GRADUATE CERTIFICATE PROGRAM

SIX SIGMA FOR BUSINESS AND INDUSTRY

SUBMITTED BY

SCHOOL OF TECHNOLOGY

PURDUE UNIVERSITY

CALUMET CAMPUS

RECEIVED IN THE GRADUATE SCHOOL

3/24/11

FINAL REVISIONS RECEIVED

7/22/11
Proposal for Graduate Certificate program in Technology at Purdue University Calumet

I. Overview

a. Title of the proposed graduate certificate program. Six Sigma for Business and Industry

b. Purpose of the program. This program is intended for students who have earned a bachelor’s degree and are interested in learning how to apply quality improvement principles in their chosen profession to reduce waste and process variation by applying the tools of Six Sigma in order to enhance bottom-line profit of their organization. This program includes versatile examples and case studies that focus on manufacturing, healthcare, and service environments.

Statement of need
Quality improvement practices have evolved over the past 100 years but it has only been in recent decades that they have begun to weave themselves into the core functions of business management. Prior to these recent changes, quality practices were largely considered separate silo functions within an organization. Six Sigma is one of the most popularized quality improvement practices that has steadily evolved since its inception at Motorola in the mid 1980’s into a world-class system of business management. Over this period of time, it has clearly and decisively demonstrated its ability to deliver verifiable and sustainable bottom-line results.

Today, Companies as varied as drug giant Merck, British confectioner Cadbury, and doughnut maker Dunkin' Brands are increasingly turning to Six Sigma to lift their bottom lines. Capital One says it has launched a Six Sigma initiative to "drive continuous improvement" in its operations, while Pfizer this year embarked on 85 Six Sigma projects to lower the cost of delivering medicines to patients in its pharmaceutical sciences division (Business Week On-Line, September 10, 2009).

As a system of business management, Six Sigma qualifications are now expected requirements of many different professionals. A simple search of job ads on popular job search engines reveals the growing expectations of Six Sigma qualifications within the fields of Engineering, Quality Control and Manufacturing. Of all open jobs listed in Indiana that were associated with these three fields, from 6 to 15% of these jobs (see table below) listed Six Sigma within the job advertisement. Also noteworthy is the fact that a similar search for Six Sigma preference for jobs associated with Healthcare revealed that the Healthcare industry is also starting to recognize Six Sigma knowledge as a noteworthy qualification for professionals within their field.
(see table below). So whereas it is well known that Six Sigma’s inception in the 1980’s at Motorola was applied by engineers in the manufacturing industry, Six Sigma as an evolved system of business management is today finding new life in other fields as well.

<table>
<thead>
<tr>
<th>Percentage of Job ads for Jobs in Indiana with Six Sigma qualifications requested</th>
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<tbody>
<tr>
<td><strong>Job search for:</strong></td>
</tr>
<tr>
<td>Engineer</td>
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<tr>
<td>Quality Control</td>
</tr>
<tr>
<td>Manufacturing and Manufacturing Management</td>
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<tr>
<td>Healthcare and Healthcare Administration</td>
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Six Sigma is also being utilized in retail businesses. Target claims more than $100 million in savings over the past six years from the program. Mike Fisher, Best Buy's senior director of Lean Six Sigma, says projects like streamlining appliance installation have helped the company save up to $20 million in some cases (Business Week On-Line, September 10, 2009).

With Six Sigma being recognized by employers as a desirable qualification for new hires in many varied positions within an organization, professionals looking to update their skills and qualifications are seeking to attain reputable Six Sigma credentials. A graduate Certificate in Six Sigma from Purdue University offers professionals the assurance that the coursework required is of a rigorous level expected to profoundly affect their career and business. The coursework for this Certificate in Six Sigma for Business and Industry will take professionals to the next level allowing them to create value-centered solutions for a wide array of humanitarian, environmental and business problems.

**Need for graduate certificate program in the region**
Within the state of Indiana and its surrounding states of Illinois, Wisconsin, and Michigan, there are 210 universities of which only 6 % currently offer certificate opportunities in Six Sigma. The Six Sigma credential has grown in notoriety over the past several decades and it is well understood in the existing economic market that holding a Six Sigma credential will provide individuals with an employment advantage over colleagues without the credential. A review of
employment ads provide evidence that Six Sigma qualifications are sought after by employers in this region (as well as national and international employers).

**The target audience**
The target audience for this Certificate in Six Sigma for Business and Industry consists of holders of a baccalaureate degree who plan to increase their employability and add to their existing credentials. This certificate is relevant for employees in manufacturing, healthcare and service environments.

**The number of students expected to participate in the program**
The anticipated enrollment is expected to build to approximately 25 students over the course of 3-4 years. There are currently students within the MS degree in Technology program who have expressed the desire to take the list of courses proposed for this certificate. Several students have recently completed the proposed coursework and attained nationally recognized Six Sigma certification through the American Society for Quality (Black Belt and Green Belt certification) which the students have credited directly to the coursework completion being proposed for this certificate.

**Relation to relevant existing certificate programs, if any**
Currently, there are no existing graduate certificate programs related to this topic at Purdue University Calumet.

