KENNESAW STATE UNIVERSITY

SYLLABUS

SOUTHERN POLYTECHNIC COLLEGE OF ENGINEERING AND ENGINEERING TECHNOLOGY
DEPARTMENT OF ROBOTICS AND MECHATRONICS ENGINEERING
MTRE 3720 | INTRODUCTION TO PLCS AND MICROCONTROLLERS

Course Information

Class meeting time: WF 3:30PM – 4:20PM
Modality and Location: Face to Face
Location: Academic Building (H) 320
Syllabus is posted in D2L

Instructor Information

Name: Razvan Voicu, Ph.D.
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Office Location: Q340
Office phone: 470-578-7234
Office Hours: By Appointment
Preferred method of communication: Email

Course Description

This course covers semiconductor electronics as the basic foundation. Further topics covered are Industry, automation, control, a basic sensing scheme, the PLC software environment, and the creation of RLL diagrams. Additionally, detailed communication protocols and interfaces with the AVR microcontroller will be carried out.

2 Class Hours 0 Laboratory Hours 2 Credit Hours
Prerequisite: ((CSE 1322 and CSE 1322L) or MTRE 2710) and Engineering Standing Concurrent: MATH 3260 and (EE 2301 or EE 2305 or MTRE 2110 or CS 3503)

Course Materials

Recommended Texts: Everything about PLC Programming by Avinash Malekar and AVR Microcontroller and Embedded Systems: Using Assembly and C, by Mazidi, Naimi, and Naimi.

Technology requirements: Laptop/Desktop

Course Learning Outcomes

Students who successfully complete this course will be able to:

1. Program microcontroller input and output in C.
2. Program microcontroller specialized hardware.
3. Understand the organization of hardware in the PLC, sequence and logic control.

4. Design RLL Diagram for simple industrial logic control problems.
5. Develop a sequence control program for a Finite State Machine model.

Evaluation and Grading Policies

Participation	10 %
Homework	30 %
Exam 01	20 %
Exam 02	20 %
Exam 03	20 %
Total	100 %

GRADING SCALE:
90% - 100% A
80% - 89% B
70% - 79% C
60% - 69% D
0% - 59% F

I will round up grades if they are > or = .5 or above, for example, an 89.6 is an A, but 79.2 is a C.

Course Policies

Communication: Course material will be disseminated in D2L, including lecture notes, etc. All course announcements will be sent via email or D2L. Email is the surest means of contacting the instructor regarding problems or requests. The subject line of the email should have the course number "MTRE 6100".

Attendance Policy: Attendance is optional. A student is responsible for any material covered in class. No credit is possible for any missed grade items.

Instructional Continuity Plan
Kennesaw State University (KSU) may decide to close campuses, operate on a delayed schedule, or transition to remote instruction for inclement weather or in case of emergency.

The University will announce campus closures, delayed schedules, or remote instruction through KSU Alerts sent to your cell number on file and to your university email account. In addition, announcements will be posted on KSU's home page: www.kennesaw.edu.

Our class continuity plan includes:

1. Communication: Please check D2L or e-mail for necessary instructions.
2. Virtual Classes: If in-person classes are not possible, we may transition to virtual classes using MS Teams.
3. Assignments and Assessments: Deadlines for assignments and assessments may be adjusted to accommodate the emergency situation.

We understand that emergencies create unique challenges. If you need additional support during an emergency, reach out via Brightspace or e-mail. The university also offers resources such as counseling and academic support, which can be accessed remotely.

In Case of illness

If you are feeling ill, please stay home and contact your health professional. In addition, please email your instructor to say you are missing class due to illness. Wearing a face covering inside campus facilities is permitted for anyone who feels more comfortable doing so.

Policy on the Usage of Artificial Intelligence

AI Use Allowed, but Not Required: In this class, you are welcome to use AI for any purpose. However, you should note that all AI generative tools still tend to make up incorrect facts and fake citations, code generation models tend to produce inaccurate outputs, and image/art generation tools can produce copied work or offensive products. You will be responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit regardless of whether it originally comes from you or an AI tool. If you use an AI tool, its contribution must be credited in your submission. The use of an AI tool without acknowledgement is cheating and constitutes a violation of the KSU Code of Academic Integrity.

Relying on AI in a programming course may prevent you from developing the core fundamental skills needed to truly understand the content, which can lead to gaps in your knowledge and the inability to apply concepts independently in future work.

However, it is equally important to know how to use it.

Institutional Syllabus Policies, Procedures, and Resources

Federal, BOR, & KSU Required Syllabus Policies and Student Resources

Course Schedule

Week	Topic	Assignment	Exam
1	Introduction to Course and Industrial automation		
2	Diode, Diode characteristics, Zener Diode, Transistors, BJT, FET with its IV curve		
3	Transistor as a Switch, CMOS Logic design and memory	A 1	
4	Transistor as Amplifier and Operational Amplifier circuit and Filtering		
5	Introduction to Numbering Systems and AVR Microcontroller, I/O Port Programming		E 1
6	AVR Microcontroller: Timer 0, Timer 1, Timer 2	A 2	
7	AVR Microcontroller: Interrupts, PWM with DC motor Control		
8	AVR Microcontroller: ADC, DAC, Sensor Interfacing	A 3	
9	AVR Microcontroller: SPI Protocol, I2C Bus Protocol		
10	AVR Microcontroller: UART, LCD, Keypad Interfacing	A 4	
11	Measurement System (Specifications, Sensors)		E 2
12	Measurement System (Signal Conditioning Circuits, Errors, and Calibration)		
13	Programmable Logic Control Systems (Introduction to Logic control and PLCs)	A 5	
14	Programmable Logic Control Systems (Software Environment and Programming of PLCs)		
15	Programmable Logic Control Systems (Modeling and Structured RLL Programming)		E 3