

New Course Request

Indiana University

Indianapolis Campus

Check Appropriate Boxes: Undergraduate credit Graduate credit Professional credit

1. School/Division Business 2. Academic Subject Code BUS
3. Course Number P528 (must be cleared with University Enrollment Services) 4. Instructor Mark Frohlich
5. Course Title Operations Processes II
Recommended Abbreviation (Optional) _____
(Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Spring 2010

7. Credit Hours: Fixed at 1.5 or Variable from _____ to _____

8. Is this course to be graded S-F (only)? Yes _____ No X

9. Is variable title approval being requested? Yes _____ No X

10. Course description (not to exceed 50 words) for Bulletin publication: Part II - this course picks up where Operations Process I left off - examining thoroughly the concept of "process improvement" in developing proficiency in the use of Six-Sigma tools, and to consider the challenges of implementation in real business situations.

11. Lecture Contact Hours: Fixed at 1.5 or Variable from _____ to _____

12. Non-Lecture Contact Hours: Fixed at _____ or Variable from _____ to _____

13. Estimated enrollment: 30 of which 100 percent are expected to be graduate students.

14. Frequency of scheduling: 2 X yearly Will this course be required for majors? no

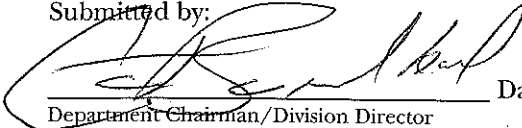
15. Justification for new course: Would lik eto add this as a permanent course in the ~~marketing~~ ^{supply chain} curriculum.

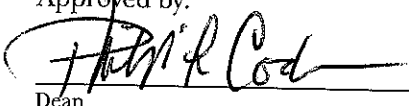
16. Are the necessary reading materials currently available in the appropriate library? yes

17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.

18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by:  Date 7/16/09
Department Chairman/Division Director

Approved by:  Date 7/27/09
Dean

Date _____
Dean of Graduate School (when required)

Date _____
Chancellor/Vice-President

Date _____
University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

Kelley School of Business - Indianapolis

P527 & P528: Operations Processes (I & II)

Spring 2010

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INTRODUCTION

This course is an introduction to process improvement featuring the famous Six-Sigma Methodology. Six-Sigma is a powerful management tool that not only drives cost reductions and significant improvements in bottom-line profitability but also enhances customer satisfaction and market share. It is no surprise then that Six-Sigma is one of the biggest managerial trends in business today for companies of all sizes. The purpose of this course is to examine thoroughly the concept of "process improvement", to define it in terms that are useful for managers, to survey the ideas of major process improvement and quality management thinkers, to develop proficiency in the use of Six-Sigma tools, and to consider the challenges of implementation in real business situations. Throughout the course, we will investigate similarities and differences between process improvement in manufacturing and service contexts. This is *not* a course in *quality control*. It *is* a course in *process management*. Along those lines, the course has three major objectives.

1. The first goal is to define process improvement and explore important philosophies and useful frameworks for managers or consultants. Along those lines, we will examine the works of some of these famous theorists including Deming, Juran, Crosby, Ishikawa, and Taguchi. While theory is important, we will emphasize concepts that are usable in real service and manufacturing organizations around the world.
2. The second goal is to focus on the Six-Sigma tools available for the pursuit of lasting improvements. Continuous process improvement methodologies and tools will be introduced and the fundamentals and application of statistical process control will be closely studied.
3. The final (and perhaps most important) objective of this course is to focus on the implementation of process improvement programs. The distinct Six-Sigma methods of process improvement will be put into practice in a project done in conjunction with companies in the greater Indianapolis area. We will also discuss "implementation theory" and analyze the lessons learned from successful and unsuccessful implementation projects.

