# TEACHING PORTFOLIO

Ozan Ozcan

Department of Industrial and Management Systems Engineering

University of South Florida

4202 East Fowler Avenue, ENB118
Tampa, FL 33620
oozcan@mail.usf.edu

## Table of Contents

- Teaching and Learning Philosophy .................................................................................. 2
- Teaching Responsibilities ................................................................................................. 2
- Teaching Methodologies ................................................................................................. 3
- Assessment of Teaching Effectiveness ............................................................................ 4
- Teaching Improvement Activities ................................................................................... 6
- Future Teaching Program Goals ..................................................................................... 7
- Appendices: Summary of Documentation ....................................................................... 7
  - Appendix A: Sample Course Syllabi ........................................................................... 8
  - Appendix B: Sample Lesson Plan of Confidence Interval for Constructivist Teaching ...... 11
  - Appendix C: Animations and Case Studies for Class Discussions ................................. 13
  - Appendix D: Message from Instructor Coordinator and a Student ............................... 14
  - Appendix E: Evaluations from Students ...................................................................... 15
  - Appendix F: List of Workshops Attended to Improve Teaching .................................. 16
  - Appendix G: Certifications of Workshop Participations ............................................. 17
Teaching and Learning Philosophy

My teaching philosophy is composed of the following statements which are directly affecting the learning of students. Each of them demonstrates the opinion and purpose of my teaching.

- Students learn best when they are actively involved in and committed to what they are learning. I have designed several course tools, lesson plans, games, and collaborative works to actively engage students in class.
- The development of critical thinking skill improves students’ ability to analyze and synthesis the course contents. I create a positive learning environment and promote a habit of analyzing every situation critically.
- Each student is a unique individual who has different ways to learn. Therefore, I am using several techniques to communicate important information clearly and in varied ways.
- Good teaching do not begins and ends inside the classroom. I designed my office hours to serve as a mentor to students outside the classroom.
- All instructors continuously develop and renew themselves; therefore, instructors must work diligently to improve their knowledge and teaching methods.

In the following sections, I illustrate my teaching philosophy with several examples.

Teaching Responsibilities

As a graduate student instructor, my teaching assignments are centered on foundations of Statistics and Engineering economics. I taught and am currently teaching the following undergraduate courses:

- Probability and Statistics for Engineers (EGN 3443) in Fall 2009 (Class size 80)
- Engineering Economics with Social and Global Implications (EGN 3615) in Fall 2010 (Class size 160)
- Engineering Economics with Social and Global Implications (EGN 3615) in Spring 2011 (Class size 160)

PROBABILITY AND STATISTICS FOR ENGINEERS (EGN 3443): Graphical Representation of Data; Axioms of Probability; Conditioning, Bayes’ Theorem; Discrete Distributions (Geometric, Binomial, Poisson); Continuous Distributions (Normal Exponential, Weibull), Point and Interval Estimation, Likelihood Functions, Test of Hypotheses for Means, Variances, and Proportions for One and Two Populations, Simple Linear Regression and Correlation (See the example Syllabus in Appendix A).


As a graduate student, I was a teaching assistant for Probability and Statistics for Engineers in Fall 2007, Fall 2008, Spring 2010 and for Engineering Economics in Fall 2006 and Spring 2007 semesters.
Teaching Methodologies

_Education is not the filling of a pail, but the lighting of a fire._—William Butler Yeats

I always begin each lecture with a smile and aloud “Good Morning” and continue with an outline. Each lecture, I _combine the theories and models with real life examples_. This helps students integrate the subject of the course with their outside experiences and store newly acquired information to long term memory.

The _constructivist teaching_ is the main strategy I used in my lectures. As a part of an NSF funded project, I have developed several active learning tools and lesson plans (See example lesson plan in Appendix B) with my advisor Dr. Kingsley A. Reeves. For example, using a model catapult, I taught several concepts in my Statistics class. A group of students throw a ball several times using this catapult (Appendix C) and collect data with measuring the distance of each ball. After this, using the distance data, they learn several concepts of statistics including descriptive statistics, confidence interval, and hypothesis testing. For instance, I asked students to make 15 throws with the catapult and measure the distances and construct a confidence interval. Then, the students made 5 more shots and observed how many of them are within this confidence interval. Additionally, I applied several exercises, which enable active participation to classroom activities (See example active learning exercise in Appendix C).

