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IT 403 - Quality Systems Management
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PLAN, DO, CHECK, ADJUST

COURSE CONTENT

The course will cover what quality is, how to get it, and how to keep it. Although the material covered in this class applies to all types of organizations producing a product or service, the focus for this class will be on manufacturing operations.

The class will be highly experiential. The class will provide the students will knowledge and experience in:

- Problem solving
- Teamwork
- Continuous improvement
- Quality systems
- Quality tools.

This class will take a unique approach to teaching quality management. Rather than surveying a wide range of quality management practices, the class will use the Toyota Production System (TPS) as an exemplar of world-class quality management. Much of the content in this class is the same as that used by Toyota to train its own employees. The course primarily uses short lectures and a production line simulation to convey concepts. Teams are assigned to design, manage, and improve their own production lines. *NOTE: Students are required to bring their own **safety glasses with side shields** to class for sessions where eye safety is a potential concern – **SAFETY FIRST!***

At the end of this course students will be able to describe the principles of quality management and to apply them to any given product or service.

Catalog Description: IT 403 Quality Systems Management (4)
Quality assurance as viewed from a systems perspective that includes cost, time, and process elements. Lean thinking applied as a problem solving approach to achieve continuous process improvement through the elimination of waste and the reduction of variability. 4 lectures. Prerequisite: ~~IT 341 or IT 371 and STAT 217, or STAT 218, or STAT 251~~ → IT303; Business majors must have formally declared their concentration to enroll.

LEARNING GOALS AND OUTCOMES

IndTec Learning Objectives (LO): Students graduating from our program will be able to…

LO 1.1 Demonstrate fundamental knowledge and skills to solve management, technology and applied engineering problems.
LO 2.1 Recognize the ethical responsibilities as they apply to applications of technology
LO 2.2 Illustrate an understanding of sustainability practices in industry
LO 2.3 Act upon decision tools and methods and explain the action taken
LO 3.1 Demonstrate effective participation and leadership in teams.
LO 3.2 Demonstrate effective speaking skills.
LO 3.3 Demonstrate effective writing.

Course Learning Outcomes After completing this course, you should be able to:

1. Understand and apply the foundational principles of a world-class quality system (**LO#1.1**)
2. Understand and identify value added and wasteful activities in a process (**LO#2.2**)
3. Apply the PDCA (A3) problem solving process to any business problem (**LO#2.3**)
4. Explain the important elements of team success (**LO#3.1**)
5. Talk intelligently about quality issues and impact **(LO3.2)**
6. Write up an analysis of a production process from a lean perspective (**LO#1.1 and #3.3**)
7. Apply various lean tools in a production environment **(LO#2.3)**

COURSE MATERIALS

Required:

- Liker, Jeffrey. 2004. The Toyota Way: 14 Management Principles from the world's greatest manufacturer (TTW). New York: McGraw-Hill
- Safety glasses with side shields (by beginning of week 3).

COURSE OUTLINE

Topics	References
o **Course Intro** o **Lean Overview** o **Section I: Long Term Philosophy**	• TTW Forward & Preface (xi – xvii) • TTW Chap 1. Using Operational Excellence as a Strategic Weapon • TTW Chap 2. How Toyota Became the World's Best Manufacturer: The Story of the Toyoda Family and the Toyota Production System • Short video on TPS History [see PolyLearn] • TTW Chap 3. The Heart of the Toyota Production System: Eliminating Waste • TTW Chap 4. The 14 Principles of The Toyota Way: An Executive Summary of the Culture Behind TPS • TTW Chap 5. The Toyota Way in Action: The "no compromises" development of the Lexus • TTW Chap 6. The Toyota Way in Action: New century, new fuel, new design process - Prius • TTW Chap 7. **Principle 1 – Base Your Management Decisions on a Long-Term Philosophy, Even at the Expense of Short-Term Financial Goals** • **QUIZ 1**
Section II: The Right	• TTW Chap 8. **Principle 2 – Create Continuous Process Flow to Bring**

