

**NCEES Principles and Practice of Engineering Examination  
 ELECTRICAL AND COMPUTER—POWER Exam Specifications  
 Specifications Effective Beginning with the April 2009 Examinations**

**The 2014 NEC® will be used beginning with the April 2015 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.

	<b>Approximate Number of Questions</b>
<b>I. General Power Engineering</b>	<b>24</b>
A. Measurement and Instrumentation	6
1. Instrument transformers	
2. Wattmeters	
3. VOM metering	
4. Insulation testing	
5. Ground resistance testing	
B. Special Applications	8
1. Lightning and surge protection	
2. Reliability	
3. Illumination engineering	
4. Demand and energy management/calculations	
5. Engineering economics	
C. Codes and Standards	10
1. National Electrical Code (NEC)	
2. National Electrical Safety Code (NESC)	
3. Electric shock and burns	

<b>II. Circuit Analysis</b>	<b>16</b>
A. Analysis	9
1. Three-phase circuit analysis	
2. Symmetrical components	
3. Per unit analysis	
4. Phasor diagrams	
B. Devices and Power Electronic Circuits	7
1. Battery characteristics and ratings	
2. Power supplies	
3. Relays, switches, and PLCs	
4. Variable-speed drives	
<b>III. Rotating Machines and Electromagnetic Devices</b>	<b>16</b>
A. Rotating machines	10
1. Synchronous machines	
2. Induction machines	
3. Generator/motor applications	
4. Equivalent circuits	
5. Speed-torque characteristics	
6. Motor starting	
B. Electromagnetic Devices	6
1. Transformers	
2. Reactors	
3. Testing	
<b>IV. Transmission and Distribution (High, Medium, and Low Voltage)</b>	<b>24</b>
A. System Analysis	10
1. Voltage drop	
2. Voltage regulation	
3. Power factor correction and voltage support	
4. Power quality	
5. Fault current analysis	
6. Grounding	
7. Transformer connections	
8. Transmission line models	
B. Power System Performance	6
1. Power flow	
2. Load sharing: parallel generators or transformers	
3. Power system stability	
C. Protection	8
1. Overcurrent protection	
2. Protective relaying	
3. Protective devices (e.g., fuses, breakers, reclosers)	
4. Coordination	