I use the _Think-Pair-Share technique_ in my lectures to encourage active participation. At the end of the every chapter, students find one or two partners and solve the questions that I post to the board. After solving each question, some groups share their results with the classroom. In group study, each partner has a discussion about the question, and, if necessary, one partner teaches the solution to the other partner. These Think-Pair-Share activities create a positive environment and help students to be more prepared for future exams. Additionally, the students get credit from participating in these activities, which results in high attendance to the lecture.

I _illustrate statistics and economics concepts_ using different animations that I found on the internet. These illustrations and animations help students to understand the concept through visual support. (See example animations in Appendix C). To encourage active participation in class, I design multiple choice questions and students vote for the correct answer. This helps me to understand their knowledge level in addition to actively engaging them in class. I attended a workshop of the Center for 21st Century Teaching Excellence at USF and learned how to use _clickers_ in the classroom. I am planning to use clickers in my lectures to get more effective results of multiple choice questions.

I _give importance to being accessible_ because I believe every student is different. Students are individuals, and they learn in different ways. Therefore, office hours have an important place in my lecture. In the first lecture of the semester, I and my teaching assistant determine the office hours by asking students to make sure everybody can come to at least one of them. Additionally, using Elluminate online education software, I conduct online office hours, in which everybody can easily participate. Elluminate is a real-time virtual classroom environment designed for distance education and enables instructors and students to share their files and to communicate in several ways. I use Elluminate to promote active learning, improve the students’ performance and expand the boundaries of the traditional classroom. To encourage students, I gave one point to each student who came to office hours throughout the semester at least once.
Assessment of Teaching Effectiveness

“If you cannot measure it, you cannot improve it.” – Lord Kelvin

Student evaluations are vital to my efforts to improve courses. I use several methods to evaluate my teaching’s effectiveness.

- Throughout the semester, students can make comments about several aspects (methods, exams, assignments, etc…) of the course using Select Survey, which is an online survey tool at USF. This enables continuous assessment of my lecture.
- In the middle of the semester, I conduct mid-semester evaluations and ask questions about Think-Pair-Share activities, attitudes of instructors and TAs, exams, assignments, and instructor English. These anonymous evaluations help determine course strengths and address student concerns.
- At the end of the semester, College of Engineering conducts instructor evaluation.
- Throughout the semester, during the office hours or at any other opportunity, I interview with students about the good and bad aspects of the course.
- I discuss my teaching methods, exams, and lecture materials with my advisor Dr. Kingsley Reeves and Dr. Paul Schnitzler. Dr. Reeves is the instructor of another Statistics session and is a member of Center for 21st Century Teaching Excellence (C 21 TE). Dr. Schnitzler is the instructor of another Engineering Economics session.

Indicators of teaching effectiveness include quantitative results and student comments from instructor evaluations. My evaluations are consistently high in all sections, and I earned appreciations from students about my methods, fairness, helpfulness, knowledge, and enthusiasm. The College’s evaluation forms rate faculty on several items using a five-point Likert scale (with five representing the most favorable rating).

<table>
<thead>
<tr>
<th>Questions</th>
<th>Statistics Fall/09 Campus</th>
<th>Statistics Fall/09 Online</th>
<th>Engineering Econ Fall/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Course Objectives &amp; Assignments</td>
<td>4.23</td>
<td>4.20</td>
<td>4.18</td>
</tr>
<tr>
<td>Communication of Ideas and Information</td>
<td>4.15</td>
<td>3.80</td>
<td>3.88</td>
</tr>
<tr>
<td>Expression of Expectations for Performance</td>
<td>4.38</td>
<td>4.60</td>
<td>4.22</td>
</tr>
<tr>
<td>Availability to Assist Students In or Out of Class</td>
<td>4.74</td>
<td>5.00</td>
<td>4.50</td>
</tr>
<tr>
<td>Respect and Concern for the Students</td>
<td>4.85</td>
<td>5.00</td>
<td>4.50</td>
</tr>
<tr>
<td>Stimulation of the Interest In the Course</td>
<td>4.03</td>
<td>4.60</td>
<td>3.83</td>
</tr>
<tr>
<td>Facilitation of Learning</td>
<td>4.28</td>
<td>4.60</td>
<td>4.21</td>
</tr>
<tr>
<td>Overall of Rating of the Instructor</td>
<td>4.36</td>
<td>4.60</td>
<td>4.14</td>
</tr>
<tr>
<td><strong>Average Mean</strong></td>
<td><strong>4.38</strong></td>
<td><strong>4.55</strong></td>
<td><strong>4.23</strong></td>
</tr>
</tbody>
</table>

Positive Comments of Teaching Instructor Coordinator:

“I want to congratulate you for the excellent work you did in the Eng Econ course this semester. I know that you have worked hard to make this a good course, especially due to the large size of your section. I always received the emails that Ozan sent the students about questions, quizzes, exams, office hours, and help sessions. …. Thank you for a job well done and I hope you keep up the great work.

