Fall 2016 – Spring 2017

Office Hours:  Monday & Wednesday 10:00 – noon; Thursday 3:00-4:00

MET 477:  Programmable Control & Data Acquisition, 3 semester hours
PREREQUISITES:  one of the following: CS 114, CS 211/212, CS 214, CS 225, CS 488, or permission of instructor

COURSE DESCRIPTION:  A study of programmable logic and data acquisition control systems used to monitor and update facilities, machines and equipment. Topics will include signal conditioning; A-D conversions; decision models; ladder, state, and object oriented programming, data logging and differential control.

DEPARTMENT OUTCOMES & ASSESSMENT

By graduation, Engineering Technology students should be able to:

1. Think critically and creatively,
2. Understand the theoretical principles of the profession,
3. Understand and apply relevant technology in the solution of technical problems,
4. Organize, manage, and maintain projects,
5. Develop an appreciation for ethical and professional practices,
6. Develop and refine oral, written, and visual communication skills, and
7. Demonstrate an overall competency in the program objectives.

COURSE OBJECTIVES

This is a technical course that will meet Outcomes 1, 3, 4 & 7. Upon completion of this course, the student will be able to:

1. Use relay-ladder-logic (RLL) programming instructions and techniques to solve industrial and other control system applications.
2. Correctly utilize the following RLL commands:
   STR, OR, AND, NOT, CMP, OUT, SET, RST, PD, LD, TMR, TMRA, CNT, UDC, ADD, MUL, DIV, SUB, MOV, NOP, END, BIN, BCD, INV and Immediate
3. Use Boolean algebra, POS, SOP and K maps to calculate RLL program logic.
4. Design and select an appropriate plc based on field device and installation location characteristics.
5. Select, install & troubleshoot appropriate sensors, transducers and other industrial input devices necessary to solve specified industrial problems.
6. Select, install & troubleshoot appropriate solenoids, motors, lights and other industrial output devices.
7. Install and program operator panels and HMI distributed control systems.
8. Optimize control systems using fuzzy logic.
This course is a lecture/lab/internet experience. Many of the course materials will be provided at Western On-Line. Each student should check the course website often for updates and messages.

REFERENCE

TEXT

REQUIRED MATERIALS
Wire Strippers (14 – 26 guage) ** will be supplied
1/8” straight blade screwdriver

ATTENDANCE
Students are expected to attend every lecture and laboratory session. Students having an unexcused absence from an activity will lose 3 points for that day. If you are going to miss a class, notify the instructor in person, by phone or email. You must provide written evidence if an absence is to be excused. No work may be turned in if unexcused.

LATE
NO ASSIGNMENT WILL BE COLLECTED LATE IF UNEXCUSED.
If you know you will miss a class period, make arrangements with the instructor to insure your work is turned in on-time. If you are ill and cannot make it to class, notify the instructor immediately by email or phone. Bring homework to class following period with written notice.

If a student is late to class twice in one month, s/he will be warned. If the student is late a third time, six (6) points will be deducted for the three tardys. Additional tardys will lose additional points at the rate of 2 points per tardy.

GRADES
YOU MAY ASK TO SEE YOUR GRADE AT ANY TIME DURING THE SEMESTER.
THERE WILL BE NO EXTRA CREDIT OR "WAYS TO IMPROVE YOUR SCORE"

This course is graded by points. To calculate your grade, divide the total number of points you have accumulated by the total number of points possible. This percentage corresponds to the following:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
</tr>
</thead>
</table>
| A+    | not allowed
| A     | 94 and above |
| A-    | 90 – 93 |
| B+    | 87 – 89 |
| B     | 84 – 86 |
| B-    | 80 – 83 |
| C+    | 77 – 79 |
| C     | 74 – 76 |
| C-    | 70 – 73 |
| D+    | 67 -69 |
| D     | 64 - 66 |
| D-    | 60 - 63 |

THE FINAL EXAM WILL BE ON ________________________________.

INCOMPLETE GRADES
A temporary symbol of I (incomplete) for a course may be given only when a student, due to circumstances beyond his or her control, has been unable to complete the course requirements within the official limits of the term. The circumstances must be documented to the instructor’s satisfaction.
TURNING IN WORK

Unless announced, all assignments except test, quizzes and exams, are due at the beginning of class the following Tuesday after assigned unless previously announced. Due dates will seldom be extended but, if exceptions are made, all students will be notified in class. It is expected that every student does his/her own homework – see academic integrity policy below.

