

# Process Control Level/Flow

TEAM - 1520 101

## Course Description

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This course covers the most common types of process control systems, flow and liquid level. To include process control safety, instrument tags, piping and instrumentation diagrams, troubleshooting and level measurement. System control functions such as liquid level control, automatic control methods, basic flow measurement and control, and control loop performance using industry instrumentation. It is recommended that students complete TEAM 1050 prior to taking this course.

Semester(s): All

## Course Student Learning Outcomes

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- Identify definitions related to process control, safety, the elements of a process control system, and the general requirements of a control system.
- Explain instrument tags, block diagrams, piping and Instrumentation diagrams.
- Demonstrate the use of loop controllers, parameters, and manual operation.
- Use final control operation, I/P operation, and proportional control valves.
- Implement level measurement, level sensor operation, signal measurement, and display scaling.
- Troubleshoot process control systems.
- Utilize liquid level control.
- Implement methods of automatic control.
- Use basic flow measurement and control devices.
- Identify effective control loop performance.

- Use ultrasonic level measurement and control devices.
- Use differential pressure flow measurement and control devices.

## College Wide Student Learning Outcomes

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- Students acquire substantive knowledge in their intended major
- Students think critically

## Course Prerequisites

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As listed in catalog

## Transfer/Certification/Licensure/Employment Information

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As listed in SLTC transfer information.

## Engagement Plan

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Example language:

- We will respond to email within 24 to 48 hours except Saturday and Sunday. We will offer feedback on major assignments within 24 to 48 hours except Saturday and Sunday] The best way to contact us regarding course work is via the Canvas Inbox, as I will prioritize this email over other modes of communication. Other issues use Outlook.

## Keys for Success (how to succeed in the course)

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Regular attendance and making daily progress is critical.

Staying on track and working on a regular basis.

Ask for assistance when needed.

Complete all assignments as listed.

## Course Content Advisory

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PACE Plans are designed to keep you on PACE and making good progress.

## Required Text or Materials

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**Title: As listed in course introduction module**

For more information on textbook accessibility, contact Accessibility & Disability Services at [ads@slcc.edu](mailto:ads@slcc.edu).

## Brief Description of Assignments/Exams

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### 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 areas 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 Weight  
25%  
Skills Based Hands-on Weight  
25%  
Theory/Quizzes/Exams Weight  
25%  
Skills Based Hands-on Weight  
25%

**100%**

### **Criteria**

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.  
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-on  
100%

## **Criteria**

100% of course work @ minimum grade of 77% for each assignment.

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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 cases 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

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| Due Date | Assignment Name                                                                                                                     | Assignment Type | Points |
|----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------|
|          | <a href="#"><u>Module 11 -<br/>Ultrasonic Level<br/>Measurement and<br/>Control - FAC</u></a>                                       | Assignment      | 100    |
|          | <a href="#"><u>Module 11 -<br/>Ultrasonic Level<br/>Measurement and<br/>Control - LAP11 - FAP-<br/>Faculty Tool</u></a>             | Quiz            | 3      |
|          | <a href="#"><u>Module 12 -<br/>Differential Pressure<br/>Flow Measurement<br/>and Control - LAP12-<br/>1- FAP- Faculty Tool</u></a> | Quiz            | 3      |
|          | <a href="#"><u>Module 3 - Piping<br/>and Instrumentation<br/>Diagrams - FAC</u></a>                                                 | Assignment      | 100    |
|          | <a href="#"><u>Module 4 - Loop<br/>Controllers - FAC</u></a>                                                                        | Assignment      | 100    |
|          | <a href="#"><u>Summative<br/>Assessment<br/>Cognitive 11-12 - SAC</u></a>                                                           | Quiz            | 20     |
|          | <a href="#"><u>Summative<br/>Assessment<br/>Cognitive 9-10 - SAC</u></a>                                                            | Quiz            | 20     |

| Due Date | Assignment Name                                                                  | Assignment Type | Points |
|----------|----------------------------------------------------------------------------------|-----------------|--------|
|          | <a href="#">Summative Assessment Cognitive 7-8 - SAC</a>                         | Quiz            | 20     |
|          | <a href="#">Summative Assessment Performance - 9 - SAP</a>                       | Quiz            | 20     |
|          | <a href="#">Introduce Yourself</a>                                               | Discussion      | 0      |
|          | <a href="#">Introduce Yourself</a>                                               | Discussion      | 0      |
|          | <a href="#">Lap 1: Process Inputs Troubleshooting - Skills 1-4</a>               | Assignment      | 100    |
|          | <a href="#">LAP 2: Process Outputs Troubleshooting - Skills 1 -4</a>             | Assignment      | 100    |
|          | <a href="#">LAP 3: Systems Troubleshooting - Skills 1-5</a>                      | Assignment      | 100    |
|          | <a href="#">Module 1 - Introduction to Process Control - FAC</a>                 | Assignment      | 100    |
|          | <a href="#">Module 1 LAP1 FAP Introduction to Process Control - Faculty Tool</a> | Quiz            | 4      |
|          | <a href="#">Module 10 - Control Loop Performance - FAC</a>                       | Assignment      | 100    |