Process Will Produce the Right Results	**Problems to the Surface** • TTW Chap 9. **Principle 3 – Use "Pull" Systems to Avoid Overproduction** • TTW Chap 10. **Principle 4 – Level Out the Workload (*Heijunka*)** • Toyota Kata (Rother) Appendix 2: Process Analysis [see PolyLearn] • TTW Chap 11. **Principle 5 – Build a Culture of Stopping to Fix Problems** • TTW Chap 12. **Principle 6 – Standardized Tasks Are the Foundation for continuous Improvement and Employee Empowerment** • TTW Chap 13. **Principle 7 – Use Visual Control So No Problems are Hidden** • TTW Chap 14. **Principle 8 – Use only Reliable, Thoroughly Tested Technology That Serves Your People and Processes** • **QUIZ 2**
Section III: Add Value to the Organization by Developing Your People and Partners	• TTW Chap 15. **Principle 9 – Grow Leaders Who Thoroughly Understand the Work, Live the Philosophy, and Teach It to Others** • TTW Chap 16. **Principle 10 – Develop Exceptional People and Teams Who Follow Your Company's Philosophy** • TTW Chap 17. **Principle 11 – Respect Your Extended Network of Partners and Suppliers by Challenging Them and Helping Them Improve** • **QUIZ 3**
Section IV: Continuously Solving Root Problems Drives Organizational Learning	• TTW Chap 18. **Principle 12 – Go and See for Yourself to Thoroughly Understand the situation (*Genchi Genbutsu*)** • TTW Chap 19. **Principle 13 – Make Decisions Slowly by Consensus, Thoroughly Considering All Options; Implement Decisions Rapidly** • TTW Chap 20. **Principle 14 – Become a Learning Organization Through Relentless Reflection (*Hansei*) and Continuous Improvement (*Kaizen*)** • **QUIZ 4**
Applying the Toyota Way in Your Organization	• TTW Chap 21. Using the Toyota Way to Transform Technical And Service Organizations • TTW Chap 22. Build Your Own Lean Learning Enterprise, Borrowing from the Toyota Way • **QUIZ 5 and FINAL EXAM**

Notes:

1. The class is set up in five "topics" aligned with the course text. The topics specify the sequence of the material to be covered. Students are expected to read and prepare material prior to its discussion in class.
2. Quizzes are given during the second half of class on Wednesday of the weeks 3, 5, 7, and 9. Quiz 5 and comprehensive final exam will be given during the university specified final exam period.
3. I reserve the right to adjust the outline as the class progresses.

QUARTER SCHEDULE	
Week	**Activity Note**
2	Mon – No class. Out of class assignment.
3	Tues – Follow Mon schedule Wed, Quiz 1
5	Wed, Quiz 2
7	Mon – Holiday. No class.

	Wed, Quiz 3
9	Wed, Quiz 4
10	Team Presentations
12	Final Quiz/Exam – Take home due Mon, 4pm.

TEAM PROJECT

Objective:

Apply the lean thinking process to an appropriate product to be selected by the teams and instructor. Each team's production process becomes a platform for learning about lean.

Equipment and materials:

- Production "machinery" procured by student teams.
- A first set of materials provide by instructor.

Note: the team provides all other materials and equipment.

Conditions:

1. Annual demand to be set by the instructor.
2. Other conditions may be imposed.

Process Documentation (Deliverables):

Provide this documentation package in a clear, well-labeled, "low muda" format (8.5x11 unless otherwise specified) **in the following order**:

