NCEES
advancing licensure for engineers and surveyors

NCEES Principles and Practice of Engineering Examination
ELECTRICAL AND COMPUTER—ELECTRONICS, CONTROLS, AND COMMUNICATIONS
CBT Exam Specifications

Effective beginning with April 2026 examination

- The PE Electronics, Controls, and Communications exam is computer based. It is closed book with an electronic reference.
- Examinees have 9.5 hours to complete the exam, which contains 85 questions. The 9.5-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.
- The knowledge areas specified as examples of kinds of knowledge are not exclusive or exhaustive categories.

		Number of Questions
1.	**Circuit Analysis and Design**	**10–15**
	A. Passive and active components	
	B. DC circuits	
	C. AC circuits	
	D. Transient analysis	
	E. Battery characteristics and applications	
2.	**Measurement and Instrumentation**	**5–8**
	A. Transducers	
	B. Operational amplifiers	
	C. Measurement system analysis and design	
3.	**Safety and Reliability**	**5–8**
	A. Failure limits and circuit protection	
	B. Electromagnetic field exposure	
	C. Safety and protection	
	D. Reliability analysis (e.g., MTBF, tolerances)	
4.	**Signal Processing**	**5–8**
	A. Sampling theory	
	B. Transforms and applications	
	C. Analog-to-digital and digital-to-analog conversion	
	D. Filtering	
	E. Signal processing system analysis and design	

5.	**Digital Systems**	**7–11**
	A. Combinational logic	
	B. Sequential logic	
	C. Logic devices	
	D. Programmable logic devices (e.g., microcontrollers, embedded systems, PLCs)	
6.	**Electromagnetics and Fiber Optics**	**5–8**
	A. Electromagnetic properties of materials (conductivity, permittivity, permeability)	
	B. Electromagnetic waves and propagation	
	C. Electromagnetic compatibility (e.g., shielding, grounding, filtering)	
	D. Transmission lines and waveguides	
	E. Antennas (e.g., gain, link budget)	
	F. Optical fibers	
7.	**Electronic Components**	**6–9**
	A. Diodes, transistors, and other solid-state devices	
	B. Power supplies and converters	
	C. Power amplifiers	
8.	**Electronics Circuits**	**7–11**
	A. Device models	
	B. Networks and filters	
	C. Nonlinear component applications (e.g., diode, comparator)	
	D. Frequency response	
	E. Transient analysis	
	F. Power, energy, and heat dissipation	
9.	**Analog and Digital Control Systems**	**8–12**
	A. Block diagrams and signal flow graphs	
	B. Characteristic equations	
	C. Frequency response	
	D. Time response	
	E. Stability (e.g., tests, Bode plots, root locus, transport delay)	
	F. Digital control systems	
10.	**Communication Techniques**	**4–6**
	A. Analog modulation (e.g., AM, FM, PM)	
	B. Digital modulation (e.g., ASK, PSK, QAM)	
11.	**Noise and Interference**	**4–6**
	A. Noise (e.g., SNR, quantization noise, noise figure, noise temperature)	
	B. Interference	
	C. Coding, error detection, and correction	
12.	**Communications Systems**	**4–6**
	A. Wired communications	
	B. Wireless communications	
	C. Multiple access techniques (e.g., TDMA, CSMA/CD, WDM)	
	D. Traffic capacity analysis	