

# National Council of Examiners for Engineering and Surveying

## Principles and Practice of Engineering Examination Electrical and Computer—COMPUTER Exam Specifications

EFFECTIVE Beginning with the April 2009 Examinations

	Approximate Percentage of Examination
<b>I. Computer Systems</b>	<b>40%</b>
A. Numeric and Nonnumeric Formats	5%
1. Number representation	
2. Character representation	
3. Encoding schemes	
4. Error detection and correction	
B. Computer Architecture	35%
1. Computer organization	
2. Processor-controlled systems	
3. Processor structures	
4. Memory systems	
5. Hardware fault tolerance	
6. System performance	
<b>II. Hardware</b>	<b>25%</b>
A. Digital Devices	5%
1. Memory devices	
2. Standard modular devices (e.g., multiplexers)	
B. Digital Electronics	7.5%
1. Basic solid-state devices	
2. Operating parameters	
3. Tristate logic	
4. Data conversion and instrumentation	
5. VLSI circuits	
6. Timing design and analysis	
C. Digital Circuits	7.5%
1. Arithmetic hardware	
2. Synchronous	
3. Asynchronous	

4. Testability	
5. Programmable hardware	
D. Hardware Description Languages	5%
1. Testbench software	
2. Analysis and design	
3. Synthesis issues	
4. Assertions and verification	
<b>III. Software</b>	<b>25%</b>
A. System Software	7.5%
1. Operating systems	
2. Real-time operating systems	
3. Computer security	
4. Device drivers	
5. Interrupts	
B. Development/Applications	12.5%
1. Software design and documentation methods	
2. Quality assurance	
3. Fundamental constructs	
4. Programming language characteristics	
5. Development tools	
C. Software Maintenance	5%
1. Configuration management	
2. Software update	
3. Change control	
<b>IV. Networks</b>	<b>10%</b>
A. Computer Networks	5%
1. Protocols	
2. OSI (layer) model	
3. Topology	
4. Hardware	
5. Security	
B. Physical Layer Implementation	2.5%
1. Synchronization techniques	
2. Transmission media	
3. Asynchronous	
4. Wireless	
5. Optical	

C. Information Theory

2.5%

1. Data compression
2. Channel capacity
3. Sampling theory

**Notes**

1. 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.
2. The knowledge areas specified as examples of kinds of knowledge are not exclusive or exhaustive categories.
3. The exam contains 80 multiple-choice questions. Examinee works all questions.