

Design for Six Sigma



COLLEGE OF ENGINEERING
INTEGRATIVE SYSTEMS + DESIGN
UNIVERSITY OF MICHIGAN

ONLINE PROFESSIONAL
CERTIFICATION PROGRAM

**70–80% of Quality Problems Originate
in Product Definition and Design**

Move your design process from reactive to predictive by designing quality into the product from the start, rather than discovering and attempting to fix product issues during production.

Learn more and register for courses at:

isd.engin.umich.edu/design4sixsigma



Take Process Improvement to the Next Level

An Interactive Online Experience

In addition to viewing lecture modules and completing homework exercises you can participate in student discussions and relevant case studies to make your learning experience come alive.

Get a Free Copy of QE Tools Software (Level 1 only)

QE Tools is a highly functional, user friendly, Excel-based add-in tool designed specifically for Six Sigma. You can use QE Tools to apply the various problem-solving tools and statistical analysis methods for your Design for Six Sigma project. This is an Excel tool that will make your job much easier!

Two Skill Levels

The **Level 1, DFSS Green Belt** focuses on the core concepts and methods of applying the IDDOV methodology within the new product development process. **Level 2, DFSS Black Belt**, explores more advanced statistical analysis techniques in the areas of design of experiments, Taguchi methods, robustness, optimization, and reliability analysis.

Online, Anytime, Anyplace

Lecture slides, a dynamic table of contents, and streaming video are part of the user experience in online distance education from ISD. All lectures, exercises, and course materials are online and students can interact with instructors.

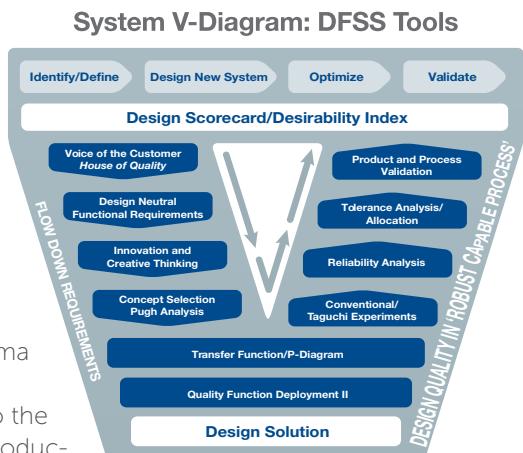
The screenshot displays a user interface for an online engineering production. On the left, there's a slide titled "A Michigan Engineering Online Production" featuring a champagne bottle and the number "4.05". A blue callout box labeled "lecture slides" points to this area. In the center, there's a "dynamic table of contents" listing various topics such as "Introduction", "What is this variable?", "Process Stability", "Champagne Bottle Simulation", "Preliminary Project Plan – Loan Case", "Deming Funnel Experiment*", "Funnel Experiment Simulations", "Rule 1: Learning the Process Alone", and "Results Using Rules 2 and 4". On the right, a video player shows a man in a white shirt pointing towards a screen, with a blue callout box labeled "streaming video of lecture" pointing to him. At the bottom, there's a control panel with buttons for "Run" and "Output".

Program Overview

Design for Six Sigma (DFSS) is an evolving advanced practice that can be applied to all kinds of products, services, and system design to take process improvement to the next level. It is estimated that 70–80% of quality problems originate in product definition and design. One of the main themes of Design for Six Sigma (DFSS) is to move from reactive to predictive by designing quality into the product, instead of waiting until production starts and then finding and attempting to fix issues. In addition, DFSS can be an enabler for new product development.

Who Should Enroll

These courses are aimed primarily at Product Designers, Manufacturing Engineers, and Project Managers working in new product development. To enroll in the DFSS Level 2 course, we recommend participants have applied statistical analysis training (e.g., Six Sigma Black Belt, Certified Quality Engineer, or equivalent).



Instructors



Pat Hammett, Ph.D.

Lead faculty for live and online Six Sigma programs and lecturer in Integrative Systems + Design.



