QUALITY AND PROCESS IMPROVEMENT IN ACTION

Proposal for a Spring 2012 Honors Seminar

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Description of the Course

The **Quality & Process Improvement in Action** honors seminar, to be delivered through the ISAT department, prepares students to analyze complex problems in integrated business, technology and engineering environments to generate tangible benefits, such as: saving time and money, improving product quality, improving productivity and efficiency, and improving the effectiveness of work processes. Students will learn about variation in systems and processes, improvement cycles, quality tools, and problem solving techniques. They will plan and execute basic quality improvement projects.

This course will go beyond the philosophy and foundational concepts about quality covered in other business and engineering classes, and introduce students to *practical strategies for defining and executing quality and process improvement projects in their community*. In particular, students will learn about basic quality tools, lean thinking, and the DMAIC (Define-Measure-Analyze-Improve-Control) methodology from Six Sigma, and use them to deliver tangible value for a local nonprofit agency, coordinated through the JMU Center for Service Learning (CSL).

Our motivation for pursuing this course as a potential honors seminar is to pilot a capstone course for a Quality and Process Improvement minor, which would be jointly offered by ISAT and the College of Business if approved. Although the course can be taken standalone, it can also enable students to synthesize material learned from previous quality-related business and engineering courses into a practical, actionable framework to make personal contributions to the community using these skills.

Bibliography of Proposed Readings

What is Quality? History, Social Context, and Current Issues

American Society for Quality (ASQ). (2010). Social responsibility and the quality professional: the implications of ISO 26000. Whitepaper, 14 pp.

Borawski, P. (2006). The state of quality: 1947 and 2006. *Journal for Quality and Participation*, Winter, p. 19-22.

Hoyer, R. W. & Hoyer, B. B. Y. (2001). What is quality? *Quality Progress*, 34(7), July, p. 52-62.

Mitra, D. (2003). An econometric analysis of the carryover effects of quality on consumer perceptions of quality. Ph.D. Dissertation, New York University, p. 5-45.

Understanding Quality Problems & Basic Quality Tools

American Society for Quality (ASQ). (2007). 10 quality basics. *Quality Progress*, June, p. 25-37.

Smith, G. F. (2000). Too many types of quality problems. *Quality Progress*, 33(4), p. 43-49.

Tague, N. (2005). *Quality toolbox*. ASQ Press, Milwaukee WI. (selected readings)

Problem Solving for Quality Improvement

APQC. (2009). *Process Classification Framework*.

Kumar, S. & Bauer, K. F. (2010). Exploring the use of lean thinking and Six Sigma in Public Housing Authorities. *Quality Management Journal*, 17(1), p. 29-46.

Lynch, D. P., Bertolino, S. & Cloutier, E. (2003). How to scope DMAIC projects. *Quality Progress*, 36(1), January, p. 37-41.

Quality Council of Indiana. (2010). *Certified Six Sigma Black Belt Primer*. (selected readings)

Reflection

Bringle, R. G. & Hatcher, J. A. (1999). Reflection in service learning: making meaning of experience. *Educational Horizons*, Summer, p. 111-117.

Course Trajectory

What is Quality? History, Social Context, and Current Issues (3 Weeks)

- **Historical Context**: Contributions will be examined from 1911 to present, including Taylor's scientific management, Shewhart's statistical process control, Deming's post-WWII contributions which consolidated as Total Quality Management (TQM) in the 1980's, and other quality gurus.
- **Social Context**: Students will explore the political, economic, social and technological environment of quality improvement from the postwar period through the 1980's, into the technological era before the dot-com bust, into the 21st century, and consider the social context of quality improvement over the next decade.
- **Social Responsibility**: The new ISO 26000 standard for social responsibility, published for the first time in 2010, will be discussed in the context of the history of quality and the current political, economic, social and technological climate.
- **Project Selection**: After the foundational concepts are introduced, students will select a project based on local community needs and available sponsors, and the rest of the course

material will be introduced to the student as tools for them to apply to the successful planning and delivery of their projects.

Understanding Quality Problems & Basic Quality Tools (1 week)

- Students will be exposed to **basic tools** for exploring, classifying and scoping quality problems and Deming's PDCA (Plan-Do-Check-Act) approach to problem solving.
- The concept of the **Project Charter** will be introduced as a mechanism for clarifying project goals and organizing project resources to accomplish those goals.

Problem Solving for Quality Improvement (2 weeks per DMAIC phase)

- **DMAIC** stands for Define – Measure – Analyze – Improve – Control. Students will be introduced to specific techniques for addressing each of the five phases, and will be encouraged to develop that aspect of their project during the scheduled two weeks.
- The concepts associated with **lean thinking** and the elimination of waste will also be covered, since these are often applied in conjunction with quality improvement projects using DMAIC.

