New Course Request

Check Appropriate Boxes: Undergraduate credit [X] Graduate credit Professional credit

1. School/Division Business
2. Academic Subject Code Bus
3. Course Number P 429 (must be cleared with University Enrollment Services)
4. Instructor
5. Course Title Operations Processes
   Recommended Abbreviation (Optional)
   (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall 2007

7. Credit Hours: Fixed at ________ or Variable from ________ to ________

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

9. Is variable title approval being requested? Yes ______ No ______

10. Course description (not to exceed 50 words) for Bulletin publication:

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: ________ Will this course be required for majors? ________

15. Justification for new course: __________________________________________________________

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

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:

[Signature]
Department Chairman/Division Director
Date 12/4/07

Dean of Graduate School (when required)
Date

Approved by:

[Signature]
Dean
Date 1-25-07

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.

University Enrollment Services Final—White: Chancellor/Vice-President—Blue: School/Division—Yellow: Department/Division—Pink: University Enrollment Services Advance—White
INTRODUCTION

This course is an introduction to process improvement featuring the Six-Sigma Methodology. Six Sigma is a powerful breakthrough management tool that promotes an increased market share, cost reductions and significant improvements in bottom-line profitability for companies of different size, so it is no surprise that Six Sigma is one of the biggest managerial trends in business today. The pursuit of process and quality improvement has become a goal for many organizations that strive to achieve competitive advantage in today's global economy. But phrases like “continuous process improvement” and words such as "quality" are vague terms that have almost become jargon. The purpose of this course is to thoroughly examine the concept of process improvement, to define it in terms that are useful for managers, to survey the ideas of major process improvement / quality thinkers and theorists, 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 quality and process management.

The course has three major objectives. The first goal is to define process improvement and quality and explore important philosophies and useful frameworks for managers or consultants. We will briefly examine the works of some of the 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.

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 reviewed and the fundamentals and application of statistical process control will be examined.

The final, and perhaps most important, objective of this course is to focus on the implementation of process improvement programs. The distinct methods of process improvement will be put into practice in a Six Sigma 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


Other Materials: Posted on Oncourse

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. The Six Sigma tools will be taught as the course progresses throughout the various phases of Six Sigma, DMAIC. Every student will be part of a team that will work on a Six Sigma process improvement project. By the end of the course, the students will have the equivalent knowledge of a Six Sigma Green Belt. Team interaction/participation and presentations are required at each stage.

D Define
M Measure
A Analyze
I Improve
C Control

III. Develop Six Sigma Toolbox
By the end of the course, the students will have developed a Six Sigma Toolbox. That is, the basic tools used to complete the various phases of Six Sigma, which includes:

- Process Mapping
- Cause & Effect Matrix (C&E)
- Failure Mode and Effects Analysis (FMEA)
- Multi-Vari Charts
- Basic 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

One individually-prepared case analysis: *Dynamic Seal* 20%
- Limit length to no more than three pages, excluding appendices.
- Hand in at beginning of class on day case is discussed.
- Use "good" case analysis recipe. Include:
  - Statement of the issue(s) and goal.
  - Description of competitive environment.
  - Key facts that frame problem (very brief!).
  - Analysis (your dissection of the problems and/or "number crunching").
    Here you’ll include exhibits (including SPC charts) to support your position.
  - Alternatives available to the decision-maker (derived from your analysis).
  - Your recommendations (short- and long-term).

The case analysis will be evaluated on your grasp of the key problems, the depth of your analysis, the relevant use of course concepts studied up to and including the class where the case is discussed, the logical argument leading from the analysis to your alternatives and recommendations (which usually will be recommendations to the management). NOTE: Following the study questions will be a good starting point, but may not lead to the best write-up.

Certification Exam 20%

Small Group Six Sigma exercise 35%
Groups of students will work with a manager and implement a Six Sigma project. Each group will prepare a short paper (60% of the Six Sigma exercise grade) and do a final presentation (40% of the Six Sigma exercise grade) on an operation they have helped bring under control and improve. The presentation will describe the project and the means by which the team helped improve the quality of that process. Presentations are scheduled for the last few classes of the term. More detailed information will follow during the semester.

