



Course Number and Title: CPO 240 Quality

Campus Location:

Stanton

Effective Date:

2020-51

Prerequisite:

MAT 153 or higher, CHM 110

Co-Requisites:

None

Course Credits and Hours:

3.00 credits

3.00 lecture hours/week

0.00 lab hours/week

Course Description:

This course provides an overview of the quality concepts used by the chemical process industry. Topics include quality philosophy, continuous improvement, operating consistency, plant economics, team skills, and statistical process control techniques.

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. Describe the impact of quality on business economic performance. (CCC 4; PGC 3)
2. Use continuous improvement methodology to optimize chemical processes. (CCC 6; PGC 7)
3. Discuss the functions of an effective team member. (CCC 3, 4; PGC 3)
4. Explain the procedures and policies required to ensure operating consistency and to reduce process variability. (CCC 6; PGC 3)
5. Use problem-solving and decision-making techniques to identify and correct process deficiencies. (CCC 2; PGC 3, 4, 7)
6. Collect, analyze, and interpret process data using statistical process control techniques. (CCC 6; PGC 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. Describe the impact of quality on business economic performance.
 1. Outline the quality philosophies of Deming, Juran, and Crosby.
 2. Discuss the importance of quality programs in the chemical process industry.
 3. Explain the purpose and benefits of ISO 9000 certification.
 4. Describe the policies and procedures that must be in place for a manufacturing facility to receive ISO 9000 certification.
 5. List different terms for total quality management (TQM).
 6. Distinguish between the old and the new philosophies of quality.
 7. Characterize the four costs of quality.
 8. Explain economics in the chemical process industry.
 9. Explain the economic impact of non-conforming production.
2. Use continuous improvement methodology to optimize chemical processes.
 1. Define *continuous improvement*.
 2. Differentiate between chronic and sporadic process problems.
 3. Characterize corrective and preventive actions.
 4. Explain the consequences of not addressing non-conformance.
 5. Take corrective action to optimize chemical processes. .

6. Describe the concept of cause and effect.
 7. Describe internal and external customer service.
 8. Differentiate between customer specifications and customer requirements.
 9. Explain the relationship between the customer's processes and the supplier's processes.
 10. Describe the characteristics of an effective and efficient processor.
 11. Outline the factors that impact productivity.
 12. Characterize organizational mission, vision, and values.
 13. Describe various organizational structures in the chemical process industry.
 14. Demonstrate a willingness to progress through training at a rate that ensures skills are acquired quickly and completely.
3. Discuss the functions of an effective team member.
 1. Summarize the purpose and function of different types of teams.
 2. Describe the stages of team development.
 3. Convert team goals and objectives into team mission statement.
 4. Identify and discuss effective interpersonal skills.
 5. Explain the merits of aligning individual values and subsequent actions with those of the team.
 6. Explain and employ effective meeting management techniques.
 7. Explain various methods for managing conflict.
 8. Describe and demonstrate effective verbal and written communication skills and techniques.
 9. Define and use plant language appropriately.
 10. Explain organizational communications etiquette.
 11. Outline the types of tools employed for plant communications.
 4. Explain the procedures and policies required to ensure operating consistency and to reduce process variability.
 1. Differentiate between processes and systems.
 2. Outline the concept of process orientation.
 3. Discuss the concept of process management.
 4. Explain the factors that impact process performance.
 5. Characterize the interdependency of units.
 6. Define *learning organization*.
 7. Describe the attributes organizations must adopt to form a learning organization.
 8. Explain the barriers that inhibit the creation of a learning organization.
 9. Discuss the advantages that learning organizations have over other traditional organizations.
 10. Describe the various causes of variance.
 11. Discuss the concept of operating consistency.
 12. Explain the importance of documentation in maintaining operating consistency.
 13. List the different types of documentation found in the chemical process industry.
 14. Discuss the process technician's role in following and maintaining procedures and policies.
 15. Explain the concept of best practices.
 5. Use problem-solving and decision-making techniques to identify and correct process deficiencies.
 1. Use various problem-solving processes.
 2. Employ various solution generation techniques.
 3. Apply various decision-making tools.
 6. Collect, analyze, and interpret process data using statistical process control techniques.
 1. Define and discuss the purpose of statistical process control.
 2. Describe the properties of normal and bi-modal distributions.
 3. Calculate the mean, median, mode, and standard deviation for a data set.
 4. Perform statistical operations using a calculator or computer spreadsheet.
 5. Illustrate how data represents the chemical process.
 6. Explain the purpose of data collection.
 7. Describe different data collection techniques used by the chemical process industry.
 8. Characterize the purpose of sampling.
 9. Discuss the problems associated with conventional sampling and testing schemes.
 10. Explain the consequences of falsifying records.
 11. Explain the purpose and use of control charts.
 12. Discuss the properties of control charts (upper and lower limits, average, mean, and range).
 13. Explain why control charts should be used only with certain types of processes.
 14. Calculate control limits.
 15. Interpret data on a control chart.
 16. Describe the rules for determining out-of-control status for a chemical process.
 17. Explain over controlling and under controlling a chemical process.
 18. Discuss process capability limits.
 19. Compare and contrast potential capability (C_p) with actual capability (C_{pk}).
 20. Apply data collection, representation, analysis, and interpretation skills to a real-world chemical process industry scenario.

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
3 Tests (summative) (equally weighted)	60%
Final Exam (summative)	20%
Class Project (summative)	10%
Homework (formative)	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 simulated 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.