic Circuit

Participants will develop and simplify a Boolean expression, draw the gate logic diagram, and build and test the circuit.



Sample Job

Power Supply Construction/Circuit Analysis

Maximum Time: 45 minutes

Participant Activity: The participant will refer to the diagram provided and build the circuit, choose proper components from the selection given, measure and record the full RMS Secondary Voltage, measure the DC voltage and record the correct polarity from X to the ground and from Y to the ground.

