NCEES
advancing licensure for engineers and surveyors

NCEES Principles and Practice of Engineering Examination

ELECTRICAL AND COMPUTER—COMPUTER ENGINEERING

CBT Exam Specifications

Effective Beginning with the October 2021 Examination

- The exam topics have not changed since April 2018 when they were originally published.
- The PE Computer Engineering exam is computer-based. It is closed book with an electronic reference.
- Examinees have 9.5 hours to complete the exam, which contains 85 multiple-choice questions. The 9.5-hour time includes a tutorial and an optional scheduled break. 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.

	Number of Questions
1. Computer Systems	**21–32**
A. Data Representation	5–8
1. Number representation	
2. Character representation	
3. Encoding schemes	
4. Error detection and correction	
5. Data compression	
6. Encryption	
B. Computer Architecture	16–24
1. Computer organization and processor design	
2. Embedded systems	
3. System architecture	
4. Memory systems	
5. System performance	
2. Embedded System Software	**14–21**
A. Systems Software	7–11
1. Operating systems	
2. Real-time operating systems	
3. Computer security	
4. Device drivers	
5. Interrupts and exception handling	
6. Firmware (e.g., BIOS)	

B. Application Development 7–11
   1. Software design
   2. Quality assurance
   3. Software fundamentals
   4. Development tools (e.g., debuggers, disassemblers, trace tools, emulators)

3. Hardware 21–32

A. Digital Devices and Systems 9–14
   1. Memory devices
   2. Standard modular devices (e.g., multiplexers)
   3. Programmable devices
   4. Serialization and deserialization
   5. Combinational and sequential circuits
   6. Implementation technology (e.g., FPGA, ASIC)
   7. Arithmetic hardware (e.g., ALU, FPU)
   8. Synchronous
   9. Asynchronous
   10. Testability
   11. Tristate logic
   12. System design (datapath/control)

B. Digital Electronics 5–8
   1. Basic solid-state devices
   2. Operating parameters
   3. Data conversion and instrumentation
   4. Circuit implementation
   5. Timing design and analysis

C. Hardware Description Languages 7–11
   1. Testbench development
   2. Abstraction levels (RTL, structural, behavioral) and hierarchical design
   3. Synthesis issues
   4. Verification (e.g., assertions, coverage)

4. Computer Networks 14–21

A. Protocols and Standards 2–3
B. Configuration/Topology 4–6
   1. Wireless
   2. Wired and optical

C. Hardware 3–5
D. Safety, Security, Privacy 3–5
E. Cyber Physical Systems 2–3
   1. Distributed sensing
   2. Self-configuration
   3. Mobile network systems