

SYLLABUS
MENG 4122 - 101 Machine Control Programming
(Required Course)
Fall 2019

Instructor: Dr. Brink

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Office Hours: M: 1-5 pm; T: 9-12; W: 9-11 am and 1-2 pm

Course Schedule: Lecture: R: 12.30 – 1.20 pm; LAB A: 1.30 – 3.20 pm; LAB B: 3.30 -5.20 pm;
LAB C: F: 1.30 3.20 pm

Location: MY 136 (for the Lecture) and LAB MY 118

CATALOG DESCRIPTION

PLC Logic Controller Programming with an emphasis on motor control using variable speed drives. Companion lab.

COURSE PRE-REQUISITES

MENG 3203 Applied Fluid Power Design.

OTHER PREREQUISITES

Basic computer skills, MS Excel, hand calculator

REQUIRED TEXTBOOK

Programmable Logic Controllers by Frank D. Petruzela, Fifth Edition + PLC Lab Manual Fall 2019

REFERENCES

Additional material will be distributed in the form of handouts.

TOPICS COVERED

- Comparison of hardwired logic vs. PLC logic
- Several labs using Automation Studio software
- Actual hands on programming of AB SLC 5/05 @ Compact Logix PLCs
- Inputs, outputs, relays, timers, counters, Math functions, Comparison functions PID
- HMI control
- Motor control and Variable Speed Drives

COURSE LEARNING OBJECTIVES AND RELATIONSHIP TO STUDENT OUTCOMES

Outcome-Related Course Learning Objectives	Program Outcomes						
	1	2	3	4	5	6	7
Compare hardwired relay logic to PLC logic	x	x				x	
Become proficient with the Automation Studio PLC and fluid power software						x	
Be able to design logic for small PLC projects		x			x		
Be able to enter a program and operate a real PLC to a real application	x	x			x	x	
Be able to design PLC logic for Motor Control, including PID	x	x				x	
Be able to design safety in machines using good programming methods				x			
1: an ability to identify, formulate, and solve complex engineering problems by applying the principles of engineering, science, and mathematics							
2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental, and economic factors							
3: an ability to communicate effectively with a range of audiences							
4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts							
5: an ability function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives							
6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions							
7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies							

CONTRIBUTION OF COURSE TO PROFESSIONAL COMPONENT

This course contributes to the Engineering Science component of the program.

COURSE ORGANIZATION AND ASSESSMENT

- Lecture Format

I will explain the labs in the class room before a lab can be performed in order to understand the material. Class time will be spent mostly explaining and discussing concepts. Lectures will not be used to communicate the entire course content and thus, you will have to study some of the course material on your own. Student participation in class discussions is highly encouraged.

- Class Attendance

You are expected to attend class regularly and are responsible for notes, homework assignments, and exams missed while being absent. *Labs and Lecture are highly intertwined in this class. Attendance is extremely important in order to be able to follow the class.*

- Student Attitude

Once class starts, the use of cell phone and/or pager, reading a newspaper, conducting private discussions, using the computer (unless asked by your instructor), working on anything that is not directly related to the course, making derogatory remarks about a classmate or your instructor will not be accepted and may result in your dismissal from the class.

- Late Assignment

Homework assignments must be turned in on the due date, at the beginning of class. Once class starts, no homework will be accepted. Do not ask one of your classmates to turn in an assignment for you. It will not be accepted.

- Exam Make-up

You are expected to take the exam on the scheduled date and time it is given. However, if for some acceptable reason you are not able to do so, then you must inform the instructor in advance. **Some form of official proof has to be provided to the instructor for the absence.**

- Exam Content

The test material will come from the lectures and the labs and some design will be required on the writing of new programs.

- Evaluation Method

Your performance will be tested regularly throughout the semester by in-class exams, and several homework assignments. There will be two exams. Homework assignments sets will be collected for grading, you are encouraged to submit each and every assignment. Homework will only be accepted at the beginning of class, since I do not want you to work on the homework during class.

- Course Grade

The final grade for the course will be based on the exam scores, the lab scores, the scores earned in the homework assignments, and the score received for your attitude/attendance. The overall average score (X) for the course is determined as follows:

$$X = 0.80 \times (\text{exam1 score} + \text{exam 2 score})/2 + 0.15 \times (\text{homework/ lab}/ \text{average}) + 0.05 \times (\text{attitude/participation/attendance score})$$

The final letter grade for the course is based on the value of X and is determined from to the following grade levels:

Value of X (in %)	89.5 - 100	79.5 - 89.4	69.5 - 79.4	59.5 - 69.4	<59.4
Letter Grade	A	B	C	D	F

GENERAL GUIDELINES

Attend all classes and all labs. Participate and do all the work

GENERAL EDUCATION STATEMENT

Students in this course must demonstrate their competency in oral and written communication through written homework assignments and exams, and through solving problems on the board. They must also demonstrate their ability to use the English language.

ACADEMIC INTEGRITY POLICY

Scholastic dishonesty will not be tolerated and will be prosecuted to the fullest extent. You are expected to have read and understood the current issue of the student handbook regarding student responsibilities & rights, and the intellectual property policy information about procedures and what constitutes acceptable on-campus behavior.

DISCLAIMER STATEMENT

Information contained in this syllabus, other than grading, late assignments, makeup work, and attendance policies, may be subject to change with advance notice, as deemed appropriate by the instructor.

Final Exam:

Will be on Thursday, Dec 12 2019, 10.30-12.30 pm