Please See Appendix D for the complete comment and a student email.
Positive Student Comments:

- “Ozan did an excellent job instructing this class. A few times we went over the materials too fast but TA’s were available to fill this gap. His passion for teaching kept the class inspired and went above to stimulate my learning experience with slides of his home country (Turkey). I would like to take other classes with him.”
- “Ozan is one of my best teachers from the year 2007. I would recommend him to all. The class was very enjoyable. USF is a better place with him. Thank you. ☺”
- “I like Think-Pair-Share activities because they assist in applying the knowledge that we learn during the class period to the section that we are being taught. The Elluminate sessions are great too, especially when a student has a hectic schedule and lives off campus. The exams are fair, as well as the quizzes and homework.”
- “Ozan was very helpful out of class and really wanted all students to understand the course work.”
- “You can tell he really cares which is nice to see.”
- “One of the best classes with you, Ozan.”
- “The professor is a very good professor he has a lot of office hours that will help and he takes time out after class to help us.”
- “Excellent job!! Everything was explained very very good. Instructor have great attitude, a lot of patience for everyone and respect all students!”
- “Great Instructor and quick response to emails and always friendly. I would highly recommend.”

Constructive Student Comments:

- “Instead of Think-Pair-Share, Explain concepts more; explain tables so it is easier for us to understand.”
- “The amount of work on Test 2 was way too much. The globalization discussions in class were sometimes boring.”
- “The accent may get in the way a little bit but he is able to communicate materials clearly.”
- “Sometimes quizzes are hard and some aren’t like any previous worked problems or like any from the book.”

Reflection on constructive comments:

- Traditional teaching methods may be more preferable to some students. Therefore, it is very important to clearly explain the intent of active learning techniques. The purpose of active learning methods is to help students learn with understanding rather than merely memorizing sets of facts.
- All instructors must pursue continuous development and renewal. I work diligently to improve my English speaking, increase the efficiency of class discussions, and set up better assignments. The details for my teaching improvement activities are given in the next section.

Appendix E includes additional student evaluations from my two classes.
Teaching Improvement Activities

I have been engaging several specific teaching improvement activities since the Fall 2008 semester.

- As I stated above, I have numerous methods to assess my teaching effectiveness. I carefully review the results of these assessments, try to listen to my students’ voices, and answer their needs.
- The Center for 21st Century Teaching Excellence is a center that contributes to development of instructors and teaching assistants. I always interact with the people in this center and benefit from their counseling services and library.
- The Center for 21st Century Teaching Excellence organizes various workshops each year to contribute to the USF instructors and teaching assistants. I attended 16 different two-hour workshops in the last 3 years. You can find the workshop list in Appendix F and my certificate in Appendix G.
- In Fall 2010, I was nominated by my department to attend a week-long workshop related to teaching methodologies. The workshop was designed to strengthen teaching, communication, and intercultural skills of teaching assistants in preparation for departmental duties related to the teaching of undergraduate students. Please see the attached certificate in Appendix G.
- My advisor Dr. Reeves had an NSF funded project that aimed to measure the impact of constructivist teaching strategies on engineering education. I participated in several parts of this project and learned various constructivist teaching strategies. We are preparing publications from findings to submit to journals to be published, and national and international conferences to be presented.
- Within the scope of my advisor’s NSF funded project, I contributed preparing lecture materials, course tools and lecture plans for constructivist learning. This process helped me to review and learn several concepts about teaching pedagogy.
- For two semesters, I attended “accent reduction therapies” in University of South Florida Speech, Language, and Hearing Center. These therapies helped me to pronounce English words clearly, make better and understandable presentations, and speak efficiently inside the classroom.
- Since my Statistics class was a combined class of on campus and online students, the Distance Education department was videotaping my classroom activities. I analyzed my classroom teaching and followed up with the consultation of other instructors. I will use this process at intervals and measure the progress of my teaching ability.
- At the second time of giving Engineering Economics in Spring 2011 semester, I am always renewing lecture notes and reviewing new teaching materials for possible application. This maintains currency of materials presented and interest among students.
- I prepared detailed course materials and presentations for my both statistics and economics courses. Before presenting in the classroom, I discuss the materials with the instructors of other sessions to make more advanced presentations and improve my teaching ability.
- When I go to an engineering conference (i.e. Informs or IIE), I always attend to engineering education sessions to learn new research about improvements in engineering teaching.
- I am a member of the American Society for Engineering Education (ASEE) and read their journals and monthly magazines on improving teaching and attempting to implement acquired ideas. ASEE in an association concerned with the improvement of teaching and learning.
- Finally, the preparation of this portfolio has been an effort to enhance my teaching ability. I have attended a special seminar for preparing a teaching portfolio. During and after this seminar, I have
discussed the items of this portfolio with several colleagues and professors from my own university and other universities. The conversations with other people and thinking about my teaching had a positive impact on my teaching.

