

# ELE 3510 Intro

Last updated 1/20/25

# ELE 3510

- ELE3510 – Digital Systems

## Course Description

This course is designed to give students a solid foundation in 21st century digital systems design practices. The course integrates digital logic, memories, library functions and a processor to develop SOPCs (System-On-A-Programmable-Chip). Designs are coded using a hardware description language, synthesized, and simulated using industry-based tools and implemented on an industry standard FPGA platform. Advanced projects in this course will include both hardware development and software developed to run on the hardware.

# ELE 3510

- ELE3510 – Digital Systems

## **Course Learning Outcomes**

*Upon successful completion of this course, the student will be able to:*

- Design and simulate multi-block digital systems utilizing registers, counters, Finite State Machines (FSMs), Memories, and other common blocks
- Utilize library blocks in digital designs
- Configure and implement a processor
- Write and execute code for a processor integrated on an FPGA
- Combine original designs, library elements, and a processor in various configurations
- Interface to external peripheral devices
- Architect, design, and validate a complete digital system as a final project

# ELE 3510

- Dr. Johnson's Website
  - <https://faculty-web.msoe.edu/johnsontimoj/index.html>
  - Search **johnson** and **MSOE** in your browser



About MSOE Admissions and Aid Academics  
Campus Experience The MSOE Advantage

**Dr. Timothy Johnson**  
Dr. Johnson | EE Dept | ELE 1601 | ELE 3510

**Fall Professor Johnson's Home Page 2023**

### Contact Information

Office: S-336 top of the ramp - end of the hallway  
Office Hours: TBD, or by appointment  
[See my open door policy](#)  
[Weekly Calendar](#)

Office Phone: N/A  
Email: [johnsontimoj@msoe.edu](mailto:johnsontimoj@msoe.edu)  
For class specific email - prepend all email subjects with "class ID". For example: "ELE 1234 - question about quiz 2"



Freshman year - 1977 (RPI)



2019 - with one of my toys

### Activities

**Common Resources**  
[Career and Student Resources](#)  
[Resources for: C / Embedded Systems / Logic / Tools](#)

**Advising**  
[Advising Requirements and Links](#)

**Research Interests**  
Microprocessor Architecture  
Multi-processor System Design  
System on a Chip (SoC) Architecture  
VLSI Circuit Design  
Engineering Management

**Current Classes**  
[ELE1601 - Intro to Programming for EEs](#)  
[ELE3510 - Digital Syatem Design](#)

**Previous Classes**

### Background

This is my eighth year as an MSOE faculty member. Prior to joining MSOE I spent 3 years as a professor at Northern Illinois University.

Before joining the academic ranks I enjoyed a thirty year career in the advanced technology industry spanning the military, industrial, commercial and consumer markets. I have been involved in basic and applied research, product development, engineering management, and business management. I have designed or been responsible for the design of over 250 integrated circuits and was responsible for more than \$2B of integrated circuits on an annual basis. I worked directly for [Motorola](#), [Harris Corporation](#), [IBM](#) and [RCA](#) and indirectly with every major semiconductor company around the world.

### Major Programs and Projects

Motorola: Microtac, Startac, Droid, Razr  
Motorola: Iridium, Tablets, Set-top Boxes  
Motorola: 1st in the world 3G chipset  
Motorola: 1st in the world LTE chipset

# ELE 3510

- ELE 3510 Website

- <https://faculty-web.msoe.edu/johnsontimobj/ELE3510/index-ele3510.html>

- Link in upper right-hand corner of Dr. Johnson's website

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About MSOE Admissions and Aid Academics  
Campus Experience The MSOE Mindset

**Dr. Timothy Johnson**  
Dr. Johnson | EE Dept | CPE 1500 | ELE 3510

**Spring Professor Johnson's Home Page 2025**

**Contact Information**  
Office: S-336 top of the ramp - end of the hallway  
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Freshman year - 1977 (RPI)  
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Dr. Johnson | EE Dept | CPE 1500 | ELE 3510

**ELE 3510 Digital System Design Spring 2025**

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**Class Information**  
**Lectures**  
Section 111  
Location: S-363  
Class Times: M,T,R 10:00 - 10:50  
Section 121  
Location: CC-118  
Class Times: M,T,R 2:00 - 2:50  
**Lab**  
Section 111  
Location: S-343  
Lab Time: F 10:00 - 11:50  
Section 121  
Location: S-343  
Lab Time: F 1:00 - 2:50

**Class Resources**  
**Text - Required**  
None  
**Text - Optional**  
Free Range VHDL  
Free VHDL book  
**Syllabus**  
Syllabus  
**Sections 111 / 121**  
Schedule and Class Notes  
Homework and Tests  
Labs  
**Videos of previous Final Projects**  
Partial like game  
Accelerometer based flying game  
Light Cycle game

8/2025 About This Web Page

# ELE 3510

- Syllabus

- <https://faculty-web.msoe.edu/johnsontimobj/ELE3510/files3510/syllabus.pdf>

- Class Notes

- <https://faculty-web.msoe.edu/johnsontimobj/ELE3510/index-ele3510-schedule.html>

- HW

- <https://faculty-web.msoe.edu/johnsontimobj/ELE3510/index-ele3510-hw.html>

- LAB

- <https://faculty-web.msoe.edu/johnsontimobj/ELE3510/index-ele3510-lab.html>

The screenshot shows the course website for ELE 3510: Digital System Design, Spring 2025, taught by Dr. Timothy Johnson. The page includes a navigation menu, a course description, contact information, class information, and class resources. Arrows from the list items on the left point to the following sections on the page:

- The arrow from the Syllabus link points to the **Course Description** section.
- The arrow from the Class Notes link points to the **Class Resources** section.
- The arrow from the HW link points to the **Class Information** section.
- The arrow from the LAB link points to the **Lab** section.

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**ELE 3510 Digital System Design Spring 2025**

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**Contact Information**  
Office: S-216 - top of the ramp - end of the hallway  
Office Hours: M, Tu, W, Th, F: 10:00 - 11:50  
Email: [johnsontimobj@msoe.edu](mailto:johnsontimobj@msoe.edu)  
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Portal like game  
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Dr. Johnson

