Course Title: Logic Circuits
Course Prefix: ELEG
Course No.: 3063
Sections: Z01

Department of | Electrical and Computer Engineering | College of | Engineering

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U.S. Postal Service Address: Prairie View A&M University
P.O. Box 519
Mail Stop 2520
Prairie View, TX 77446

Office Hours: | T R 12:30 p.m - 3:00 p.m or by appointment
Virtual Office Hours: |

Course Location: New Electrical Engr Bldg Rm 117 (Online)
Class Meeting Days & Times: | T R 10:00 am – 12:20 pm

Catalog Description: ELEG 3063: Logic Circuits (3-0) Credit 3 semester hours. Number systems and codes. Boolean algebra and logic minimization methods. Combinational and sequential design using logic gates and flip flops. Computer-aided design tools for digital design, simulation, and testing.

Prerequisites: | ELEG 2023


| Lectures, assignments, handouts, and class notes.

Access to Learning Resources: | PVAMU Library:
| phone: (936) 261-1500;
| web: http://www.tamu.edu/pvamu/library/
| University Bookstore:
| phone: (936) 261-1990;
| web: https://www.bkstr.com/Home/10001-10734-1?demoKey=d

Course Goals or Overview:
| This course is the building block for the subsequent course in Digital Design. It serves as a cornerstone for the learning of logic design, digital system design, and computer design.
Outcome 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Course Outcomes/Objectives

Upon completion of the course, the students will be able to

1. understand the operation and function of basic logic components
2. use the logic components in logic circuit design
3. understand the detail of steps of the design process including problem formulation, logic optimization, technology mapping to NAND and NOR gates, and verification
4. design efficient combinational logic circuit using multiplexers, decoders, comparators and adders
5. design, simulate, and test a sequential logic circuit using flip flops, clocking and timing diagrams.
6. use Hardware Description Language (HDL), such as Verilog

Course Requirements & Evaluation Methods

This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course.

- **Exams** – written tests designed to measure knowledge of presented course material
- **Homework** – assignments designed to supplement and reinforce course material
- **Project** – assignments designed to measure ability to apply presented course material
- **Quizzes** - May be given at various points at professor’s discretion to ensure assimilation of material

Grading Matrix (Grading matrix may be changed at instructor’s discretion, in which case all students will be informed).

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Value (percentages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams (3 exams)</td>
<td>50% (16%,17%,17%)</td>
</tr>
<tr>
<td>Homework and Quizzes</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam (Comprehensive)</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
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Grade Determination: Tentative
A = 85% or better
B = 75 – 84 %
C = 65 – 74 %
D = 55 – 64 %
F = Less than 64%
Course Procedures:

Submission of Assignments:
All assignments should be submitted by the due date. Late assignments will be subject to a penalty.

Exam Policy
Exams should be taken as scheduled. No makeup examinations will be allowed except under documented emergencies (See Student Handbook).
Tentative Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Description/Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Digital Systems; Binary, Octal and Hexadecimal Numbers; Conversion from Decimal to Other Bases; Arithmetic Operations</td>
</tr>
<tr>
<td>2</td>
<td>Boolean Algebra; Basic Identities of Boolean Algebra; Algebraic Manipulation; Binary Logic Gates; Timing Diagrams. <strong>Test 1</strong></td>
</tr>
<tr>
<td>3</td>
<td>Karnagh Map Construction, Minterms, Maxterms, SOP, POS, Don’t Care conditions</td>
</tr>
<tr>
<td>4</td>
<td>Exclusive-OR gates, Odd function, parity generation and checking; Combinational Logic circuits; analysis and design procedures, derivation of Boolean functions, derivation of truth tables</td>
</tr>
<tr>
<td>5</td>
<td>Decoders, Decoders Expansion, Combinational Circuit Implementation, Encoders, Priority Encoder</td>
</tr>
<tr>
<td>6</td>
<td>Multiplexers, Combinational Circuit Implementation, Demultiplexer. <strong>Test 2</strong></td>
</tr>
<tr>
<td>7</td>
<td>Binary Adders, Binary Ripple Carry adder, Binary Adder-Subtractors</td>
</tr>
<tr>
<td>8</td>
<td>Sequential Circuits, Flip Flops, Input Equations, State Table, Analysis with Flip Flops, State diagram, excitation table, Sequential Design with Unused states</td>
</tr>
<tr>
<td>9</td>
<td>Synchronous Binary Counters, BCD Counter, Arbitrary Count Sequence, <strong>Test 3</strong></td>
</tr>
<tr>
<td>10</td>
<td>Random-Access Memory (RAM), Three-State Buffers, Coincident Selection, Array of RAM ICs Read-Only Memory, Programmable Logic Array, Programmable Array Logic Devices.</td>
</tr>
<tr>
<td>11</td>
<td><strong>Final Exam</strong></td>
</tr>
</tbody>
</table>

University Rules and Procedures

Disability statement (See Student Handbook):
Students with disabilities, including learning disabilities, who wish to request accommodations in class should register with the Services for Students with Disabilities (SSD) early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation of their disability to the SSD coordinator.

Academic misconduct (See Student Handbook):
You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

Forms of academic dishonesty:
1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.
2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.
3. Fabrication: use of invented information or falsified research.
4. Plagiarism: unacknowledged quotation and/or paraphrase of someone else’s words, ideas, or data as one’s own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one’s own work also constitutes plagiarism.
Nonacademic misconduct (See Student Handbook)
The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor’s ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

Sexual misconduct (See Student Handbook):
Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.

Attendance Policy:
Prairie View A&M University requires regular class attendance. Excessive absences will result in lowered grades. Excessive absenteeism, whether excused or unexcused, may result in a student’s course grade being reduced or in assignment of a grade of “F”. Absences are accumulated beginning with the first day of class.

Student Academic Appeals Process
Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.