

COURSE SYLLABUS

ELPT 2319 (3:2:4)

Programmable Logic Controllers I

Industrial Manufacturing and Emerging Technologies

Industrial Technology Department

Technical Education Division

Levelland, Reese and Plainview Campus

SOUTH PLAINS COLLEGE

Fall 2024

COURSE SYLLABUS

COURSE TITLE: ELPT-2319 Programmable Logic Controller

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OFFICE LOCATION: ET Building, Reese Center, and Plainview Room # IM103, IM104, RC601, PTB112

OFFICE HOURS: By appointment Only

SOUTH PLAINS COLLEGE IMPROVES EACH STUDENTS LIFE

I GENERAL COURSE INFORMATION:

- A. Course Description:** Fundamental concepts of programmable logic controllers, principles of operation, and numbering as applied to electrical controls.
- B. Course Learning Outcomes:** Identify and describe digital logic circuits and explain numbering systems; explain the operation of programmable logic controllers; convert ladder diagrams into programs; incorporate timers and counters utilizing programmable logic controllers; and execute and evaluate programs.
- C. Course Competencies:** The student must demonstrate the ability to master the concepts and techniques covered in the classroom and lab. Each student must attain a minimum level of 70% as the average on written tests, both daily and final, and on assigned lab projects.
- D. Tutoring:** Students who do not pass their first exam will be required to attend three hours of tutoring each week until they pass their exam. This is a course requirement and will be reflected in the course grade.
- E. Academic Integrity:** It is the aim of South Plains College to foster a spirit of complete honesty and a high standard of integrity. The attempt of any student to present as his or her own any work which he or she has not honestly performed is regarded by faculty and administration as a most serious offence and renders the offender liable to serious consequences, possibly suspension. (Refer to college catalog).
- F. SCANS and Foundation Skills:** The appropriate competencies and foundations skills (SCANS) have been integrated into the IMET program. The following competencies and foundation skills have been specifically integrated into the Course. C1, C10, and F5

II COURSE REQUIREMENTS:

- A. Textbook and Other Materials:** Frank D. Petruzella, Programmable Logic Controllers, Fourth Edition ISBN-13: 978-0-07-351088-0
- B. Tools:** TI-30Xa Scientific Calculator, ANSI approved Safety Glasses, Pocket knife (Lock Blade) Or Multi-Tool, Digital Multi-meter, USB Jump-drive (Memory Stick), Earphones with standard audio jack for listening to computer audio files with, Ear Plugs or some type of hearing protection, and a class G Hard hat and a Windows based laptop or desktop computer with internet access for online assignments and meetings.

C. **South Plains College Attendance Policy**

Students are expected to attend all classes in order to be successful in a course. The student may be administratively withdrawn from the course when absences become excessive as defined in the course syllabus.

When an unavoidable reason for class absence arises, such as illness, an official trip authorized by the college or an official activity, the instructor may permit the student to make up work missed. It is the student's responsibility to complete work missed within a reasonable period of time as determined by the instructor. Students are officially enrolled in all courses for which they pay tuition and fees at the time of registration. Should a student, for any reason, delay in reporting to a class after official enrollment, absences will be attributed to the student from the first class meeting.

Students who enroll in a course but have "Never Attended" by the official census date, as reported by the faculty member, will be administratively dropped by the Office of Admissions and Records. A student who does not meet the attendance requirements of a class as stated in the course syllabus and does not officially withdraw from that course by the official census date of the semester, may be administratively withdrawn from that course and receive a grade of "X" or "F" as determined by the instructor. Instructors are responsible for clearly stating their administrative drop policy in the course syllabus, and it is the student's responsibility to be aware of that policy.

It is the student's responsibility to verify administrative drops for excessive absences through MySPC using his or her student online account. If it is determined that a student is awarded financial aid for a class or classes in which the student never attended or participated, the financial aid award will be adjusted in accordance with the classes in which the student did attend/participate and the student will owe any balance resulting from the adjustment.