**Future Teaching Program Goals**

My primary teaching goal is to develop more constructivist teaching strategies, and update and revise my existing teaching methods in accordance with the continuously changing world and student expectations. Specifically, I have established the following personal and professional goals for my teaching activities.

- Develop additional course materials such as simulations, Think-Pair -Share activities, and cooperative work, and critique these with my colleagues
- Make research related to constructivist teaching strategies, publish in journals, and attend education related national and international conferences
- Use different evaluation methods to assess my teaching effectiveness
- Learn more about critical thinking in order to develop more application to apply in large classrooms
- Contribute to Teaching Excellence of Center’s of universities by designing workshops related to constructivist teaching strategies and active learning methods
- Develop undergraduate and graduate courses in my areas of expertise with state-of-the-art content

As an Industrial Engineering student, I took several courses of Simulation, Operations Research, Project Management, Manufacturing Analysis, and Advanced Statistics. In my 5-year professional work life and Ph.D. studies, I gained experience in Process Flow, Strategic Management, TQM, Lean Production, Project Management, Supply Chain Management, Sustainable System Development, and Social Network Analysis. According to my knowledge and experiences, the following are descriptions of classes I would like to teach:

**Operations Management:** Demonstrates applications of organizational theory to the analysis and design of work organizations is taught through lectures, projects in real organizations, experiential exercises, and case studies. Topics include: Forecasting, Process Flow, Queuing Systems, Economic Order Quantity, Linear Programming, Inventory Models, Production Planning, Quality Management, and Supplier evaluation.

**Supply Chain Management:** Focuses on how managers can design and control process structures and process divers to improve the performance of any business setting with discrete flow units. Topics include: Operations strategy, Process flow, Inventory measurement,

**Theories of Administration:** Provide insight into leading theories concerning the administration of research and industrial organizations. Treat the concepts needed for describing, assessing and diagnosing organizations; processes of organizational communication, motivation, and conflict management; adaptation of organization systems to the requirements of work and information technologies.

**Appendices: Summary of Documentation**

- Appendix A: Sample Course Syllabi
- Appendix B: Sample Lesson Plan of Confidence Interval for Constructivist Teaching
- Appendix C: Animations and Case Studies for Class Discussions
- Appendix D: Message from Instructor Coordinator and a student
- Appendix E: Evaluations from students
- Appendix F: List of Workshops attended to improve teaching
- Appendix G: Certifications of Workshop participations
Appendix A: Sample Course Syllabi

EGN 3443: Probability and Statistics for Engineers
MW 4:35-5:50pm in ENB113
Fall Term 2009
University of South Florida

Instructor
Ozan OZCAN
oozcan@mail.usf.edu
Phone: (813) 974-2269
Office: ENC 2004
Office Hours: Tuesday: 11.00 am – 01.00 pm
Virtual Office Hours (via Elluminate) Tuesday: 06:30pm – 07.30 pm

Course Description
The world is divided into two realms: deterministic and probabilistic. Your math, physics, and chemistry course preparation to date has concentrated on “deterministic” models: a given set of inputs or conditions repeatedly produce a fixed, completely predictable output. This course launches your modeling skills into a new dimension wherein a given set of inputs or conditions produce random (or “chance” or “probabilistic” or “stochastic”) outcomes. Examples include the characteristics of products leaving manufacturing lines (e.g. lifetime of a bulb, concentration of a therapeutic drug), results of laboratory experiments (e.g. growth rates of microorganisms) or processes observed over space or time (e.g. spatial distribution of soil contaminants or time series of rainfall amounts). The field of statistics deals with the collection, presentation, analysis and use of data to make decisions, solve problems and design products and processes.