Reflection (1 week)

- Students will share their experiences with one another, reflect on the contributions they made to their community, and project how their experience in this course might influence their ability and inclination to provide meaningful service to their communities in the future.

Evaluation Process

Because the course is project-based, each aspect of evaluation will be tied to the successful planning and execution of a quality improvement project selected in conjunction with a local non-profit agency. The assessment of each student will be jointly performed by the instructors and the project sponsor from the community agency, and will include evaluation of their written and oral communication as they summarize the background, methodology, results and recommendations from their projects, distributed as follows:

Effective project definition and scoping as demonstrated in **Project Charter**	30%
Results and synthesis of solution shown in **End-of-Course Project Presentation**	30%
Client's evaluation of **results achieved and team's professionalism**	40%
	100%

Why this is an Honors Course

- The students will develop **high levels of critical thinking** and **experience in professional storytelling** by working with a real client to solve real, immediate needs in the community. They will be required to hone their **writing and communication skills** as they prepare the Project Charter and the End-of-Course Project Overview. The overview, in particular, will require a written executive summary (suitable for adaptation to a press release that can be issued by the partner nonprofit agency) and an oral presentation to the class and the client.

- The content is **inherently interdisciplinary**. Students will examine the history and philosophy of quality, their relationships to the past and present social context, and their relationship to a specific quality improvement problem in the local community. They will select and apply analytical and statistical techniques as appropriate to solve the problem in cooperation with the local nonprofit agency for whom the project will serve, and present the solution(s) in a professional manner.

- **Service learning** is an integral aspect of the course, embedded to demonstrate the importance of **social responsibility** as an individual and organizational value, and provide students with both an understanding and an appreciation for the new ISO 26000 standard.

- Coursework will include **readings from the most current and relevant practitioner journals** in quality management and process improvement, providing the students with insight into current themes in the field and careers that emphasize these skills.

Qualifications

Nicole has been an Assistant Professor in the Integrated Science and Technology (ISAT) department since Fall 2009. She received her Ph.D. from Indiana State University in technology management with a specialization in quality systems. She is a Senior Member of the American Society for Quality (ASQ), was certified in 2005 as a Manager of Quality and Organizational Excellence (CMQ/OE), and is being evaluated for the Six Sigma Black Belt (SSBB) in the fall of 2011. She served as an expert on the Technical Advisory Group (TAG) for the development of the ISO 26000 Standard for Social Responsibility.

Rebecca has been an Instructor of Computer Information Systems and Management Science (CIS&MS) in the College of Business since Fall 2009. She a Senior Member of the American Society for Quality (ASQ) and has held many leadership positions within the society, including Past Chair of Blue Ridge Section 1108. She was certified in 2006 as a Six Sigma Black Belt (SSBB) and has several years of industry experience working as a Black Belt.

Nicole and Rebecca worked together in support of professional projects for the American Society for Quality (ASQ) for about five years before coming to JMU. They have excellent contacts within the local and regional community of quality professionals, and many colleagues who are enthusiastic about contributing to this honors seminar by being guest speakers and/or guest mentors.

How this Course Relates to Other JMU Courses

This course can stand on its own, or serve as a capstone-type course for students who wish to integrate and synthesize material learned in other quality-related business, engineering and/or ISAT classes into a personal framework for action.

It extends and synthesizes small portions of each of the following courses:

COB 291.	Introduction to Management Science
COB 300C/OM 360.	Operations Management
OM 481.	Operations Planning & Control
MGT 370.	Quality Management
ISAT 211.	Modern Production Issues in Science & Technology
ISAT 330.	Manufacturing Systems
ISAT 331.	Automation in Manufacturing
CIS/MS 363.	Business Process Management
CIS/MS 364.	Decision Support Systems

Students who take this course must have previous coursework in business, operations, engineering management or engineering economics, or industrial simulation, and should be familiar with basic concepts of applied statistics.

Consultation with Professors for Related Courses

We have consulted with Walt Ghent in the JMU Center for Service Learning (CSL) who has agreed to be our point of contact with community agencies, and help us develop a syllabus that clearly links the service learning experience with the course learning objectives.

Although both Nicole and Rebecca teach quality-related material in their coursework, as do several professors in business, engineering, and ISAT, there is no significant overlap between the envisioned content and delivery of this course with any other course at JMU. As a result, no other professors were consulted in the development of this proposal.