Course Information
Course #: ELE 106 Digital Electronics
3 Credits
Fall 2019

Instructor Information

Course Description
In this course, students will study digital electronics theory, components and circuits. The course content has the following topics: number systems, Boolean algebra, logic gates, TTL and CMOS technologies, combinational logic, flip flops, counters, shift registers and sequential logic, memory, adders, A/D and D/A conversion, digital data communication devices, cpu digital data processing, and introduction to programmable logic. Total of 60 hours of lecture.

Textbook and Course Materials

Student Learning Outcomes
• Understand electronic digital devices, such as gates, flip-flops, counters and shift registers.
• Show a practical understanding of combinational logic design.
• Design counters and shift registers.
• Understand the theory and operation of analog to digital, digital to analog conversion.
• Understand basic principles and operation of programmable logic devices.

Course Content Objectives
• Examine the relationship between Boolean expressions and logic diagrams.
• Define the basic specifications (propagation delay, rise/fall time, fans in/out) for logic circuits.
• Explain the operation and application of the most common combinational logic circuits, such as decoders, encoders, multiplexers, demultiplexers, adders, and code converters.
• Define bus three-state logic. Differentiate between single-ended and differential binary signals.
• Use truth tables and logic signals to explain the operation of flip flops: RS/latch, D type, and JK.
• Explain the operation of a storage register and a shift register.
• Explain the operation of a binary up counter, down counter, BCD counter, and frequency divider.
• Define the fundamentals of A/D and D/A converters.
• Explain the principles of digital data communication.
• Explain the principles of CPU digital data processing.
• Discuss the types of programmable logic devices and explain their basic structure.

Definition of Credit Hour: Classroom Courses
To earn one academic credit at HCC, students are required to complete a minimum of 37.5 clock hours (45 fifty-minute academic hours) of coursework per semester. Those hours of coursework may be completed through a combination of hours in the classroom and hours outside the classroom. Certain courses may require more than the 37.5 minimum hours of coursework per credit. For most classes, students should expect to complete at least 2 hours of coursework outside of class for each hour of in-class coursework.

<table>
<thead>
<tr>
<th>Classwork type</th>
<th>Direct Faculty Instruction</th>
<th>Student Work Out of Classroom</th>
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</thead>
<tbody>
<tr>
<td>In-class lecture and discussion</td>
<td>45 hours</td>
<td>75 hours required</td>
</tr>
<tr>
<td>Reading</td>
<td></td>
<td>48 hours</td>
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<tr>
<td>Quiz/exam studying</td>
<td></td>
<td>12 hours</td>
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<tr>
<td>Reading question completion</td>
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<td>8 hours</td>
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<tr>
<td>Paper writing</td>
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<td>18 hours</td>
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<tr>
<td>Total</td>
<td>45 hours</td>
<td>86 hours</td>
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Services for students with disabilities: Students may receive reasonable accommodations if they have a diagnosed disability and present appropriate documentation. Students seeking accommodations are required to contact the Disability Support Services (DSS) office as early as possible. Students may contact a DSS staff member for an appointment at dss@hagerstowncc.edu or at 240-500-2530.