MATERIALS

Course Text: "The Six-Sigma Handbook – A Complete Guide for Green Belts, Black Belts, and Managers at all Levels" by Thomas Pyzdek

Software: Minitab 15 (available in the Barnes & Noble store in the Campus center for \$25 at the checkout counters upstairs). NOTE: You can also get through this course using other statistical packages such as SPSS or even Excel but you will *really struggle* using these softwares in the various parts of Six-Sigma. Minitab, on the other hand, has become the industry standard for Six-Sigma plus given the fact that it retails at \$1195 outside of academia while we can buy it for \$25 it is quite a deal! NOTE: If you are an Apple Computer fan, although Minitab is available in numerous languages ranging from Chinese to Turkish unfortunately it only runs on a PC. To the best of my knowledge, there is no Macintosh version of the software available. On Minitab's website, however, they describe how to use Windows virtualization software and said that it has been done with some success. For more information see: <http://www.minitab.com/support/answers/answer.aspx?log=0&id=754>

Other Materials: To be posted on Oncourse during the semester

COURSE TOPICS

I. Six-Sigma Overview

The course will begin with the history and theory behind Six-Sigma. This part of the course will answer the question "What is Six-Sigma?" and investigate the following three sub-topics:

- Background/History of Six-Sigma
- Six-Sigma Metrics
- The Six-Sigma Players

II. Six-Sigma Implementation Steps (DMAIC)

The course will then focus on a "hands-on" practical approach to teaching the Six-Sigma process improvement methodologies. Common Six-Sigma tools will be taught as X574 progresses throughout the various phases of DMAIC as follows:

- D Define
- M Measure
- A Analyze
- I Improve
- C Control

Every student will also do work on a Six-Sigma process improvement project. By the end of the X574 students will have the equivalent knowledge of a Six-Sigma Black Belt (but for reasons I'll explain in class you'll be certified at the Green Belt level).

III. Develop Six-Sigma Toolbox

By the end of the course students will have developed a Six-Sigma Toolbox. These involve the basic tools used to complete the various phases of Six-Sigma including:

- Process Mapping
- Cause & Effect Matrix (C&E)
- Failure Mode and Effects Analysis (FMEA)
- Basic Understanding of Design of Experiments (DOE)
- Control Charts
- Measurement System Analysis, Gauge R&R (MSA)
- Process Capability and Process Performance

IV. Basic Statistical Tools

A statistical background is a plus but not necessary. Basic statistical tools will be taught in the course including:

- Descriptive Statistics
- Basic Plots/Charts
- Hypothesis Testing
- Confidence Intervals
- Data Sampling Basics
- Probability Distributions

COURSE GOALS

After completing this course, students should be able to:

- Identify different ways of defining quality and discuss the advantages and disadvantages of each
- Evaluate costs of quality and make recommendations about quality initiatives
- Explain the Six-Sigma system and list its phases
- Explain how companies design processes and methods to ensure quality
- List tools and processes managers use to implement and ensure quality in their products and services
- Identify challenges in getting good, timely customer data
- Analyze customer data and prioritize quality issues
- Read and analyze data related to quality measurement, with the aim of recommending process improvements
- Read and analyze control charts
- Discuss how validation of processes is accomplished
- Recognize the benefits of quality programs through industry awards, customer recognition, and employee satisfaction

ASSESSMENT

P527: Process Improvement (I)

Class Participation	10%
Two Case Analyses (20% each): Polaroid and Dynamic Seal	40%
<ul style="list-style-type: none">• Limit length to no more than three pages, excluding appendices.• Hand in at beginning of classes 6 (Polaroid) & 7 (Dynamic Seal) on day case is discussed.• Use a “good” case analysis format. Include:<ul style="list-style-type: none">➤ Opening paragraph on the problem.➤ Analysis (your dissection of the problems and/or “number crunching”). Here you’ll include exhibits (including SPC charts) to support your position.➤ Your recommendations (short- and long-term).	
Certification Exam	<u>50%</u>

Total 100%

P528: Process Improvement (II)

Small Group Six-Sigma Project	100%
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Teams of 2-3 students will work on and where possible attempt to implement a Six-Sigma project. If you want to work alone on a project that is also OK. Teams of four (or more) will also be considered if the process studied is sufficiently complicated. Each group will prepare a paper and a short final presentation on an operation that they have examined, helped bring under control, and hopefully improved! The presentation will describe the project and the means by which the team helped improve that process. Presentations are scheduled for the final two classes of the semester. Information that is more detailed will follow during the semester in X574 (II). NOTE: your final paper will be due on Thursday May 7 at the latest.

