NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
ETR – 281 DIGITAL SYSTEMS (3 CR.)

Course Description

Includes basic numbering systems, Boolean algebra, logic circuits and systems, pulse circuits and pulse logic systems as applied to computer and microprocessor technology. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

General Course Purpose

This course is designed to teach students the basic concepts of digital systems. Students will learn the differences between analog and digital systems, numbering systems and conversion, logic gates, circuit simplification using Boolean rules and K-Maps. Students will also learn about combinational logic functions such as adders, comparators, decoders, and multiplexers. This class will also teach latches, flip flops, and sequential logic circuits such as counters, shift registers, and memories. Digital data transmission and cabling systems for digital data transmission will be discussed.

Course Prerequisites/Corequisites

Prerequisite: ELE 150.

Course Objectives

After the completion of this course the students will be able to:

- Identify the differences between analog and digital Systems
- Solve problems in various number systems such as converting binary to decimal and decimal to binary, hexadecimal to decimal and decimal to hexadecimal, octal to decimal, and decimal to octal
- Utilize Boolean rules to design logic gates and circuit simplification
- Prove De-Morgan's theorem
- Illustrate the differences between Standard POS and SOP Logic and K-Maps
- Discuss circuit simplification using K Maps
- Explain the functions of combinational and sequential logic, Boolean equations and circuits,
- Experiment with adders, comparators, decoders, multiplexers, latches, flip flops, and 555 timers
- Design synchronous and asynchronous counters and decoders
- Explain the function of shift registers
- Illustrate the use of RAM, ROM, and Flash memory in digital data transmission

Major Topics to be Included

Critical attention will be given to the following topics:

- Analog vs. digital electronics
- Numbering systems and conversions
- Logic gates and logic circuits
- Boolean rules
- K-Maps
- Combinational logic and circuit simplification
- Adder, comparator, decoder, multiplexer
- Sequential circuits
- Latches, flip-flops, counters, shift registers, and memories
- Digital data transmission