Students may turn in assignments for partial credit up through midnight of the Tuesday it is due by:

1. emailing the assignment as a PDF file to GD-Hunter@wiu.edu
   (Please limit all email attachments to 2.0 Mbyte in size, or
2. emailing the assignment as a Word document with a .doc or .docx extension, or
3. at the Department Office. Give the assignment to the secretary and ask that it be time & date stamped and placed in my mailbox. Do not enter the mailroom un-attended.

Exams

All exams will be completed in-class and are limited by time. Exams may be written, practical or a combination of the written and practical. When the instructor announces that time is complete, students must stop all work. Any student continuing work on an exam will lose 10 points from the final exam score. (Students registered with Disabilities Resources may be excused from this policy)

COURSE COSTS

Students of this course are required to pay a special course charge of $25 for each lab-related course in the Engineering Technology Department. This money is used to support the consumable items used during the course.

Payment of the course cost is a required portion of the class and must be paid after the second week of the semester but prior to your final exam. If you fail to pay your course cost, you will receive a grade of "I" for the course until the lab fee is paid or the university automatically changes the grade from "I" to "F" according to the University Policy. If the grade is changed to an "F", the grade will remain an F on your permanent transcript, regardless of payment.

Payments can be made to the Engineering Technology department office (Knoblauch Hall 135) any time after the beginning of the third week of classes. Also, for the convenience of the students, the instructor will announce one date that a staff member will visit the classroom to collect course charges en masse.

It is recommended that students pay by check made out to "WIU". Likewise, the student should expect a receipt to serve as proof of payment.

If you have questions or concerns, please direct them to the staff in Knoblauch Hall 135 or call 309/298-1091.

ACADEMIC INTEGRITY

Preamble

Western Illinois University, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. Students have rights and responsibilities and students should realize that deception for individual gain is an offense against the members of the entire community, and it is the student's responsibility to be informed and to abide by all University regulations and policies on Academic Integrity.
Plagiarism, cheating, and other forms of academic dishonesty constitute a serious violation of University conduct regulations. Students who engage in dishonesty in any form shall be charged with academic dishonesty.

It is a duty of faculty members to take measures to preserve and transmit the values of the academic community in the learning environment that they create for their students and in their own academic pursuits. To this end, they are expected to instill in their students a respect for integrity and a desire to behave honestly. They are also expected to take measures to discourage student academic dishonesty, to adjust grades appropriately if academic dishonesty is encountered, and, when warranted, to recommend that additional administrative sanctions be considered. Grading policies are the exclusive prerogative of the faculty; administrative sanctions are under the authority of the Director of Student Judicial Programs. This document provides policies and procedures to be followed when academic dishonesty is encountered.

Definitions of Academic Dishonesty

The following definitions and examples are not meant to be exhaustive. The University reserves the right to determine, in a given instance, what action constitutes a violation of academic integrity. (See www.wiu.edu/policies/acintegrity.php for complete descriptions of the following topics:

- Plagiarism
- Fabrication and Falsification
- Cheating
- Complicity in Academic Dishonesty
- Abuse of Academic Materials
- Multiple Submissions

Reporting Academic Dishonesty

All members of the University community share the responsibility and authority to challenge and make known acts of apparent academic dishonesty. Any student, faculty member, or staff person who has witnessed an apparent act of student academic dishonesty, or has information that reasonably leads to the conclusion that such an act has occurred or has been attempted, has an ethical responsibility for reporting said act(s). Confronting and reporting academic dishonesty can be done in a variety of ways, and people should choose the manner most appropriate for the circumstances. Acts of apparent academic dishonesty that occur in the classroom should be reported directly to the course instructor, and/or the course instructor's Department Chair, and/or the instructor's College Dean. The Council on Admission, Graduation, and Academic Standards (CAGAS) or the Graduate Council will not accept or act upon anonymous reports, but will hold in strict confidence the identity of any person reporting a suspected instance of academic dishonesty, unless that person consents to having his/her identity revealed.

ACCESS & DISABILITIES

“Students with disabilities: In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.

AN ELECTRONIC VERSION of this statement can be found at https://www.wiu.edu/student_services/disability_resource_center/publications/index.php

If you have emergency medical information to share with me, if you need special arrangements in case the building must be evacuated, or if you need accommodations in this course because of a disability, please make an appointment with me as soon as possible. My office location and hours are at the top of this syllabus. If you plan to request disability accommodations, you are expected to register with the Disability Support Services (DSS) at 298-2512.

RESOLUTION OF PROBLEMS

Should a problem occur, students should speak to their instructor first. If the problem is not resolved, meet with the chair of the department. If the problem continues to be unresolved, go to the College of Business and Technology’s Dean.

Students should observe the following sequence for the resolution of problems:

   Student --- Instructor --- Chairperson --- Dean