The first part of the course will be devoted to the presentation of probabilistic concepts which form the building blocks of all statistical procedures that will be introduced in the second (more applied) part of the course.

Relevance
Knowledge of probability and statistics will certainly prove useful regardless of the career one chooses to pursue. In academia, probability and statistics find applications in engineering, the biological sciences, the social sciences, and management science. (Thus, knowledge of probability and statistics is a prerequisite for many courses you will subsequently take.) Academicians frequently employ probability and statistics in the form of hypothesis testing, time series analysis, stochastic modeling and in many other manners. In the business professions there are myriad applications including design of experiments (DOE), computer simulation and modeling, decision analysis, and others. Finally, in our more personal lives, a good grounding in probability and statistics may help us “tell the liars from the statisticians.”

Course Objectives

1. Students will develop a working knowledge of statistics, probability modeling and their application to various processes.
2. Students will enhance their problem solving skills and ability to think analytically.
3. Students will gain an appreciation for the interesting historical context of some of the probability and statistics concepts they will learn and employ.

Format and Procedures
Class lecture and discussion will be used in addition to the textbook and written handouts to present ideas both theoretically and by example. Tests, quizzes, and homework assignments will be used to assess understanding of basic knowledge.

Prerequisites
No previous knowledge of probability and statistics is assumed; however, a fluent understanding of calculus and linear algebra is required. Familiarity with Excel and/or SPSS is useful, but not required. Finally, a will to work hard a put forth an honest effort is required. A large portion of the learning that occurs will happen outside of the formal classroom. Therefore, it is incumbent upon you to get the most out of the experience. I anticipate that for every hour spent in class, you will spend another 4-5 hours outside of class studying, thinking, or doing homework.
Coursework Feedback and Grading
There will be nine homework assignments, several quizzes, and three examinations. There is an optional cumulative final examination in this course. Homework must be submitted by the beginning of class on the day it is due. Homework will not be accepted during or after class. Homework will be returned within one week after it is due, and it is expected that students will review mistakes and utilize office hours to clear up any outstanding questions.

The course grade will be determined as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>Seven best homework assignments (out of 9)</td>
<td>25%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Pre-announced quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Participation</td>
<td>In-class and online participation</td>
<td>5%</td>
</tr>
<tr>
<td>Exams</td>
<td>Exam one</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Exam two</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Exam three</td>
<td>20%</td>
</tr>
</tbody>
</table>

Final grades will likely be based on a straight scale: >97 A+, 93-96 A, 90-92 A-, 87-89 B+, 83-86 B, 80-82 B-, 77-79 C+, 73-76 C, 70-72 C-, 67-69 D+, 63-66 D, 60-62 D-, <60 F. Grades may be adjusted down depending on class performance. These adjustments will occur after each exam if instructors believe an adjustment is necessary. Note: The College of Engineering only accepts grades of C or better in all Math, Science and Engineering courses.

Exams
For each midterm exam, students are allowed one 8.5” x 11” formula sheet (front and back). You must hand-in your formula sheet with your exam; make sure that your name is on your formula sheet.

The emphasis of grading for all exam problems is on the correct approach, not necessarily the correct numerical answer. Thus, students should remember to show all relevant work. If you fail to show work, you may lose points even if you obtain a correct numerical solution.

Homework
Students are expected to complete all assignments but 7 best assignments will be considered out of 9 assignments. Homework assignments will be posted on the course website one week prior to their due date. Soon thereafter, homework assignment solutions will also be posted to the course website. Similar to the grading of exams, the emphasis for homework is on the correct approach, not necessarily the correct numerical answer. Thus, students should remember to show all relevant work. If you fail to show work, you may lose points even if you obtain a correct numerical solution. Homework assignments will typically consist of 4-6 problems. No late homework will be accepted. Please use pencil and eraser while preparing your homework and make sure everything is easily readable.

Participation Grades
There will also be in-class and online activities that will contribute to a course participation grade. Student discussion, group studies, being active in the classroom, activities in the classroom, discussion board, and attendance to office hours.

