Troubleshooting Automated Sys

TEAM - 1135 101

Course Description

This course presents a systematic approach to troubleshooting, troubleshoot control systems, procedures for proper loop check-out, Apply distributed control system (DCS) functions for troubleshooting. Interpret pneumatic and electronic loops, utilize the general operation features of control systems, like HART.

Recommendations: Completion of support courses or equivalent experience.
Semester: All

Course Student Learning Outcomes

- Develop a systematic approach to troubleshooting.
- Identify why a systematic approach to troubleshooting is most effective.
- Verify, locate, and identify performance problems and the causes of the problems.
- Take or recommend appropriate follow-up procedures to minimize problem recurrence.
- Identify the common causes of sensor, transmitter, controller, and final control element problems.
- Troubleshoot control systems.
- Apply distributed control system (dcs) functions for troubleshooting.
- Understand how to learn to troubleshoot.
- Demonstrate an understanding of the basics of failures, how hardware fails, measures of reliability, the wear-out period, how software fails, environmental effects on failure rates, exceeding instrument limits, common-cause failures, and root-cause analysis.

- Demonstrate an understanding of failure, overt and covert failures, directed failures, and what failure states indicate.
- Demonstrate an understanding of logical/analytical troubleshooting frameworks, how a specific troubleshooting framework works, generic logical/analytical frameworks, and the seven-step procedure.
- Demonstrate an understanding of other troubleshooting methods, why use other troubleshooting methods, substitution method, fault insertion method and other approaches.
- Demonstrate an understanding of safety, general troubleshooting safety practices, human error in industrial settings, plant hazards faced during troubleshooting, personnel hazards (electrical), protection, procedures, and permit systems and procedures.
- Demonstrate an understanding of tools and test equipment, hand tools contact-type test equipment, noncontact test equipment, infrared thermometer guns and imaging systems, leak detectors, documenting test equipment and accuracy of test equipment.
- Demonstrate an understanding of troubleshooting scenarios, and have knowledge of case examples for troubleshooting approaches.
- Demonstrate an understanding of troubleshooting hints, and related indicators.
- Demonstrate an understanding of troubleshooting aides.
- Demonstrate all TROUBLESHOOTING AUTOMATED SYSTEMS Competencies/Skills Set by completing a Hands-on Final Project that meets all Industry Automation & Instrumentation Standards.

Engagement Plan

Example language:

- In this course I will be posting interactive announcements which will offer specific opportunities for class questions and extra credit every other week.
- Additionally, I will be participating in the discussion forums with you to share my perspective within the discipline and to offer some nuances of interpretation that may not be present in your textbook.

- Lastly, we'll be holding small group Q & A sessions, where we can learn from our peers (and faculty) on some of the more difficult units within the course.

Brief Description of Assignments/Exams

Grading Criteria & Assessment Definitions Grading System: The list below is how letter grades will be defined for the course work required and completed. Each course will have specific requirements as listed in the canvas course site. Letter Grades Scale: The SLTC Electronics Department has as a minimum grade requirement of: C+ (77%) as a passing grade for all courses and all course assignments and assessments. Grades for SLTC Electronics Department are based on the categories assignment/assessments are as below:

In most courses there are all 4 categories as shown below and the letter grade will be based upon the average of the applicable categories. There are courses that do not have 4 categories and those exceptions are below.

4 - Categories Formative Assessment Cognitive Formative Assessment Performance-Based Summative Assessment Cognitive Summative Assessment Performance-Based Items Theory/Quizzes Weight25%Skills Based Hands-on Weight 25%Theory/Quizzes/Exams Weight25%Skills Based Hands-on Weight25%100%Criteria100% of course work @ minimum grade of 77% for each assignment.100% of course work @ minimum grade of 77% for each assignment.100% of course work @ minimum grade of 77% for each assignment.100% of course work @ minimum grade of 77% for each assignment. Any 3 - Categories Courses - Where there are only a SAC or SAP - but not both. Or not a FAC and/or FAP. Weight 33.33%Formative Assessment Cognitive Formative Assessment Performance-Based Summative Assessment Cognitive or Summative Assessment Performance- Based Items Theory/Quizzes Skills Based Hands-on Theory/Quizzes/Exams Skills Based Hands-on100%

Criteria100% of course work @ minimum grade of 77% for each assignment.100% of course work @ minimum grade of 77% for each assignment.100% of course work @ minimum grade of 77% for each assignment.2 - Categories assessments/assignments each will carry 50% of total weight for a total of 100%.Formative Assessment – During the Learning Cycle• Formative assessment is a term for any type of assessment or

assignment used to gather student feedback and improve instruction. Formative assessments occur during the learning process, often while students are engaged in other activities. Anecdotal records, periodic quizzes or essays, diagnostic tests and in-class or homework assignments are all types of formative assessment because they provide information about a student's progress. Any Formative Assessment serves in most case s as the determining tool that “says” you as a student are ready and able to “Demonstrate Proficiency” of the required course outcomes/objectives. Therefore, any weakness or missed objectives that need addressing during the Formative cycle will require some level of remediation before any Summative Assessments are allowed. You are encouraged to ask for assistance with concepts that are challenging. Summative Assessment – Demonstration of Proficiency• Summative assessment occurs at various points in a course and may include both cognitive and performance-based assessments.• This is a time that you as a student should be able to complete the assignments and meet the criteria listed for the assessment.• Objectives must be performed to the level that would meet industry requirements.

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	Simutech - TCC FAP	Assignment	100
	Course Survey	Quiz	0
	Introduce Yourself	Discussion	0
	Introduce Yourself	Discussion	0
	Module 1 - Simutech - TEC FAP	Assignment	100
	Module 1 - Troubleshooting Electrical Circuits FAC	Quiz	20
	Simutech - TMC FAP	Assignment	100

Due Date	Assignment Name	Assignment Type	Points
	Troubleshooting Automated Systems SAC	Quiz	25
	Troubleshooting Automated Systems SAP	Assignment	100
	Troubleshooting Control Circuits FAC	Quiz	20
	Troubleshooting Motors Circuits -FAC	Quiz	20

Grading Scale

Grading

Grading

Grade	Grade Range
A	92-100%
B	77-91%
F	0 to 76%

How to Navigate to Canvas

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities,

academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

For more information, navigate to the Institutional Policies tab on the Institutional Syllabus page.

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, visit the Institutional Syllabus page under the Tutoring and Learning Support tab. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, visit the Institutional Syllabus page under the Advising and Counseling Support Services tab. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar