



DE LA SALLE UNIVERSITY
College of Science
Mathematics and Statistics Department



STAT1QC – Introduction to Statistical Quality Control
 Prerequisite: STATHE2

Prerequisite to: _____

Instructor: _____
Consultation Hours: _____

Contact details: _____
Class Schedule and Room: _____

Course Description

This course discusses the use of statistical methods to improve the quality of products used in society. These products include manufactured goods and services. Topics include statistical process control, process design and acceptance sampling.

Learning Outcomes

On completion of this course, the student is expected to present the following learning outcomes in line with the Expected Lasallian Graduate Attributes (ELGA) and the outcomes prescribed by the CHED Memorandum Order for the BS Mathematics program.

ELGA	Learning Outcome	Program Outcome													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Critical and Creative Thinker Effective Communicator Lifelong Learner	At the end of the course, the student will														
	apply appropriate statistical concepts, processes, tools, and technologies in the solution to various conceptual and real-world problems.	✓	✓	✓	✓	✓	✓				✓		✓	✓	✓

Program Outcomes (BS Statistics)

- A graduate of the program should be able to
1. Demonstrate broad and coherent knowledge and understanding of the core areas of statistical theory and statistical modeling .
 2. Apply critical and problem solving skills using the scientific method.
 3. Interpret scientific data and make judgments that include reflection on relevant scientific and ethical issues.
 4. Carry out basic mathematical and statistical computations and use appropriate technologies in (a) the analysis of data; and (b) In pattern recognition, generalization, abstraction, critical analysis and problem solving.
 5. Communicate information, ideas problems and solutions, both, orally and in writing, to other scientists, decision makers and the public.
 6. Relate science and mathematics with other disciplines.
 7. Design and perform safe and responsible techniques and procedures in laboratory or field practices.
 8. Critically evaluate input from others.
 9. Appreciate the limitations and implications of science in everyday life.
 10. Commit to the integrity of data.
 11. Demonstrate broad and coherent knowledge and understanding in the core areas of statistics, computing and mathematics.
 12. Generate information involving the conceptualization of a strategy for generating timely and accurate/reliable data, organizing a process for putting together or compiling the needed data, and transforming available data into relevant and useful forms.
 13. Translate real-life problems into statistical problems.
 14. Identify appropriate statistical tests and methods and their proper use for the given problems, select optimal solutions to problems and make decision in the face of uncertainty.

Final Course Output

As evidence of attaining the above learning outcomes, the student is required to submit the following during the indicated dates of the term.

Learning Outcome	Required Output	Due Date
At the end of the course, the student will apply appropriate statistical concepts, processes, tools, and technologies in the solution to various conceptual and real-world problems.	An inquiry-based written and oral group presentation highlighting the uses of statistical quality control in manufactured products and services	Week 13

Rubric for assessment

CRITERIA	EXEMPLARY 4	SATISFACTORY 3	DEVELOPING 2	BEGINNING 1
Formulation of the Research Problem and Objectives (10%)	Research problem and objectives are clearly defined and significant; Demonstrates evidence that the research problem was researched and designed well.	Research problem and objectives are clearly defined and significant.	Research problem is clearly defined but some objectives are insignificant.	Research problem and objectives are vague and insignificant.
Correct Application of the Statistical Concepts (35%)	Statistical analyses are appropriate with correct interpretations and relevant conclusions.	Statistical analyses are appropriate with correct interpretations.	Some statistical analyses are inappropriate.	Statistical analyses are inappropriate
Depth of Analysis (30%)	The analysis convinces the reader about the wisdom of conclusions, implications and consequences on the basis of statistical methods and findings	The analysis engages the reader to appreciate the wisdom of conclusions, implications and consequences on the basis of statistical methods and findings	The analysis have limited ideas that do not explain the wisdom of conclusions, implications and consequences on the basis of statistical methods and findings	The analysis has incorrect ideas and conclusions.
Clarity and Organization of Written Report (10%)	Written report is organized logically and presented clearly with effective transitions.	Written report is organized logically and presented clearly.	Written report is organized and some discussions are not clear.	Written report is not organized.
Oral Presentation (15%)	Overall presentation is creative and well organized with innovative ideas.	Overall presentation is creative and well organized.	Overall presentation is organized	Overall presentation is not organized

Additional Requirements

- ✚ Quizzes
- ✚ Class Participation (seatwork and group exercises, homework, recitation)
- ✚ Computer hands-on exercises
- ✚ Final Examination

Grading System

	FOR STUDENTS with FINAL EXAM		Scale:
	with no missed quiz	With one missed quiz	
Average of quizzes	60%	50%	95-100% 4.0
Seatworks, Boardwork, Assignment	10%	10%	89-94% 3.5
Final exam/Project	30%	40%	83-88% 3.0
			78-82% 2.5
			72-77% 2.0
			66-71% 1.5
			60-65% 1.0
			<60% 0.0

Learning Plan			
LEARNING OUTCOME	TOPIC	WEEK NO.	LEARNING ACTIVITIES
At the end of the course, the student will apply appropriate statistical concepts, processes, tools, and technologies in the solution to various conceptual and real-world problems	1. Overview of SQC 1.1 Basic concepts and definitions 1.2 Brief history of quality methodology	1.5 hours / Week 1	Prior knowledge and beliefs survey Concept mapping Library work Group discussion and presentations Computer laboratory activities* Skills exercises Student self-assessment and reflection
	2. Useful Statistical Concepts in Quality Improvement 2.1 Describing variability - Graphical display - Statistical measures 2.2 Important probability distributions to model process quality - Discrete distributions - Continuous distributions 2.3 Inferences about process quality - Estimation - Hypothesis testing	10.5 hours / Week 1-4	
	Quiz No. 1	1.5 hours / Week 5	
	3. Statistical Process Control 3.1 Methods and philosophy 3.2 Control charts for variables 3.3 Control charts for attributes	10.5 hours / Week 5-8	
	Quiz No. 2	1.5 hours / Week 9	
	4. Acceptance Sampling 4.1 Lot-by-lot acceptance sampling for attributes 4.2 Other acceptance sampling techniques	9 hrs / Week 9-12	
	Quiz No. 3	1.5 hours / Week 12	
	Group and Written Reports*	3 hours / Week 13	
	Final Examination	2.0 hours / Week 14	

***Suggested topics for group reports:**

ISO
 Process Capability Analysis
 Total Quality Management
 Six-Sigma (DMAIC and DMADV)
 Reliability
 Journal articles on the applications of SQC to other fields

*Skills exercises/ computer laboratory activities are given weekly and the students are expected to work on the solutions for their fourth hour activity. At the end of the term, the solutions to the problems will be compiled and submitted as one of the course outputs.

References

Montgomery, Douglas C. (2013). *Introduction to Statistical Quality Control (7th edition)*. Wiley.
 Besterfield, Dale H. (2001). *Quality Control (6th Edition)*. Upper Saddle River, N.J.: Prentice Hall.
 Miller Irwin and Miller Marylees. (1995). *Statistical Methods for Quality*. Englewoods, Cliffs N. J.: Prentice Hall

Online Resources

SQC Online: *Online statistical calculators for acceptance sampling and quality control*. Accessed October 15, 2012 from: <http://www.sgconline.com/>

Freeware Process Capability Calculator. Accessed October 15, 2012 from: <http://www.symphonytech.com/pccfree.htm>

HyperStat Online Statistics Textbook. Accessed October 15, 2012 from: <http://davidmlane.com/hyperstat/>
Stat Trek: *Teach Yourself Statistics*. Accessed October 15, 2012 from: <http://stattrek.com>

Class Policies

1. The required minimum number of quizzes for a 3-unit course is 3, and 4 for 4-unit course. No part of the final exam may be considered as one quiz.
2. Cancellation of the lowest quiz is not allowed even if the number of quizzes exceeds the required minimum number of quizzes.
3. As a general policy, no special or make-up tests for missed exams other than the final examination will be given. However, a faculty member may give special exams for
 - A. approved absences (where the student concerned officially represented the University at some function or activity).
 - B. absences due to serious illness which require hospitalization, death in the family and other reasons which the faculty member deems meritorious.
4. If a student missed two (2) examinations, then he/she will be required to take a make up for the second missed examination.
5. If the student has no valid reason for missing an exam (for example, the student was not prepared to take the exam) then the student receives 0% for the missed quiz.
6. Students who get at least 89% in every quiz are exempted from taking the final examination. Their final grade will be based on the average of their quizzes and other prefinal course requirements. The final grade of exempted students who opt to take the final examination will be based on the prescribed computation of final grades inclusive of a final examination. Students who missed and/or took any special/make-up quiz will not be eligible for exemption.
7. Learning outputs are required and not optional to pass the course.
8. Mobile phones and other forms of communication devices should be on silent mode or turned off during class.
9. Students are expected to be attentive and exhibit the behavior of a mature and responsible individual during class. They are also expected to come to class on time and prepared.
10. Sleeping, bringing in food and drinks, and wearing a cap and sunglasses in class are not allowed.
11. Students who wish to go to the washroom must politely ask permission and, if given such, they should be back in class within 5 minutes. Only one student at a time may be allowed to leave the classroom for this purpose.
12. Students who are absent from the class for more than 5 meetings will get a final grade of 0.0 in the course.
13. Only students who are officially enrolled in the course are allowed to attend the class meetings.

Approved by:



DR. JOSE TRISTAN F. REYES
Chair, Mathematics and Statistics