Kelley School of Business - Indianapolis
X574: Operations Processes
Spring 2009

Session	Date	Day	Topic	Assignment
P527: Process Improvement (I)				
1	1/14	Thur	Course Introduction: What is Six-Sigma?	Skim Chapter 1: pages 3 – 13 Skim Chapter 1: pages 20-23; 28-29; and 48 on “Green Belts” Read Chapter 7: pages 237-245
2	1/21	Thur	DEFINE Selecting and Tracking Six-Sigma Projects Problem Solving Tools Selecting and Tracking Six-Sigma In class I’ll also do a demonstration/tutorial on Minitab 15 to get you familiar with some of its capabilities	Pages 188 - 205 Chapter 8: Read pages 252 - 276
3	1/28	Thur	MEASURE Basic Principles of Measurement	Chapter 9 - Read pages 277-293 & 318-324 Chapter 9 - Skim pages 294-317
4	2/4	Thur	ANALYZE Knowledge Discovery Tools	Chapter 11 - Read Pages 361 – 392
5	2/11	Thur	Statistical Process Control Variable Charts & Attribute Charts	Chapter 12 - Read Pages 393 – 428 Case: Deutsche Allgemeinversicherung (abbreviated DAV) <i>Why is DAV using SPC? Is it an appropriate approach for a service organization like DAV? Is the process of the Policy Extension Group in control? How would you begin improving performance of the process?</i> (NOTE: You don’t have to write-up this case, but I do want you to try and do a control chart using the data on page 12. Also here’s a hint – why are the first 12 weeks of data in Exhibit 4 shaded grey?)
6	2/18	Thur	Process Capability Analysis	Case: Process Control at Polaroid (A) <i>Compare the quality control procedures before and after Project Greenlight. What are the benefits of Project Greenlight? Any problems? What can we find from the data in Exhibits 5 to 7?</i> Chapter 13 - Read Pages 467 – 478 Skip Chapter 13: pages 479 - 491

Session	Date	Day	Topic	Assignment
7	2/25	Thur	IMPROVE & CONTROL Process	Case: Dynamic Seal <i>Where in Dynamic Seal should the SPC implementation start? Evaluate the capability of the Lablond Lathe.</i> Chapter 15 - Skim Pages 534 – 548 Chapter 18 - Read Pages 649 – 664
8	3/4	Thur	<i>Certification Exam & Course Wrap-up</i>	
P528: Process Improvement (II)				
9	3/11	Thur	Managing Six-Sigma Projects	Chapter 15 – Skim Pages 549 – 570 Chapter 6 – Read Pages 208 – 234
	3/18		<i>Spring Break!</i>	
10	3/25	Thur	A little more "Measure" and "Improve"... Measurement Systems Analysis and Risk Assessment	Chapter 10 – Read Pages 325 – 360 Chapter 16 – Read Pages 596 – 600
11	4/1	Thur	Project Team Time	
12	4/8	Thur	Quality Philosophers (Crosby, Deming, Juran, Ishikawa, Taguchi, etc.) The Baldrige Award, ISO 9000, and European Quality Award	Check-out: www.baldrige.com www.efqm.com Chapter 15 – Skim Pages 607 – 616 & 641-644
13	4/15	Thur	Project Team Time	
14	4/22	Thur	Start Group Project Presentations	
15	4/29	Thur	Finish Group Project Presentations, Course Wrap-Up, and Six-Sigma Certification Awards	
16	5/6	Thur	Final Exam Week (No Class - Last Day to turn in your final paper)	

PROCESS IMPROVEMENT & QUALITY MANAGEMENT READING LIST
(If you want to read and learn even more)

www.freequality.org (a great "all-purpose" website with lots of information on Six-Sigma tools and other operations management topics)

Breyfogle, Forrest W. III, *Implementing Six-Sigma: Smarter Solutions Using Statistical Methods*, John Wiley and Sons, 1999.

