NCEES
advancing licensure for engineers and surveyors

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

Effective Beginning with the April 2018 Examinations

- 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. Computer Systems	**24**
A. Data Representation	6
1. Number representation	
2. Character representation	
3. Encoding schemes	
4. Error detection and correction	
5. Data compression	
6. Encryption	
B. Computer Architecture	18
1. Computer organization and processor design	
2. Embedded systems	
3. System architecture	
4. Memory systems	
5. System performance	
II. Hardware	**24**
A. Digital Devices and Systems	10
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 6
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 8
1. Testbench development
2. Abstraction levels (RTL, structural, behavioral) and hierarchical design
3. Synthesis issues
4. Verification (e.g., assertions, coverage)

III. Embedded System Software 16

A. Systems Software 8
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 8
1. Software design
2. Quality assurance
3. Software fundamentals
4. Development tools (e.g., debuggers, disassemblers, trace tools, emulators)

IV. Computer Networks 16

A. Protocols and Standards 2

B. Configuration/Topology 4
1. Wireless
2. Wired and optical

C. Hardware 4

D. Safety, Security, Privacy 4

E. Cyber Physical Systems 2
1. Distributed sensing
2. Self-configuration
3. Mobile network systems