PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

STATISTICAL PROCESS CONTROL
MET 2820

Class Hours: 3.0 **Credit Hours: 4.0**

Laboratory Hours: 3.0 **Revised: Fall 06**

Catalog Course Description:

A study of the fundamental concepts and methodology of Statistical Process Control (SPC) with particular emphasis placed on laboratory projects to enhance "hands-on" operational experience. Topics include philosophy of SPC and other quality systems, basic statistical concepts, variable and attribute charting, and computer-assisted methods.

Entry Level Standards:

Students entering this course should have a fundamental knowledge of basic measuring techniques.

Prerequisites:

MATH 1530 and MET 2810

Textbook(s) and Other Course Materials:

Textbook: *Quality Control: Besterfield*, Prentice-Hall, Latest Edition.
The Quality Technician's Handbook: Griffith, Prentice-Hall, Latest Edition.
References:
Gage Calibration Reference Manual: Latest Edition, L.S. Starrett Company.
SPC Plus II Reference Manual: Latest Edition, L.S. Starrett Company.
DātaMyte Handbook: Latest Edition, DātaMyte Corporation.
Quality: Summers, Prentice-Hall, Latest Edition.

I. Week/Unit/Topic Basis:

Week	Topic
1	Introduction & Philosophy
2-3	Basic Statistical Concepts
4-6	Control Charts For Variables
7-8	Process Capability
9-10	Control Charts For Attributes
11-14	Culminating Experience

15 Final Exam, Final Project, Or Presentation

II. MET Program Objectives & Outcomes:

Objectives:

I. Apply basic engineering theories and concepts.

II. Apply basic engineering theories and concepts.

III. Identify and solve work related problems with minimum assistance.

IV. Operate equipment and instruments with a high degree of skill.

V. Communicate effectively, including verbal, writing, and graphical skills.

VI. Apply the principles of good work ethics.

VII. Obtain gainful employment in the MET discipline or matriculate to a 4-year program in engineering technology.

Outcomes:

A. apply the knowledge of mathematics, science, and engineering technology. (I, II, IV, VI)

B. use the techniques and modern engineering tools needed for engineering technology practices. (I – IV, VI)

C. identify, formulate, and solve engineering technology-based problems. (I, II, VI)

D. design and conduct experiments, as well as analyze and interpret collected data. (I– IV, VI)

E. create or fabricate a system, subsystem, component, or process to meet specified needs. (I – IV, VI)

F. read and extract information from manuals, journals, and other discipline related literature. (I –IV, VI)

G. communicate effectively, including verbal, writing, and graphical skills. (IV, V, VI)

H. function and contribute positively in team situations. (II, IV- VI)

I. comprehend social, professional, and ethical responsibilities, including development of a respect for diversity and other contemporary issues.(II, V, VI)

J. realize the impact of engineering technology solutions in a global and societal context. (V, VI)

K. realize the importance of a commitment to quality, timeliness, and continuous improvement. (V, VI)

L. recognize the importance of life-long learning.(I – VI)

III. Course Objectives*:

A. Demonstrate their understanding of the basic philosophy and principles of SPC.

(A-C, K)

B. Demonstrate their understanding of basic statistical concepts. (A-C)

C. Set-up, initiate, and analyze a gage capability study by computer-assisted methods. (A-C, D)

D. Set-up and initiate a variable control process by computer-assisted methods. (A-C, D)

E. Set-up and initiate an attribute control process by computer-assisted methods. (A-C, D)

F. Collect data and analyze results. (D)

G. Communicate technical information. (F , G)

*Letters after course objectives reference MET Program Outcomes (as required by ABET).

IV. Instructional Processes*:

Students will:

1. Actively listen to class lectures and participate in class activities that develop and reinforce an understanding of the theories, concepts, principles, and applications of SPC. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies*

2. Work individually and in teams to complete lab projects and assignments related to the theories, concepts, principles, and applications covered in the lecture or demonstration portion of the course. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies*

3. Collect, analyze, and tabulate data in an orderly format to prepare a college level technical report using software packages such as AutoCAD, Word, SPC Plus II, and Starrett Gage Calibration. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies*

4. Observe class demonstrations on measuring equipment, practice, and then demonstrate to instructor basic manipulative skills required to set-up, calibrate, and operate equipment. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies*

5. Observe class demonstrations on SPC software, practice, and then integrate manipulative and cognitive skills with assimilated knowledge to successfully complete lab projects. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies*

6. Participate in technical meetings, plant tours, and seminars sponsored by local technical societies to increase student knowledge of machining and manufacturing processes and enhance awareness of required job skills and opportunities in industry. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Transitional Strategies, Active Learning Strategies*

*Strategies and outcomes listed after instructional processes reference TBR's goals for strengthening general education knowledge and skills, connecting course work to experiences beyond the classroom, and

encouraging students to take active and responsible roles in the educational process.

V. Expectations for Student Performance*:

Upon successful completion of this course, the student should be able to:

1. Define, explain, and associate the terminology used in SPC. A
2. Apply and associate the principles of SPC. A
3. Calculate mean, median, mode, range, and standard deviation. B
4. Create a frequency distribution chart and histogram. B
5. Analyze a histogram for skewness, kurtosis, and normal distribution. B
6. Create a GR&R program by computer-assisted methods. D
7. Collect data and analyze results of gage capability study. D & G
8. Create computer-assisted program for a variable and attribute process. E & F
9. Collect data and analyze results for a variable and attribute process. B, E, F, & G
10. Document technical information from gage capability, variable, and attribute processes in a neat and orderly format. H
11. Locate and extract needed information from operational and programming manuals. H
12. Complete assignments based on oral and written instructions. H

*Letters after performance expectations reference the course objectives listed above.

VI. Evaluation:

A. Testing Procedures:

Quizzes (25 Points): Approximately 4-6 quizzes will be administered during the course. They will include discussion questions, short answer questions, true/false questions, and problem solving.

B. Laboratory Expectations:

Process Capability Project	(10 Points)
e Data Project	(15 Points)
e Data Project	(15 Points)
Case Study	(25 Points)

The instructor will provide guidelines and requirements for each project.

C. Field Work:

N/A

D. Other Evaluation Methods:

Participation (10 Points):
Based on instructor observation during the course, each student will be evaluated on participation activities. Evaluation parameters to include active participation in class discussions, being prepared, efficient use of lab time, striving to achieve more than minimum requirements, and regular attendance.

E. Grading Scale:

Final grade for this course will be based on the following alphabetic/numerical scale.

A	93-100
B+	88-92
B	83-87
C+	79-82
C	74-78
D	65-73
F	Below 65

VII. Policies:

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course (Pellissippi State Catalog).

B. Academic Dishonesty:

Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions which may be imposed through the regular Pellissippi State procedures as a result of academic misconduct, the instructor has the authority to assign an F or a zero for the exercise or examination or to assign an F in the course.

C. Accommodations for disabilities:

If you need accommodations because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Please see the instructor privately after class or in his/her office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127 or 131 or by phone: 694-6751(Voice/TTY) or 539-7153.

D. Other Policies:

Make-Up Quizzes: As a general rule, no make-up quizzes will be administered during the course.

Safety and Equipment Abuse: Repeated safety violations will result in a reduction of final grade, at the instructor's discretion. Flagrant violations which result in equipment damage or personal injury will result in automatic failure of the course.

Your instructor is available during posted office hours or by appointment.