Aydın Adnan Menderes University
Electrical and Electronics Engineering Department
EE441 – Programmable Logic Controller (2026-2027 Fall)

Instructor:

Prof. Dr. Yılmaz KALKAN

Schedule:

Monday 09:30 - 12:15 (**@ MA203**)

Office Hours:

Wednesday 09:30-12:00, Office: C-326

!!!!! No office hours in exam weeks.

If you cannot come to my office, you can reach me with e-mail whenever you need via yilmaz.kalkan@adu.edu.tr

Textbook:

1. Everything about PLC programming: Practical lessons on Allen-Bradley, Siemens, and Mitsubishi PLC with real world examples, Avinash Malekar, 2021

Reference Book:

1. Learn Basic Plc Programming with Mitsubishi Q-Series: Intermediate level using GX Works 2 software PLC Simulation MX OPC Server and Factory I/O, Daryl Glover

2. Basic Plc Programming For Beginners (Mitsubishi Electric GX Works2), Williams Robertson

Grading:

Midterm : 40%
Project : 60%
Social Bonus : + 10%

Grade	Letter	Grade	Letter	Important Dates (~approximately)
95 – 100	A1	65 – 69	C1	
90 – 94	A2	60 - 64	C2	Midterm: In Midterm Weeks
85 – 89	A3	55 - 59	C3	
80 – 84	B1	50 - 54	D1	Final: No Final
75 – 79	B2	0 - 49	F1	
70 – 74	B3	Irregular	F2	Project Report Deadline

Specific Goals - Student Learning Objectives

The student will be able to:

1. Demonstrate knowledge of programmable logic controllers.
2. Demonstrate knowledge of process control systems.
3. Program using ladder logic programming of software.
4. Design PLC based system for process control.
5. Understand various timers, counters.
6. Define and design a PLC based process control system.
7. Implement a PLC based project, write a report and present results.
8. Develop team work

Course Outline

1. Basic of Industrial Automation
2. Understanding Automation & Control System
3. History of PLC
4. Basic Components of Automation
5. Hardware / Software Classification Of Automation
6. Introduction to PLC
7. Need of PLC in Designing
8. Architecture of PLC
9. Application and Advantage of PLC
10. Automation Concept And Basic Design
11. NO/ NC Concept
12. PLC Programming
    a. Introduction of Ladder Logic
    b. Introduction of SFC
    c. Introduction of Instruction list
13. Creating & Editing Ladder Logic Program
14. Different Types Of Sensors-Sinking, Sourcing, NPN, PNP
15. PLC Fault Finding, Trouble Shooting
16. Forcing I/O's
17. Detailed Sequence of Wiring
18. PLC Control Panel Wiring
19. Interfacing With Relay Logics

Course Materials

In this course Mitsubischi Electric Company PLC's (MELSEC IQ-F Series FX5U) will be used. 5 sets ME PLCs were donated to our department. These sets will be planning to use in applications. **GX Works3 & GT Works3** softwares will be supplied and you will be able to download and install these programs. Simulations will be possible by using these softwares without need to a physical PLC.

- ✓ Mitsubishi Electric offers FA e-learning programs in 18 languages (as well as Turkish)
- ✓ **https://www.mitsubishielectric.com/fa/assist/e-learning/tur.html**
- ✓ All documents can be found in this site (also for manuals)
- ✓ **https://www.mitsubishielectric.com/app/fa/download/search.do?kisyu=/plcf&mode=manual**

Expectations

We expect you to study regularly. Also we expect that the work you submit to us under your name is yours. Interactions of students on the problems are useful and are encouraged, but each person should work on his/her solution. Copying from others is immature, dishonest and waste of everyone's time. **Attendance is mandatory.** A Student has to attend 80% (9 weeks) of the lectures in a semester. If a student does not attend more than 20% of the lectures, it fails and it is not permitted to enter the final examination.

Social Bonus (extra +10%)

To award **social development of the students** (which is important for today's engineers), social activities (Reading book, playing a musical instrument, doing sport regularly, and going to cinema or theatre etc.) will be graded as bonus. This bonus grade (being extra +10%) will be added directly the overall score of the student at the end of the term. **Bonus point is at most 100 points** and includes the following activities.

- **Reading book:**
  - Reading any classical book (eg. Tolstoy, Steinbeck, J. Verne, Yaşar Kemal…)---- 10 points
  - Reading any kind of book except classical ones ----- 5 points
  - Reading "Nutuk" ------25 points
- **Playing a musical instrument** ------50 points for each instrument
- **Doing sports regularly** ------30 points for each sport

- **Going to cinema or theatre** ------10 (20) points for each cinema (theatre)
- **ADU IEEE Membership** ------- 20 points
- Other social activities (camping, dancing etc.) may be evaluated with student's declaration.

For evaluation of social activities, the student's declaration is enough. You need to write your activities in a word file with detailed information and send to me at the end of semester. Presentations in the classroom may be supported ☺

"Bir öğretim üyesinin güvenini kaybekmetense, not kaybetmeyi tercih edin ve kopya çekmeyin." Prefer to lose a grade but do not lose reliance of an instructor, DO NOT CHEAT.