Course Schedule
This course will adhere to the following expected schedule. Changes to the schedule may occur if necessary, so watch the course website for the most up-to-date schedule.

Lectures 1-10: Building the Foundation of Probability
Basic principles, properties of probability, probability counting, permutations, combinations, conditional probability and independence
Lectures 11-13: Discrete Random Variables  
Uniform distribution, binomial distribution, Poisson distribution

Lectures 14-19: Continuous Random Variables  
Normal distribution, central limit theorem, exponential distribution, probability plots

Lectures 20-21: Data Summary and Presentation  
Measures of central tendency, measures of dispersion, stem-and-lead diagrams, frequency distributions and histograms, Pareto charts, box plots, time series plots

Lectures 22-27: Statistical Inference and Test of Hypotheses for a Single Sample  
Confidence interval properties, confidence intervals for mean and variance, hypothesis testing-single sample, p-value, Type I and Type II error

Lectures 28-30: Simple Linear Regression  
Least squares estimation, prediction of on new observations, checking model adequacy, correlation and regression

Textbook and References
Required text:  
The following are suggested references:  

Course Website
The course has a web site in the USF Portal. You can access the course web site at https://my.usf.edu. You will need a USF NetID and password in order to have access. If you do not already have a USF NetID, you can obtain one by going to https://una.acomp.usf.edu, clicking on Activate your NetID, and filling out a few simple forms.  
Procedure to log onto the website:  
1. Go to https://my.usf.edu  
2. Log into myUSF using your USF NetID and password.  
3. Click on the Courses tab, and then click on the course title.  
4. Look for course information by clicking on the buttons: Announcements, Syllabus, Faculty Information, Course Material, Assignments, Books, Communication, Virtual Classroom, Discussion Board, Groups, Web Sites, and Tools.  
Check this website frequently for:  
- Course syllabus updates  
- Homework assignments  
- Homework and exam solutions  
- Posted notices of importance  
- Student grading records  
- Additional resources and useful web sites

Feedback
I value feedback highly, so please feel comfortable approaching me or emailing me with your suggestions, questions, and criticisms. I will use the feedback to make adjustments in order to accommodate the needs of students in this class while also using the feedback toward continuous improvement of the course and my teaching. I will ask for structured anonymous feedback twice during the course, but do not wait until then to approach me. Please, feel free to approach me any time. I appreciate your thoughts.

Have fun, and all the best!
Appendix B: Sample Lesson Plan of Confidence Interval for Constructivist Teaching

Teacher’s Name: ...
Grade Level: ...
Subject/Unit: Confidence Intervals (CI)

Unit Goal: To appreciate the idea of the confidence interval and to interpret how confidence interval can be used to give information about the population parameter $s$.

Lesson Objectives:
Upon completion of this unit, students should be able to:
- Know how to compute CI for various confidence levels, given sample data.
- Know how to consciously interpret CI, make an appropriate inference according to context and be able to make a correct probability statement as an interpretation of a confidence.
- (In line with constructivist learning techniques) Have ability to apply the same CI principles with unrefined real world data structures.

Learning Resources and Materials:
- Overhead projector,
- Educational video(s),
- Hand-outs of catapult experiments,
- Walter Williams’ article (in Washington Times on April 11, 2007).

Development of Lesson

Introduction and Assignment (10 minutes): In the previous session before the actual week designated for CI starts, a video demonstration, which is closely related to the experiments in the plan, is presented.

Video alternatives:
http://youtube.com/watch?v=ZFzPEYCjRBw&feature=related (1 min)
or http://youtube.com/watch?v=JkEv6fzl4m4k (3 min)
or both
Then, students are given two simple assignments.
1. Based on the video demo, list the factors that affect the distance of a thrown object.
2. Reading assignment: Walter Williams’ article (in Washington Times on April 11, 2007). (distributed)

Session I, Understanding of Center, Dispersion and Interval (50 Minutes):
Review on assignments 1 and 2 (5 min):
Step 1. Write down the factors “that affect the distance of a thrown object” with the help of students.
Step 2. (optional, if time permits) Students are asked “What implication has the decrease of CI level from %95 to 90% on the margin of error?”.