1. Team name / sign
2. Team Responsibility Matrix
3. Project Charter
4. Team assessment on application of 14 Principles (14 pgs max)
5. Value Stream Map (11x17)
6. Process Analysis - Work balance chart (Current-Condition Summary)
7. Set of standard work instructions (8.5x11 or 11x17 ea)
8. Balanced scorecard for Cost, Quality, and Time.
9. Applied Quality Tools: Apply each of the following tools to some aspect of your process development, control, or improvement. Be sure to include the **objective and implications** for the project in your results on each tool.
    a. S-I-P-O-C Flow Chart
    b. Affinity Diagram
    c. Pareto Chart
    d. CTQCs Identified with Operational Definitions
    e. Trend chart
    f. Statistical Process Control Chart – before & after
    g. Capability Analysis
    h. Cause and Effect Diagram
    i. Failure Modes and Effects Analysis
    j. Regression Analysis
    k. Error-Proofing
    l. A3 Problem Analysis (11x17)

m. A3 "Story Board" – Print/create a 24x36 inch version of your A3. The smallest type should be 14 pt full size. You should be able to fit more information than your 11x17 A3 as appropriate.

Team Presentation and Demonstration

1. Each team is required to make a brief 5-minute presentation on their project emphasizing their achievement in terms of Plan, Do, Check, Act or Lean Thinking.
2. Each team will run their process in the classroom.

Team Tools Video

1. Each team will do a "5 minute (max) training" video on a quality tools assigned from those required for the Team Documentation.
2. For each tool and video, the team will lead a 5-minute max classroom discussion and answer questions on the tool from the instructor and other students.

Scenario:

Your team works for a world-class company. Every morning at the start of shift, they have short "stand-up meetings" to review the previous shift's performance and understand the requirements for today's shift. The production lines use a PDCA approach to drive continuous improvement. The production manger learns that your team has training in quality tools from the Cal Poly IT program and asks you to create a reusable video to train other teams in the use of a particular quality tool. After your training, members of the production team have to lead a brief discussion of the tool to demonstrate that they understand the concept.

Peer Evaluation

1. Each team member will complete a confidential evaluation of his or her teammates' and their own performance.
2. Peer evaluations will be used to adjust individual scores on Process Documentation / Present / Demo up or down.

PERFORMANCE EVALUATION	
Quiz 1	10 *
Quiz 2	10 *
Quiz 3	10 *
Quiz 4	10 *
Quiz 5 and Comprehensive Final Exam	10 *
Team Project: Process Documentation / Presentation / Demonstration	40
Tools Presentation	10
Class Participation	10
Total	100%

Notes:

1. A total of five quizzes will be given in the course to assess each student's mastery of the material.
2. The quizzes include Quiz 5 that is combined with a comprehensive final exam.
3. * Only the four highest-grade quizzes will be counted with a weight of 10% each (40% total).
4. Since only four quizzes are required for a final grade, make-up quizzes will NOT be given and the final time is fixed. No valid excuses for missing quizzes will be considered until a student has missed at least one quiz.
5. Taking more than four quizzes will count as class participation regardless of score.
6. Class participation will be approximately 50% quantitative completion of assignments, random attendance checks, etc. 50% will be the instructor's qualitative assessment of your classroom performance.

POLICIES AND PROCEDURES

Personal Integrity Policy

Although I do not expect cheating in my classroom, the penalty is an **F for the course**. Cheating occurs when a student looks at other students' papers during an exam or obtains help of faculty or students outside their assigned group on assigned homework sets or exams. Plagiarism occurs when students copy large sections of another author's material without referencing it.

Professional Behavior Guidelines:

Sleeping: Get a good night's rest before coming to class. Falling asleep in class is not considered professional behavior.

Inattention: Please do not read other books or newspapers or study for other courses during my class. It is not polite. Please pay attention, join in the individual, and group discussions. It will help you master the material.

Laptop Computers: Surfing the net and checking email during business meetings is rude. Notebook computers are allowed. You may be asked to email you notes to the class.

Cell Phones are NOT allowed.

Leaving the Classroom: If you need to exit or re-enter the classroom during class, please do so with a minimum of fanfare. I consider my class adult education. Adults in a business setting should be free to move or stand unobtrusively in the back of the class if it improves their ability to be attentive and contribute.

You are responsible for anything that is said in class or any changes made to assignments. Do not e-mail or call me asking, "What did I miss?" Find a buddy to share coverage responsibility.

I do not give additional projects to increase one's grade.