**Fraction of students who are expected to participate in the program who will also be concurrently working toward a graduate degree at Purdue University Calumet**
This number is expected to be 20 of the anticipated enrollment of 25, or about 80%.

**c. Proposed date of initiation of the certificate program.** Upon approval (estimated Fall 2011)

**d. Whether certificate is graduate or postbaccalaureate.** This is a graduate certificate (75% or more graduate level courses—500 level or higher).
II. Admission requirements

A. Items which are specified by the Graduate School
   1. Bachelors degree from an accredited institution.
   2. Minimum undergraduate GPA of 3.0/4.0 with the possibility of conditional admission for applicants who do not meet this requirement.
   3. Minimum English proficiency for applicants whose native language is not English, with the possibility of allowing exceptions, including substitution of alternate criteria. TOEFL Paper based 550, Computer based 213, Internet based: 77, with minimum scores as follows; Reading 19, Listening 14, Speaking 18, Writing 18); IETLS overall band score of 6.5.
   4. A personal interview with a graduate program faculty advisor.

B. Additional Items specified for the certificate program
   1. Students who are currently admitted to a degree program are eligible to earn a certificate. Such students may:
      a. complete the certificate if it is in their field of study; or
      b. complete the certificate if it is not in their field of study with appropriate leveling coursework (such as Statistics) completed.
III. Completion requirements

A. Items which are specified by the Graduate School

1. The certificate shall require 12 credit hours, taken for a letter grade.
2. No more than 12 credit hours earned in non-degree status, including credit hours earned toward completion of a single certificate or more than one certificate, may be applied toward a graduate degree.
3. Courses that have been certified as undergraduate excess may be used to satisfy requirements for a certificate.

B. Items which are left to the discretion of the graduate program responsible for the certificate, but which must be specified in the proposal for the certificate program

1. Total number of credit hours required: 12 hours
2. Total number of credit hours that must be taken for a letter grade: 12 hours
3. Specific course requirements, including any not-for-credit courses.
   - IT 50800 Quality and Productivity in Industry and Technology
   - IET 51000 Product Development and Optimization
     - Prerequisite: basic statistics
   - IET52000 Enterprise Quality Planning and Analysis
     - Prerequisite: basic statistics and IT 50800
   - IET 41100 Applications of Lean Six Sigma Methodologies
     - Prerequisite: basic statistics and basic understanding of quality principles
4. GPA requirements
   a. Minimum overall GPA for courses that are to be used to fulfill certificate requirements. Only courses taken for a letter grade may be included in this computation. Minimum overall GPA: 3.0/4
   b. Minimum grade for any course to be applied toward the certificate: B
5. Maximum number of credits that may be transferred from another institution: 6 credits
6. Maximum number of credits from undergraduate-level courses that may be used toward the certificate: 3 credit hours at 400 level (excess credit)
7. Maximum time allowed for completion of the certificate: 3 years from time of enrollment in first course.
8. Whether or not courses may be applied for credit toward more than one certificate. The Graduate School considers a certificate to signify competence in a particular area of study, and recognizes that such areas may overlap. On the
other hand, there may be some courses for which it would not be appropriate to allow credit toward more than one certificate. Such restrictions, if any, should be stated.

9. Number of credit hours taken prior to admission to the certificate program that may be counted toward completion of the certificate. 6 credit hours
IV. Administration

A. Items which are specified by the Graduate School

1. Admission process -- In general, the admission process will parallel that for degree-seeking students at the graduate level.
2. To facilitate tracking of students who are enrolled in certificate programs, the Office of the Registrar will establish a special admission status for such individuals.
3. When a student completes requirements for a certificate, Assistant Dean of the School of Technology graduate studies will notify the Graduate School. The Graduate School will then notify the Office of the Registrar.
4. Transcripting
   a. Will be consistent for all graduate certificate programs throughout the Purdue system.
   b. Each certificate earned will be posted separately upon completion of the requirements.
   c. Graduate certificates will be recorded in the following manner:
      1. GRADUATE CERTIFICATE
      2. FIELD OF STUDY: Six Sigma for Business and Industry
   d. Credits earned toward a certificate will be included in the computation of the overall GPA posted on the transcript.

5. The certificate, itself, will be printed by the Office of the Registrar. All certificates under the purview of the Graduate School that are awarded by Purdue University will share a common format and style.
6. The certificate will be awarded jointly by the appropriate academic unit and the Graduate School. It will bear the signature of the head of the academic unit and the dean of the Purdue University Graduate School.
7. Certificates will be awarded at the normal times when degrees are awarded.
8. The academic unit offering the certificate will submit an annual report to the Graduate Council containing the following information:
   a. the number of students currently admitted to the certificate program
   b. for each admitted student: date admitted whether or not the student is also currently admitted to a degree program at Purdue, and if so, which degree and number of credits completed toward fulfillment of certificate requirements
c. the number of certificates awarded annually
The Office of the Registrar will assist in generating this information.

B. Items which are left to the discretion of the graduate program responsible for the certificate, but which must be specified in the proposal for the certificate program
   a. Process for certifying completion of requirements. This audit process will be the full responsibility of the School of Technology at Purdue University Calumet awarding the certificate.
   b. Dissemination: The Certificate will go from the office of the registrar to the PUC School of Technology's Assistant Dean for Graduate Studies