| Due Date | Assignment Name                                                                                              | Assignment Type | Points |
|----------|--------------------------------------------------------------------------------------------------------------|-----------------|--------|
|          | <a href="#">Module 10 - Control Loop Performance - LAP10 - FAP- Faculty Tool</a>                             | Quiz            | 3      |
|          | <a href="#">Module 12 - Differential Pressure Flow Measurements and Control - LAP12- 2 FAP- Faculty Tool</a> | Quiz            | 2      |
|          | <a href="#">Module 12 - How to install differential pressure sensors - VIDEO</a>                             | Assignment      |        |
|          | <a href="#">Module 12 - Differential Pressure Flow Measurement and Control - FAC</a>                         | Assignment      | 100    |
|          | <a href="#">Module 13 -Process Inputs Troubleshooting - FAC</a>                                              | Assignment      | 100    |
|          | <a href="#">Module 14 -Process Outputs Troubleshooting - FAC</a>                                             | Assignment      | 100    |
|          | <a href="#">Module 15 - System Troubleshooting - FAC</a>                                                     | Assignment      | 100    |
|          | <a href="#">Module 2 - Instrument Tags - LAP2 - FAP</a>                                                      | Assignment      | 100    |

| Due Date | Assignment Name                                                               | Assignment Type | Points |
|----------|-------------------------------------------------------------------------------|-----------------|--------|
|          | <a href="#">Module 2 -Instrument Tags - FAC</a>                               | Assignment      | 100    |
|          | <a href="#">Module 3 - Piping and Instrumentation Diagrams - LAP3 - FAP</a>   | Assignment      | 100    |
|          | <a href="#">Module 4 -Loop Controllers LAP4 FAP - Faculty Tool</a>            | Quiz            | 5      |
|          | <a href="#">Module 5 - Final Control Elements - FAC</a>                       | Assignment      | 100    |
|          | <a href="#">Module 5 - Final Control Elements LAP5- FAP - Faculty Tool</a>    | Quiz            | 4      |
|          | <a href="#">Module 6 - Level Measurement - FAC</a><br>-                       | Assignment      | 100    |
|          | <a href="#">Module 6 - Level Measurement - LAP6 - FAP- Faculty Tool</a>       | Quiz            | 6      |
|          | <a href="#">Module 7 - Liquid Level Control - FAC</a><br>-                    | Assignment      | 100    |
|          | <a href="#">Module 7 - Liquid Level Control - LAP7- 1 - FAP- Faculty Tool</a> | Quiz            | 4      |
|          | <a href="#">Module 7 - Liquid Level Control - LAP7- 2 - FAP- Faculty Tool</a> | Quiz            | 3      |

| Due Date | Assignment Name                                                                          | Assignment Type | Points |
|----------|------------------------------------------------------------------------------------------|-----------------|--------|
|          | <a href="#">Module 8 - Methods of Automatic Control - FAC</a>                            | Assignment      | 100    |
|          | <a href="#">Module 8 - Methods of Automatic Control - LAP8 - FAP- Faculty Tool</a>       | Quiz            | 4      |
|          | <a href="#">Module 9 - Basic Flow Measurement and Control - FAC</a>                      | Assignment      | 100    |
|          | <a href="#">Module 9 - Basic Flow Measurement and Control - LAP9 - FAP- Faculty Tool</a> | Quiz            | 5      |
|          | <a href="#">Summative Assessment Cognitive 1-3 - SAC</a>                                 | Quiz            | 25     |
|          | <a href="#">Summative Assessment Cognitive 4-6 - SAC</a>                                 | Quiz            | 22     |
|          | <a href="#">Summative Assessment Performance - 1-3 - SAP</a>                             | Quiz            | 76     |

## Grading Scale

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

## How to Navigate to Canvas

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### Institutional Policies

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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

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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

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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

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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](#)

## Additional Policies

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As listed on SLTC/SLCC web sites as it applies to SLTC students.

## Course Work

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All course work is to be submitted by mid-night of the last day of the semester.

Any courses not completed within a semester will require the student to begin a fresh, with no credit for previous course work.

The exception to the above is for students that qualify for an "I" incomplete.

All NIDA and Amatrol and similar cloud based work must be completed during the registered semester and all submissions are required to have that respective semester date stamp.

### **Conditional Procedures. The student in any respective course.**

1. If they have started but did not complete the course - due to non-attendance or lack of work. Grade earned at that point should be entered. B,C,D, E. etc.
2. They registered - but did not start or complete any work - after 10 days (including weekends), please use non-attendance drop