Course Syllabus

Department: Science & Technology

Date: 01-17-2013

I. Course Prefix and Number: TECH 123

   Course Name: Digital Electronics

   Credit Hours and Contact Hours: 3 credit hours and 5 contact hours

   Catalog Description including pre- and co-requisites: supporting data required for grade prerequisite of ‘C’ or higher. This course focuses on the theory and application of digital devices and circuits. Topics investigated include digital signals, binary number systems, Boolean algebra and Karnaugh mapping circuit reduction techniques. Digital devices/circuits tested include basic logic gates, flip-flops, counters, adders, registers, encoders, decoders, multiplexers, demultiplexers, and analog-digital converters. The course will also provide an introduction to microcontrollers and applications.

   Pre-requisites: MAT 145 or placement into Math Level 3 or higher.

Relationship to Academic Programs and Curriculum including SUNY Gen Ed designation if applicable:
This course is primarily a technical elective course for the A.A.S. in Mechanical Technology program. Other students from other programs may also take the course if they have the appropriate background.

II. Course Student Learning Outcomes: State the student learning outcome(s) for the course (e.g. Student will be able to identify...)

Upon completion of the course the student will be able to:

   1. Analyze and design logic gate circuits using Karnaugh maps
   2. Construct simple digital circuits
   3. Design basic control programs for microcontrollers

College Learning Outcomes Addressed by the Course: (check each College Learning Outcome addressed by the Student Learning Outcomes)

☐ writing ☑ computer literacy
☐ oral communications ☐ ethics/values
☐ reading ☐ citizenship
☒ mathematics ☐ global concerns
☒ critical thinking ☐ information resources
III. Assessment Measures (Summarize how the college and student learning outcomes will be assessed): For each identified outcome checked, please provide the specific assessment measure.

<table>
<thead>
<tr>
<th>List identified College Learning Outcomes(s)</th>
<th>Specific assessment measure(s)</th>
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</thead>
<tbody>
<tr>
<td>eg: writing</td>
<td>eg: student will complete a research paper</td>
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<tr>
<td>Mathematics</td>
<td>Students will be tested on application of Boolean algebra.</td>
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<tr>
<td>Critical Thinking</td>
<td>Students will do project work to arrive at solution through flow-charting.</td>
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<tr>
<td>Computer Literacy</td>
<td>Student will use Circuit Simulation software for lab report.</td>
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IV. Instructional Materials and Methods

Types of Course Materials:
A college level algebra based introductory digital electronics textbook is used. Instructor notes are used as the supplemental source of information for the course content. Each student is required to have a scientific calculator. A course website is maintained on the internet for lecture schedule, test solutions, and other supplemental learning material. Lab softwares MultiSim and LabVIEW are available on select school computers.

Methods of Instruction (e.g. Lecture, Lab, Seminar …):
Mainly lectures are used to convey knowledge to the student. They are presented in the traditional way, using either whiteboard or smartboard, supplemented with models, material samples, or power point presentations. Plenty of example problems are solved in class and the students are allowed to practice the problem solutions through various homework assignments. Weekly lab sessions are used to reinforce the theory by allowing the students to carry out hands-on activities with actual circuits, electrical components, and instruments.

V. General Outline of Topics Covered:
Analog vs Digital Systems
Binary Numbers
Logic Gates: AND OR NOT
Logic Gates: NAND and NOR
Simple Logic Gate Circuits
Boolean Algebra
Karnaugh Maps
Binary Coded Decimal
Seven-Segment Display Decoder
Half Adder
Full Adder
Two’s Complement Arithmetic
Binary Subtraction Circuit
Flip-Flops
Counters
Multiplexers
Microprocessors
Microcontrollers

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