Absence for Military Service

In accordance with Texas Education Code Section 51.9111, a student is excused from attending classes or engaging in other required activities, including exams, if he or she is called to active military service of a reasonably brief duration. The maximum time for which the student may be excused has been defined by the Texas Higher Education Coordinating Board as "no more than 25 percent of the total number of class meetings or the contact hour equivalent (not including the final examination period) for the specific course or courses in which the student is currently enrolled at the beginning of the period of active military service." The student will be allowed a reasonable time after the absence to complete assignments and take exams.

Religious Holy Days

In accordance with Texas Education Code Section 51.911, South Plains College will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within seven (7) calendar days after the absence. Students are required to file a written notification of absence with each instructor within the first fifteen (15) days of the semester in which the absence will occur. Forms for this purpose are available in the Dean of Students Office along with instructions and procedures. "Religious holy days" means a holy day observed by a religion whose place of worship is exempt from property taxation under Texas Tax Code Section 11.20.

D. The following attendance guidelines have been established for the IMET program:

1. **Absent** from class is defined as "not present and ready to participate during scheduled lecture or lab times."

2. **Tardy** is defined as "not present at the designated starting time of the lecture or lab." **Three tardies will equal one absence and will be treated the same as any absence.**
3. When a student accumulates **three** absences minimum course objectives cannot be met and student will be withdrawn from the course.

Assignment policy: All required work must be turned in on time in order that the student may benefit from the corrections and study for future examinations. Any work that is handed in post the due date or tests missed will be accepted only at the discretion of the Instructor, Points will be taken from all late assignments or test accepted by the Instructor.

Grading Policy: Daily tests and homework average will equal 33.3% of final semester grade. Lab grade will equal 33.3% of final semester grade and final test grade will equal 33.3% of final semester grade. Written and oral assignments will be averaged in with daily test average and lab grade will consist of lab projects. The lab grade will also include an end of semester Instructor assessment that will be used to adjust the lab grade up or down by up to 20%. This is used to account for class participation, safety violations, end of class clean up as well as other criteria deemed important by the instructor such as overall attitude and demeanor.

Cell phones:

No cell phones or other electronic devices are allowed in the classroom or during lectures.
Cell phones may be used during break or during labs.

Class Dress Code:

No open toed shoes, sandals or flip-flop styled shoes.
No baggy, saggy or drooping clothes. This includes wearing pants pulled down in a "Low Slung Style".
For safety considerations standard shop acceptable attire is required.
If you have any doubts about what is acceptable see the instructor for clarification.

Tobacco Use:

No tobacco use of any kind is permitted inside the buildings. This includes smokeless tobacco.
No spitting in the trashcans
No spitting in the urinals or toilets
No spitting on the floor (Including inside the lab/Shop areas)
No use of cups or bottles as spittoons.

III. COURSE OUTLINE:

- A. PLC
- B. **Number systems**
- C. **Programming PLCs**
- D. **Wiring PLCs**
- E. **PLC Systems**

Students can find statements for:

Intellectual Exchange, Disabilities, Non-Discrimination, Title IX Pregnancy Accommodations, CARE (Campus Assessment, Response, and Evaluation) Team, Campus Concealed Carry, COVID symptoms and procedures, and the Artificial Intelligence statement at:

<https://www.southplainscollege.edu/syllabusstatements/>

For Internet Access Classes Only:

This course is part of your TexBook program, which means you don't need to purchase a textbook or access code for this course. TexBook is the required content (either an eBook or online Courseware) for your course, and is provided for you via the Bibliu platform from Day 1 of class.

· Cost of TexBook: this required content is provided as part of a Program called 'Inclusive Access', which means that content is provided for you at the lowest price available from the publisher. The cost for this is included in your tuition.

· How to access your digital content via Bibliu: you can access your material via the Bibliu link inside your Blackboard Course, or directly via the Bibliu app. If you have issues with this, please contact your professor, the Bookstore Manager or Bibliu Support (see below).

