Tentative Syllabus for Physics 332
Digital Logic and Circuitry
Spring 2015

Catalog Description: Phys 332 - Digital Logic and Circuitry
Four semester hours (3 lecture, 2 lab)
This course covers the fundamentals necessary to apply state-of-the-art digital components
to practical problems in computing and scientific research. Components are constructed,
operated, and tested in a laboratory environment. Typical topics covered are digital
information and number systems, switching algebra and logic networks, flip-flops, registers,
gates, arithmetic processors such as adders and counters.

Texts: 1. Digital Fundamentals
by T. Floyd
2. Experiments for Digital Fundamentals
by D. Buchla

Instructor: Charles Rogers Office S-238 & Lab S-108
charles.rogers@tamuc.edu

Office Hours: M 10:30-11am, T 9-9:30am, R 9-9:30am, F 2-4pm or by appointment at other
times. I am also available in my lab most days before and after classes.

Goals of the Course: Students learn the principles and applications of digital electronics. The
course also provides background for laboratory work in the sciences at the graduate level
and/or the background required of managers in the technical industries. The laboratory
instruction for this course includes circuit design and analysis using electronic instrumentation
and interactive schematic capture and circuit simulation software. Laboratory reports are
written describing the results obtain by the students.

Topical Outline:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to digital electronics</td>
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<tr>
<td>2</td>
<td>Number systems, operations, and codes</td>
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<td>3</td>
<td>Logic gates and integrated circuit logic families</td>
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<td>4</td>
<td>Boolean algebra and logic simplification</td>
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<td>5</td>
<td>Combinational logic</td>
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<td>6</td>
<td>Timing and state diagrams &amp; introduction to FPGAs</td>
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<td>7</td>
<td>Computer tools -- logic simulation and QM logic simplification</td>
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<td>8</td>
<td>Adders, comparators, encoders/decoders, and code conversion</td>
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<td>9</td>
<td>Multiplexers/deplexers, and parity generators/checkers</td>
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<td>10</td>
<td>Flip-flops, latches, one-shots, clock generators (including 555)</td>
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<td>11</td>
<td>Counters</td>
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<td>12</td>
<td>Shift Registers</td>
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<td>13</td>
<td>Memory circuits</td>
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<td>14</td>
<td>Programmable logic</td>
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<td>15</td>
<td>Fundamentals of digital computers (includes a 3-bit machine)</td>
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**Grading Procedure and Scale:**

**Lab Grade:** The laboratory grade counts 25% of the total class grade. The lab grading procedure will be discussed in lab.

**Lecture Grade:** The lecture portion of the grade (i.e. 75%) is determined from homework, three hour exams, pop quizzes, and the final exam as outlined below.

- Homework, attendance, and pop quizzes: 100 points
- Each hour exam: 100 points (total 300 points)
- Final exam (comprehensive): 100 points

**Course Grade:** The course grade is determined from the weighted average of the lecture and lab grades according to the schedule below. The lowest exam score will not be counted on the course grade.

- 90% and up: A
- 80% to 90%: B
- 60% to 80%: C
- 50% to 60%: D
- less than 50%: F

**Attendance and Tardiness:** Students are expected to be on-time and present for all class meetings. Excused absences can be arranged prior to the class period being missed for appropriate activities as determined by the instructor. If an emergency results in an absence, the student should contact the instructor as soon as possible informing the instructor of the emergency and inquiring about ways to make up the missed class. The instructor will make judgments on how to handle the situation. Possible reasons for an excused absence are listed in the “Student’s Guidebook” under class attendance policy. Attendance and tardy records will be maintained and both may result in deductions from your overall grade.

**Classroom Behavior:** Disorderly conduct which interferes with the normal classroom atmosphere will not be tolerated. The classroom instructor is the judge of such behavior and may instruct a disorderly student to leave the room with an unexcused absence or in more serious situations a student may be removed from the class with a failing grade.

**Cheating and other Breaches of Academic Conduct:** Academic cheating, plagiarism, and other forms of academic misconduct may result in removal of the student from class with a failing grade or may in extreme cases result in suspension or expulsion from the University as described in the “Code of Student Conduct” section of the “Student’s Guidebook”.

**ADA Eligible Students:** ADA eligible students should make arrangements with the instructor in the first week of the semester about special arrangements needed for classroom or testing facilities and procedures to accommodate the disability.

**Evaluation of Instruction:** Students will be given opportunities to evaluate instruction near the end of the semester. The physics department utilizes a scantron graded questionnaire with statements regarding various elements of instruction and in addition utilizes an open ended form where students can make comments on all elements of the classroom. These comments are given to the instructor and department head soon after the grades are recorded.
If students have concerns about the classroom experience during the semester they should inform the instructor of those concerns and failing a satisfactory response may, as a last resort, contact the physics department head with those concerns.