Don Lynch, Ph.D.

A Lean Six Sigma Corporate Master Black Belt for SKF, Inc. He holds a Ph.D. in Mechanical Engineering as well as an MBA.

Program Components

Level 1 DFSS Green Belt Modules

- Course Introduction: New Product Development Challenges
- IDDOV Methodology/ Identifying Projects
- Defining Customer Requirements: Voice of the Customer
- Survey Analysis Methods
- Developing Functional Requirements/FAST Diagrams
- House of Quality
- Benchmarking
- Design Concept Generation
- Creativity and Innovation Tools
- TRIZ Overview
- Design Concept Selection: Design Scorecards, Pugh Matrix
- Design Failure Mode and Effects Analysis (DFMEA)
- Design Issue Counter-measures, DFX Analysis, Axiomatic Design
- Design Optimization: Transfer Functions, P-Diagrams, and Robustness
- Two Group Hypothesis Tests: T-test, F-test, 2 Proportion Tests
- One Way ANOVA Tests
- Two Way ANOVA Tests
- Problem Solving Session: Hypothesis Tests
- Tolerance Analysis: Statistical Tolerance Methods
- Tolerance Simulation: Development and Allocation
- Problem Solving Session: Tolerance Simulation
- Product Design Verification and Validation
- Process Validation
- Course Summary

Level 2 DFSS Black Belt Themes

- Course Introduction: New Product Development Challenges
- Conventional Design of Experiments
- Taguchi Design of Experiment (Static and Dynamic)
- Response Surface Methodology
- Multi-Response Analysis and Desirability
- Central Composite Designed Experiments
- Reliability Analysis/System Allocation

Program Details

Register Today!

Visit either of our Design for Six Sigma program websites: isd.engin.umich.edu/SixSigma, send an email to MEonline@umich.edu or call **(734) 647-7200**.

Program Prerequisites

Level 1: basic Microsoft Excel skills and an understanding of statistical analysis methods are recommended (e.g. Six Sigma Green Belt or equivalent).

Level 2: participants must have successfully completed our DFSS Level 1 course. In addition, this course requires the usage of Minitab® statistical software (or equivalent) and includes more advanced statistical analysis tools. Six Sigma Black Belt (or equivalent) is recommended.

Certificates

Green Belt professional certification requires successful completion of online tests and exercises and a pre-approved Green Belt project.

Black Belt professional certification requires successful completion of Design for Six Sigma Level 1, online tests and exercises, and Black Belt certification exam.

Degrees of Success

Whatever your professional dreams, you'll be a step ahead with exceptional graduate degree programs offered through ISD. These programs are immediately useful and relevant and some can be completed entirely online.

Visit our website at isd.engin.umich.edu to learn more.

Customized Programs

Our professors and industry experts are available to collaborate with you by tailoring programs to meet your specific organizational needs and presenting them at a location of your choice.

For more information, contact us at **(734) 647-7200** or MEonline@umich.edu.



About Michigan Engineering and Integrative Systems + Design

The University of Michigan's College of Engineering was founded in 1853. Today, Michigan Engineering and its academic departments rank in the top ten in their respective areas (U.S. News and World Report). The faculty's ongoing research and industry consultation in engineering contribute to Michigan's strength and impact on professional development. Michigan Engineering's research expenditures for fiscal 2014 totaled \$217.9 million, placing it in the forefront of collegiate engineering research in the U.S.

Integrative Systems + Design (ISD) (formerly known as Interdisciplinary Professional Programs), a division of Michigan Engineering, offers credit courses to students on campus and at locations around the world. Recognized as a global leader in online education in addition to offering on campus programs, ISD provides lifelong learning to technical professionals, and has served more than 100,000 with intensive short courses, conferences, professional certifications, and online advanced degree and certification programs.

ISD responds to the needs of industry, healthcare, government, the military, and non-profit organizations with specialized education programs.

For more information about ISD, visit isd.engin.umich.edu

Questions? Email meonline@umich.edu

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