Homework Assignments 15%

Class Participation 10%
Six Sigma requires active participation. Positive class participation involves regular attendance, thorough preparation for and active engagement in class discussions.
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<tr>
<th>Session</th>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td>W</td>
<td>Course Introduction: What is Six Sigma?</td>
<td>Pages 3 – 30; and 48 on “Green Belts”</td>
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<td>2</td>
<td>M</td>
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<td>Analyzing Processes</td>
<td>Pages 158-159; and 56 – 71</td>
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<td>3</td>
<td>W</td>
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<td>Six Sigma Goals and Metrics</td>
<td>Pages 81-89; and 91-96</td>
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<td>4</td>
<td>M</td>
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<td>Creating Customer Driven Organizations</td>
<td>Pages 126 – 127; 130-132; and 140 on “Linking Customer Demands to Budgets” “Note on Services and Service Quality” “The Contribution of Quality Theorists” (section on Garvin)</td>
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<td></td>
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<td>Dimensions of Product and Service Quality</td>
<td>If we know what quality is, it might be possible to figure out how to get it. Once it is achieved, what should be done with it?</td>
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<td>5</td>
<td>W</td>
<td></td>
<td>DEFINE Selecting and Tracking Six Sigma Projects</td>
<td>Pages 187 – 200. Altoona</td>
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<td>6</td>
<td>M</td>
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<td>Quality Philosophers</td>
<td>“The Contribution of Quality Theorists” “Note on Taguchi!”</td>
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<td>7</td>
<td>W</td>
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<td>MEASURE Six Sigma Tools and TechniquesDMAIC, DMADV</td>
<td>Pages 237-250; and 252-276 See also, “Note on Quality Tools”</td>
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<td>Problem Solving Tools</td>
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<td>Basic Principles of Measurement</td>
<td>Pages 278-323</td>
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<td>9</td>
<td>W</td>
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<td>ANALYZE Knowledge Discovery</td>
<td>Pages 361-392</td>
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<td>10</td>
<td>T</td>
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<td>IMPROVE &amp; CONTROL Statistical Process Control I: Attribute Charts</td>
<td>Pages 406 – 430</td>
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<td>Pages 393 – 405 Process Control at Polaroid (A) *** 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?</td>
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<td>11</td>
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<td>Statistical Process Control II: Variable Charts</td>
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<td>12</td>
<td>M</td>
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<td>Process Capability Analysis I</td>
<td>Pages 467 – 476</td>
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| 13      |      | W   | Process Capability Analysis II | Chapter 9, pp. 291-310  
Dynamic Seal ***  
*Where in Dynamic Seal should the SPC implementation start? Evaluate the capability of the Labond Lathe.* |
| 14      | M    |     | Statistical Analysis of Cause and Effect | Pages 278 – 318 |
| 15      | W    |     | Project Work | |
| 16      | M    |     | Managing Six Sigma Projects | Pages 534 – 570 |
| 18      | W    |     | Project Work | |
| 19      | M    |     | Certification Exam | |
| 20      | W    |     | Project Work | |
| 21      | M    |     | Risk Assessment | Pages 571 – 606 |
| 22      | W    |     | Project Work | Pages 607 – 623  
See also, “Note on Taguchi” |
| 23      | M    |     | Design of Experiments | Pages 649 – 664 |
| 24      | W    |     | Maintaining Control after the Project | |
| 25      | W    |     | The Baldrige Award, ISO 9000, and European Quality Award | Check-out: www.baldrige.com  
www.efqm.com |
| 26      | M    |     | Group Project Presentations | |
| 27      | W    |     | Group Project Presentations | |
| 28      | M    |     | Group Project Presentations | |
| 29      | W    |     | Course Wrap-Up and Six Sigma Certification Awards | |
QUALITY MANAGEMENT READING LIST
(If you want to learn even more)


*For more books on Six Sigma, see:*