



Course Number and Title: CPO 106 Statistical Process Control Overview

Campus Location:

Stanton

Effective Date:

2019-51

Prerequisite:

MAT 010 or higher, SSC 100 or concurrent

Co-Requisites:

none

Course Credits and Hours:

1.00 credits

1.00 lecture hours/week

0.00 lab hours/week

Course Description:

This course provides a brief overview of basic statistics, including variation, and explains how to transform raw data into control charts for variables or attributes as well as how to determine in-control/out-of-control conditions. Basic problem solving tools such as Pareto analysis and cause and effect (fishbone) diagrams are presented.

Required Text(s):

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

Additional Materials:

None

Schedule Type:

Classroom Course

Disclaimer:

None

Core Course Performance Objectives (CCPOs):

1. Apply statistical concepts and principles to chemical process operations. (CCC 6; PGC 3, 7)
2. Interpret control charts to maintain process parameters within standard operating conditions. (CCC 2; PGC 3, 7)
3. Demonstrate the use of quality problem-solving tools. (CCC 2; PGC 3, 7)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

Measurable Performance Objectives (MPOs):

Upon completion of this course, the student will:

1. Apply statistical concepts and principles to chemical process operations.
 1. Explain the quality philosophy of W. Edwards Deming.
 2. Discuss the purpose of the Baldrige and the Delaware Quality Awards.
 3. Provide a brief history of the development of statistical process control (SPC) concepts.
 4. Describe the current uses of SPC by the chemical process industry.
 5. Highlight the importance of measurements.
 6. Calculate averages and measures of dispersion.
 7. Explain the differences between variables and attributes.
 8. Calculate the following statistical values: process distribution, process mean, and process standard deviation.
2. Interpret control charts to maintain process parameters within standard operating conditions.
 1. Show how to measure variation.
 2. Explain normal versus non-normal variation.
 3. Develop a frequency distribution chart for a data set.
 4. Construct a histogram.
 5. Construct and plot average and range charts.
 6. Determine if a pattern is normal or non-normal.
 7. Explain systematic and random errors.
 8. Identify typical and atypical patterns of process variables.
 9. Explain process capability indices.
 10. Compute control limits, and construct fraction nonconforming (p) and number nonconforming (np) charts.
 11. Determine the system of data collection and use.
 12. Explain p and np chart interpretations.
 13. Compute control limits and construct c and u control charts.
 14. Explain count type c and u control chart interpretations.
3. Demonstrate the use of quality problem-solving tools.
 1. Explain the purpose and use of the Pareto and the cause and effect (fishbone) diagrams.
 2. Construct Pareto and the cause and effect (fishbone) diagrams.

Evaluation Criteria/Policies:

Students must demonstrate proficiency on all CCPOs at a minimal 75 percent level to successfully complete the course. The grade will be determined using the Delaware Tech grading system:

92	-	100	=	A
83	-	91	=	B
75	-	82	=	C
0	-	74	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

Final Course Grade:

Calculated using the following weighted average

Evaluation Measure	Percentage of final grade
Summative: Mid-Term Test	30%
Summative: Final Exam	45%
Formative: QI Macros Statistical Software	15%
Formative: Homework Assignments	10%
TOTAL	100%

Core Curriculum Competencies (CCCs are the competencies every graduate will develop):

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):

1. Maintain safety, health, and environmental standards during simulation exercises or in a chemical plant.
2. Handle, store, and transport chemical materials according to all applicable federal, state, and local regulations.
3. Apply chemical process and quality systems in a chemical process environment or a chemical plant.
4. Operate, monitor, control, and troubleshoot batch and continuous chemical processes.
5. Analyze samples of raw materials, intermediates, and finished products in a simulated chemical process environment or a chemical plant.
6. Perform routine, predictive, and preventive maintenance and service to process equipment and instrumentation.
7. Use computers and computerized equipment for communications and chemical process control.

Disabilities Support Statement:

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.