NCEES
advancing licensure for engineers and surveyors

NCEES Principles and Practice of Engineering Examination

ELECTRICAL AND COMPUTER—POWER CBT Exam Specifications

Effective Beginning with the December 2020 Examination

- The exam topics have not changed since April 2018 when they were originally published.
- The PE Power exam is computer-based. It is closed book with an electronic reference. Codes and standards applicable to the PE Power exam are shown on the last page.
- Examinees have 9 hours to complete the exam, which contains 80 questions. The 9-hour time includes a tutorial and an optional scheduled break. Examinees work all questions.
- The exam uses both the International System of units (SI) and the US Customary System (USCS).
- The exam is developed with questions that will require a variety of approaches and methodologies, including design, analysis, and application. Some questions may require knowledge of engineering economics.
- The knowledge areas specified as examples of kinds of knowledge are not exclusive or exhaustive categories.

	Number of Questions
1. General Power Engineering	**21–32**
A. Measurement and Instrumentation	4–6
1. Instrument transformers	
2. Insulation testing	
3. Ground resistance testing	
B. Applications	7–11
1. Lightning protection	
2. Surge protection	
3. Reliability	
4. Illumination/lighting and energy efficiency	
5. Demand calculations	
6. Energy management	
7. Engineering economics	
8. Grounding	
C. Codes and Standards	10–15
1. National Electrical Code (NFPA 70, NEC-2017)	
2. National Electrical Safety Code (ANSI C2, NESC-2017)	
3. Standard for Electrical Safety in the Workplace: Shock and Burns (NFPA 70E-2018)	
4. Hazardous area classification (NFPA 497-2017, 499-2017, 30B-2015)	

2. Circuits **14–21**

A. Analysis 8–12
1. Three-phase circuits
2. Symmetrical components
3. Per unit system
4. Phasor diagrams
5. Single-phase circuits
6. DC circuits
7. Single-line diagrams

B. Devices and Power Electronic Circuits 6–9
1. Battery characteristics and ratings
2. Power supplies and converters
3. Relays, switches, and ladder logic
4. Variable-speed drives

3. Rotating Machines and Electric Power Devices **14–21**

A. Induction and Synchronous Machines 7–11
1. Generator/motor applications
2. Equivalent circuits and characteristics
3. Motor starting
4. Electrical machine theory

B. Electric Power Devices 7–11
1. Transformers
2. Reactors
3. Testing
4. Capacitors

4. Transmission and Distribution (High, Medium, and Low Voltage) **21–32**

A. Power System Analysis 10–15
1. Voltage drop
2. Voltage regulation
3. Power factor correction and voltage support
4. Power quality
5. Fault current analysis
6. Transformer connections
7. Transmission line models
8. Power flow
9. Power system stability

B. Protection 11–17
1. Overcurrent protection
2. Protective relaying (e.g., differential, distance, undervoltage, pilot)
3. Protective devices (e.g., fuses, breakers, reclosers)
4. Coordination

NCEES Principles and Practice of Engineering Examination
PE ELECTRICAL AND COMPUTER—POWER Codes and Standards

Effective Beginning with the December 2020 Examination

The following codes and standards will be supplied to examinees on exam day as an electronic pdf file in the exam if they are required to answer an exam question. Solutions to exam questions that reference a standard of practice are scored based on this list and the revision year shown. Solutions based on other standards will not receive credit.

STANDARD	TITLE
NFPA 30B-2015	Code for the Manufacture and Storage of Aerosol Products
NFPA 70-2017	National Electrical Code®
NFPA 70E-2018	Standard for Electrical Safety in the Workplace
NFPA 497-2017	Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
NFPA 499-2017	Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
ANSI C2-2017	2017 National Electrical Safety Code®