

**NCEES Principles and Practice of Engineering Examination
 ELECTRICAL AND COMPUTER—POWER Exam Specifications**

Specifications Effective Beginning with the April 2018 Examinations

The 2017 NEC® will be used beginning with the April 2018 exam administration.

- The exam is an 8-hour open-book exam. It contains 40 multiple-choice questions in the 4-hour morning session, and 40 multiple-choice questions in the 4-hour afternoon session. Examinee works 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.

	Approximate Number of Questions
I. General Power Engineering	24
A. Measurement and Instrumentation	4
1. Instrument transformers	
2. Insulation testing	
3. Ground resistance testing	
B. Applications	8
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	12
1. National Electrical Code (NFPA 70, NEC)	
2. National Electrical Safety Code (ANSI C2, NESC)	
3. Standard for Electrical Safety in the Workplace: Shock and Burns (NFPA 70E)	
4. Hazardous area classification (NFPA 497, 499, 30B)	
II. Circuits	16
A. Analysis	9
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	7
1. Battery characteristics and ratings	
2. Power supplies and converters	
3. Relays, switches, and ladder logic	
4. Variable-speed drives	
III. Rotating Machines and Electric Power Devices	16
A. Induction and Synchronous Machines	8
1. Generator/motor applications	
2. Equivalent circuits and characteristics	
3. Motor starting	
4. Electrical machine theory	
B. Electric Power Devices	8
1. Transformers	
2. Reactors	
3. Testing	
4. Capacitors	
IV. Transmission and Distribution (High, Medium, and Low Voltage)	24
A. Power System Analysis	11
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	13
1. Overcurrent protection	
2. Protective relaying (e.g., differential, distance, undervoltage, pilot)	
3. Protective devices (e.g., fuses, breakers, reclosers)	
4. Coordination	