· The Bibliu platform: you can use the Bibliu platform to enhance your learning experience, with features including: highlighting, notes and reading text aloud. For more details and support on how to use Bibliu, please visit the Bibliu support pages, or contact Bibliu support via the email: support@bibliu.com

· Opting out: you can Opt-Out of the TexBook Program, up until the Opt-Out deadline, via the banner displayed when you open the Bibliu platform. Remember that Opt-Out deadlines vary by term, and if you choose to Opt-Out you will lose access to this low price option, and will need to purchase the content through a different method. If you opt-Out, the fee will be refunded to your account.

Useful contacts: 1. Bookstore Manager: Christian Bruno - christian.bruno@bibliu.com 2. Bookstore Text Coordinator: Trish Wells - patricia.wells@bibliu.com 3. Bibliu Support: email support@bibliu.com

SCANS COMPETENCIES

RESOURCES: Identifies, organizes, plans and allocates resources.

- C-1 **TIME**--Selects goal--relevant activities, ranks them, allocates time, and prepares and follows schedules.
- C-2 **MONEY**--Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives
- C-3 **MATERIALS & FACILITIES**--Acquires, stores, allocates, and uses materials or space efficiently.
- C-4 **HUMAN RESOURCES**--Assesses skills and distributes work accordingly, evaluates performances and provides feedback.

INFORMATION--Acquires and Uses Information

- C-5 Acquires and evaluates information.
- C-6 Organizes and maintains information.
- C-7 Interprets and communicates information.
- C-8 Uses computers to Process information.

INTERPERSONAL--Works With Others

- C-9 Participates as members of a team and contributes to group effort.
- C-10 Teaches others new skills.
- C-11 Serves clients/customers--works to satisfy customer's expectations.
- C-12 Exercises leadership--communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
- C-13 Negotiates--Works toward agreements involving exchanges of resources resolves divergent interests.
- C-14 Works with Diversity--Works well with men and women from diverse backgrounds.

SYSTEMS--Understands Complex Interrelationships

- C-15 Understands Systems--Knows how social, organizational, and technological systems work and operates effectively with them
- C-16 Monitors and Correct Performance--Distinguishes trends, predicts impacts on system operations, diagnoses systems' performance and corrects malfunctions.
- C-17 Improves or Designs Systems--Suggests modifications to existing systems and develops new or alternative systems to improve performance.

TECHNOLOGY--Works with a variety of technologies

- C-18 Selects Technology--Chooses procedures, tools, or equipment including computers and related technologies.
- C-19 Applies Technology to Task-Understands overall intent and proper procedures for setup and operation of equipment.
- C-20 Maintains and Troubleshoots Equipment-Prevents, identifies, or solves problems with equipment, including computers and other technologies.

FOUNDATION SKILLS

BASIC SKILLS--Reads, writes, performs arithmetic and mathematical operations, listens and speaks

- F-1 Reading--locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
- F-2 Writing--Communicates thoughts, ideas, information and messages in writing, and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
- F-3 Arithmetic--Performs basic computations; uses basic numerical concepts such as whole numbers, etc.
- F-4 Mathematics--Approaches practical problems by choosing appropriately from a variety of mathematical techniques.
- F-5 Listening--Receives, attends to, interprets, and responds to verbal messages and other cues.
- F-6 Speaking--Organizes ideas and communicates orally.

THINKING SKILLS--Thinks creatively, makes decisions, solves problems, visualizes, and knows how to learn and reason

- F-7 Creative Thinking--Generates new ideas.
- F-8 Decision-Making--Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
- F-9 Problem Solving--Recognizes problems and devises and implements plan of action.
- F-10 Seeing Things in the Mind's Eye--Organizes and processes symbols, pictures, graphs, objects, and other information.
- F-11 Knowing How to Learn--Uses efficient learning techniques to acquire and apply new knowledge and skills.
- F-12 Reasoning--Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

PERSONAL QUALITIES--Displays responsibility, self-esteem, sociability, self-management, integrity and honesty

- F-13 Responsibility--Exerts a high level of effort and preservers towards goal attainment.
- F-14 Self-Esteem--Believes in own self-worth and maintains a positive view of self.
- F-15 Sociability--Demonstrates understanding, friendliness, adaptability, empathy, and politeness in-group settings.
- F-16 Self-Management--Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
- F-17 Integrity/Honesty--Chooses ethical courses of action