Byrne, Diane M. and Taguchi, Shin, "The Taguchi Approach to Parameter Design," *Quality Progress*, December 1987.

Chang, Y.S., Labovitz, George, and Rosansky, Victor, *Making Quality Work: A Leadership Guide for the Results-Driven*, HarperCollins, New York, 1993.

Crosby, Philip B., *Quality Is Free*, Mentor/New American Library, New York, 1979.

Deming, W. Edwards, *Out of the Crisis*, Cambridge, MA, MIT Center for Advanced Engineering Study, 1984.

Eckes, George, *The Six-Sigma Revolution: How General Electric and Others Turned Process Into Profits*, John Wiley & Sons, Inc., 2000.

Eckes, George, *Making Six-Sigma Last*, John Wiley & Sons, Inc., 2001.

Feigenbaum, Armand, *Total Quality Control*, McGraw-Hill, New York, 1961.

Feigenbaum, Armand, "Total Quality Control," *Harvard Business Review*, November-December 1956, pp. 94-98.

Garvin, David, *Managing Quality*, The Free Press, New York, 1988.

Ishikawa, Kaoru, "How to Apply Company-wide Quality Control in Foreign Countries," *Quality Progress*, September 1989.

Ishikawa, Kaoru, "Quality and Standardization: Program for Economic Success," *Quality Progress*, January 1984, pp. 16-20.

Ishikawa, Kaoru, *What is Total Quality Control?*, Prentice Hall, 1985.

Juran, J.M., *Juran on Planning for Quality*, The Free Press, New York, 1988.

Juran, J.M., *Quality Control Handbook*, New York, McGraw-Hill, 1951.

Juran, J.M. and Gryna, F.M., *Quality Planning and Analysis*, McGraw-Hill, New York, 1980.

Kackar, Raghu N., "Taguchi's Quality Philosophy: Analysis and Commentary," *Quality Progress*, December 1986.

Pande, Peter S., Neuman, Robert P. and Cavanagh, Roland R, *The Six-Sigma Way: How GE, Motorola, and Other Top Companies are Honing Their Performance*, McGraw-Hill, New York, 2000.

Pande, Peter S., Neuman, Robert P. and Cavanagh, Roland R, *The Six-Sigma Way Team Fieldbook*, McGraw-Hill, New York, 2002.

Pirsig, Robert M., *Zen and the Art of Motorcycle Maintenance*, Bantam Books, New York, 1974.

Pryor, L., "Benchmarking: A Self-Improvement Strategy," *Journal of Business Strategy*, November-December 1989.

Roslund, Jerry L., "Evaluating Management Objectives with the Taguchi Loss Function," *Quality Progress*, August 1989.

Ross, Phillip J., "The Role of Taguchi Methods and Design of Experiments in QFD," *Quality Progress*, June 1988.

Shewhart, W.A., *Economic Control of Quality of Manufactured Product*, D. Van Nostrand Co., New York, 1931.

Sullivan, Lawrence, "The Power of Taguchi Methods," *Quality Progress*, June 1987.

Sullivan, Lawrence, "Reducing Variability: A New Approach to Quality," *Quality Progress*, July 1984.

Taguchi, Genichi and Clausing, Don, "Robust Quality," *Harvard Business Review*, January-February 1990.

Walton, M., *The Deming Management Method*, Putnam Publishing Group, New York, NY, 1986.

Walton, M., "From Control to Commitment in the Workplace," *Harvard Business Review*, March -April 1985.

For more books on Six-Sigma, see:

<http://www.sixsigmaspc.com/quality-books/quality-books-six-sigma.html>