New Course Request

Indiana University

Business

P528 (must be cleared with University Enrollment Services)

Operations Processes II

1. School/Division

2. Academic Subject Code

BUS

3. Course Number

4. Instructor

Mark Frohlich

5. Course Title

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

Spring 2010

7. Credit Hours: Fixed at ______ 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 Processes 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 ______ or Variable from ______ to ______

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

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

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

15. Justification for new course:

Would like to add this as a permanent course in the 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:

Department Chairman/Division Director

Date

Dean of Graduate School (when required)

Date

Approved by:

Dean

Date

Chancellor/Vice-President

Date

University Enrollment Services

Date

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.
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


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%

- 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:
  > 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 50%

Total 100%

P528: Process Improvement (II)

Small Group Six-Sigma Project 100%

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.
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<tr>
<th>Session</th>
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<tr>
<td></td>
<td>1/14</td>
<td>Thur</td>
<td><strong>DEFINE</strong>&lt;br&gt;Course Introduction: What is Six-Sigma?</td>
<td>Skim Chapter 1: pages 3 – 13&lt;br&gt;Skim Chapter 1: pages 20-23; 28-29; and 48 on “Green Belts”&lt;br&gt;Read Chapter 7: pages 237-245</td>
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<td>2</td>
<td>1/21</td>
<td>Thur</td>
<td><strong>MEASURE</strong>&lt;br&gt;Selecting and Tracking Six-Sigma Projects&lt;br&gt;Problem Solving Tools&lt;br&gt;Selecting and Tracking Six-Sigma&lt;br&gt;In class I’ll also do a demonstration/tutorial on Minitab 15 to get you familiar with some of its capabilities</td>
<td>Pages 188 - 205&lt;br&gt;Chapter 8: Read pages 252 - 276</td>
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<td>3</td>
<td>1/28</td>
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<td><strong>ANALYZE</strong>&lt;br&gt;Basic Principles of Measurement&lt;br&gt;Knowledge Discovery Tools</td>
<td>Chapter 9 - Read pages 277-293 &amp; 318-324&lt;br&gt;Chapter 9 - Skim pages 294-317</td>
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<td>4</td>
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<td>Statistical Process Control&lt;br&gt;Variable Charts &amp; Attribute Charts</td>
<td>Chapter 12 - Read Pages 393 – 428&lt;br&gt;Case: Deutsche Allgemeinversicherung (abbreviated DAV)&lt;br&gt;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? (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?)</td>
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<td>Case: Process Control at Polaroid (A)&lt;br&gt;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 ??&lt;br&gt;Chapter 13 - Read Pages 467 – 478&lt;br&gt;Skip Chapter 13: pages 479 - 491</td>
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<td>Process Capability Analysis</td>
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<td><strong>IMPROVE &amp; CONTROL</strong> Process</td>
<td>Case: Dynamic Seal</td>
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<td><em>Where in Dynamic Seal should the SPC implementation start?</em> Evaluate the</td>
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<td>capability of the Lablund Lathe.</td>
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<td>Chapter 15 - Skim Pages 534 – 548</td>
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<td>Chapter 18 - Read Pages 649 – 664</td>
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<td>8</td>
<td>3/4</td>
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<td><em>Certification Exam &amp; Course Wrap-up</em></td>
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**P528: Process Improvement (II)**

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<tr>
<td>9</td>
<td>3/11</td>
<td>Thur</td>
<td>Managing Six-Sigma Projects</td>
<td>Chapter 15 – Skim Pages 549 – 570</td>
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<td>Chapter 6 – Read Pages 208 – 234</td>
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<td>3/18</td>
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<td><em>Spring Break!</em></td>
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<td>10</td>
<td>3/25</td>
<td>Thur</td>
<td>A little more &quot;Measure&quot; and &quot;Improve&quot;... Measurement Systems Analysis and Risk Assessment</td>
<td>Chapter 10 – Read Pages 325 – 360</td>
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<td>Chapter 16 – Read Pages 596 – 600</td>
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<td>Thur</td>
<td><strong>Project Team Time</strong></td>
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<td>12</td>
<td>4/8</td>
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<td>Quality Philosophers (Crosby, Deming, Juran, Ishikawa, Taguchi, etc.) The Baldrige Award, ISO 9000, and European Quality Award</td>
<td>Check-out: <a href="http://www.baldridge.com">www.baldridge.com</a> <a href="http://www.efqm.com">www.efqm.com</a></td>
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<td>Chapter 15 – Skim Pages 607 – 616 &amp; 641-644</td>
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<td><strong>Project Team Time</strong></td>
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<td>14</td>
<td>4/22</td>
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<td>Start Group Project Presentations</td>
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<td>15</td>
<td>4/29</td>
<td>Thur</td>
<td>Finish Group Project Presentations, Course Wrap-Up, and Six-Sigma Certification Awards</td>
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<td>16</td>
<td>5/6</td>
<td>Thur</td>
<td>Final Exam Week (No Class - Last Day to turn in your final paper)</td>
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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)


*For more books on Six-Sigma, see:*