Implementation of Catapult Experiment 1 (20 min)
Step 3. Constitute 5 groups. Each group works with one catapult, makes 6 shots.
Step 4. Students are asked to write their distance values on their own vertically placed line on the board.
Step 5. Random variables and variation definitions are provided.
Step 6. The 5 vertical lines are consolidated on another single vertical line. Now 30 values lay on a single line.
Step 7. From among the discussion topics, 3rd topic is discussed.
(3rd topic:) If we placed a circle on the floor, centered on the mean distance of shots, how large would the diameter of circle need to be ensure we can hit each time?
Step 8. (optional, if time permits) Some pre-made circles may be placed to target areas with pre-designated lengths, and students are asked with what percentage they hit the plates.

CI Formulation (15 min):
Step 9. Relationship in the CI formula: Students are asked to find any relations with the diameter of circle and characteristics of their data(for variance, $\sigma$, refer Step 4. and for sample size, $n$ refer Step 6).
Step 10. Give definition of CI, give standardization formula (8-3).
Step 11. Give probability formulas (8-4, 8-5, 8-6).

Example (5 min):
Step 13. Example 8-1 is solved in the class.

Questions (5 min).
Assignments for the next class: Solve Exercise 8-1 and 8-5, Read sections 8-1, 8-2, 8-3, 8-4.
Session II, Choice of Sample, Large Samples, t-distribution, Chi-square Distribution (50 Minutes):

Choice of Sample (5 min)
- Step 1. Explain sample size selection formula (8-8).
- Step 2. Solve example 8-2.
- Step 3. (optional) General Method for CI is explained.

Large Sample Confidence Interval (10 min)
- Step 4. Give sample size selection formula (8-13)
- Step 5. Solve example 8-4.

t Distribution (20 min)
- Step 6. Compare probability density functions of several t distributions and normal distribution.
- Step 7. Explain formulas 8-15 and 8-18
- Step 8. Solve practical example in the following

Practical example: We’re going to use confidence intervals to estimate the true average shot distance of catapult.
A simple random sample of 27 shots gives the following distances in inch:
151, 136, 147, 151, 147, 127, 169, 155, 150, 151, 143, 150, 118, 126, 142, 148, 102, 135, 142, 137, 144, 147, 140, 144, 177

CASE 1 (population σ known):
Our population of shots has σ = 12.62 inches.

For this sample of shots, the average distance is 142.6.
Find a 68% confidence interval for the true average distance of a shot (use z* = 1). (140.2, 145.1)
Find a 95% confidence interval for the true average distance of a shot (use z* = 2). (137.8, 147.5)

Discuss the relationship between the percentage of CI and the length of distance interval.
Discuss the relationship between the length of plate and characteristics of their data. (we are expecting from students to find that CI depends on variance, n, and Xbar)

CASE 2 (population σ unknown):
Our sample of shots has S = 14.95 inches.

For this sample of shots, the average distance is 142.6.
Find a 68% confidence interval for the true average distance of a shot (use \( t_{0.025, n-1} \approx 1.1 \)). (139.5, 145.8)
Find a 90% confidence interval for the true average distance of a shot (use \( t_{0.05, n-1} = 1.7 \)) (137.8, 147.5)
Find a 95% confidence interval for the true average distance of a shot (use \( t_{0.025, n-1} = 2.1 \)) (136.6, 148.7)

What effect does replacing σ by S have on the distribution of the random variable T? If n is large, the answer to this question is “very little and we can proceed to use the CI based on the normal distribution from Case 1.

Other discussion questions...

Chi-Square Distribution (10 min)
- Step 9. Explain formulas 8-19, 8-21 and 8-22
- Step 10. Solve example 8-6

Any questions (5 min)

Assignments for the next class: to be defined.
Appendix C: Animations and Case Studies for Class Discussions

Animation for discussing Normal Distribution
http://probability.ca/jeff/java/utday/

Animation for discussing Confidence Interval
http://www.stat.sc.edu/~west/javahtml/ConfidenceInterval.html

Case study and discussions about alternative fuel vehicles and economics aspects.

Clickers and Catapult for applying Constructivist Learning Teaching Strategies
Appendix D: Message from Instructor Coordinator and a Student

FW: EGN3615.001F10: Professor Ozcan

Zarate, Patricia <pzarate@usf.edu>  Thu, Dec 9, 2010 at 5:08 PM
To: Ozan Ozcan <oozcan@mail.usf.edu>, "Gunpinar, Serkan" <agunpina@mail.usf.edu>
Cc: "Zayas-Castro, Jose" <josezaya@usf.edu>

Dear Ozan and Serkan,

I want to congratulate you for the excellent work you did in the Eng Econ course this semester. I know that you have worked hard to make this a good course, especially due to the large size of your section. I always received the emails that Ozan sent the students about questions, quizzes, exams, office hours and help sessions. I also had the opportunity to see Serkan conducting problem sessions during his office hours. This email from one of your students confirms that your work is appreciated and is worth doing it.

Thank you for a job well done and I hope you keep up the great work.

Best regards,

Patricia

Patricia Zarate, Ph.D.
Instructor and Engineering Management Program Coordinator
Industrial and Management Systems Engineering
College of Engineering
University of South Florida

Sent: Thursday, December 09, 2010 7:54 AM
Subject: EGN3815.001F10: Professor Ozcan

December 9, 2010

Professor Patricia Zarate, I want to take a little time to tell you about my experience this semester in EGN3815.001F10: Engr Econ Social/Global Imp 1n TR 9:30 am. All too often students will take the time to complain about a teacher and never take the time to praise a teacher. I am taking time to do the latter. I am not your typical student; I am a junior who transferred from State College of Florida Manatee - Sarasota with an AA degree Phi Theta Kappa. I started my college education in 2007 as a high school dropout (1979), at 46 years old I decided to earn an engineering degree.

Professor Ozan Ozcan is an asset to USF. He has taken time to help all students that went to him for help. In class he took time to answer any and all questions that pertained to the subject matter. If a question was more of an individual type he would stay after class to answer any questions that students had. Furthermore, he has the desire to see that students learn and open their minds to different ways of thinking, keeping respect to all religious and political views. In addition, the TAs that worked with Professor Ozan Ozcan had the same vigor as him. I feel I was lucky to have a Professor like Ozan Ozcan. If a student complains about him or the TA's the problem lies with the student, though I do not see how anyone could complain about them. I cannot say enough good things about the teaching staff.

Thank you for a wonderful semester;
Respectfully,

Anonymous
Engineering student
Appendix E: Evaluations from Students

Excellent job! Everything was explained very, very good. Instructor have great attitude, a lot of patience for everyone and respect all students.

I think that Ozan is a very good professor. The TAs are very friendly and helpful. There are many office hours available to go to. Sometimes Ozan’s English is not perfect, but it certainly doesn’t get in the way of learning.

I like the Think-Pair-Share activities because they assist in applying the knowledge that we learned during the class period to the section that we are being taught. The examinate sessions are great too, especially when a student has a hectic schedule and lives off campus. The exams are fair, as well as the quizzes and homework.

Think Pair - Share
I love the Think pair share activities. I learn the most doing those. More of them please!

Thank you for doing a great job! Keep up the good work and dedication.

Very helpful.
Appendix F: List of Workshops Attended to Improve Teaching

**Below is the list of “Teaching Assistant Workshop” topics**

- communicating in the USF classroom and laboratory
- practicing teaching with a live audience of USF undergraduates
- involving and engaging students in the learning process
- starting the semester with a strong first day
- building rapport with students
- teaching in the intercultural classroom
- asking and answering questions
- dealing with conflict
- using classroom assessment techniques.

http://c21te.usf.edu/workshops/ita/index2009.html

**Below is the entire list of workshop I attended in Center for 21st Century Teaching Excellence**

- Comparing traditional and constructivist approaches to teaching and learning
- Promoting Active Learning in large classes
- Finding your active teaching style
- Using Clickers to engage student and assess learning
- Using Select Survey feedback from students
- Could feedback from students help inform my teaching?
- Assessment online: Developing interactive exercises, surveys, and tests in Blackboard
- Developing a professional life: Pitfalls of MySpace and Facebook
- Leading effective classroom discussions
- From inquiry to information
- Writing successful grants for NSF educational funding opportunities
- Real-time, online classroom using Elluminate Live!
- Writing case studies
- Beyond the basics: Researching the literature in the Social Sciences
- Using the ideas of others: Citing sources and avoiding plagiarism
- Creating a teaching portfolio

Contact Dawn Christian, christian@cte.usf.edu, if you have any questions about the workshops.
Appendix G: Certifications of Workshop Participations

Certificate of Achievement
Ozan Ozcan
has completed
Teaching USF Undergraduates:
A Workshop for International Teaching Assistants
August 9 – 13, 2010

Ozan Ozcan
has successfully completed
Twenty Hours of Instructional Workshops
Center for 21st Century Teaching Excellence
November 23, 2010