***Six Sigma Part 1: Define and Measure***

***An introduction to the Six Sigma methodology and the DMAIC cycle for process improvement with a focus on the Define and Measure phases, including basic statistics for understanding sampling plans and calculating process capability.***

***What You'll Learn:***

To understand the background and meaning of the Six Sigma methodology and the role of the DMAIC process improvement cycle.

To identify the Voice of the Customer and translate into Critical-to-Quality parameters.

To understand the concept of random variables, probability mass functions, and probability density functions.

To calculate probabilities using the Normal distribution.

To understand how the Central Limit Theorem applies to sampling and how to set up sampling plans.

To understand the importance of a Measurement System Analysis in a Six Sigma project.

To calculate Process Yield and Process Capability.

To perform a risk assessment using a Failure Modes and Effects Analysis.

How to apply the Define and Measure phases of the DMAIC cycle in your work or research, in order to identify problems and quantitatively assess the impact of process changes using statistical analysis.

***Instructor:***

***Martin Grunow*** - Professor of Production and Supply
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***Holly Ott*** - Senior Lecturer in Operations
Managementat Technical University of
Munich and Professor Production Ma…

***Course contents:***

00\_COURSE WELCOME

0-1 Welcome and Greetings from Munich

0-2 Course Structure

0-3 Pre-Course Survey

0-4 HELLO! Getting to Know Each Other - Discussion Board Post!

Homework Access - AUDIT vs VERIFIED LEARNERS

01\_INTRODUCTION - Motorola's Six Sigma

1-1 LECTURE: Background and Meaning of Six Sigma

1-2 LECTURE: DMAIC

1-3 LECTURE: Six Sigma Project

1-4 LECTURE: Impact of Defects - Measuring Defect Levels

1-5 LECTURE: Impact of Defects - Measuring Defect Levels

1-6 PRACTICE: Impact of Defects - Measuring Defect Levels

HW1: 1 Homework (Graded)

02\_DEFINE - Understanding Customer Expectations

2-0 Introduction DEFINE

2-1 LECTURE: Defining Quality

HW2: 2-2 ORA 1 (Graded): What does Quality Mean in your Industry?

2-3 LECTURE: Kano Model Theory

2-4 EXERCISE: Kano Model

2-5 PRACTICE: Kano Model Theory

2-6 LECTURE: Problem Definition

2-7 PRACTICE: Problem Definition - Case Study Cold Delight

2 PROJECT: Introduction - HANWAG Hiking Shoes

2 PROJECT: DEFINE - HANWAG Hiking Shoes

2 PROJECT: Introduction - Kopschitz Candles

2 PROJECT: DEFINE - Kopschitz Candles

HW3: 2 Homework (Graded)

03\_MEASURE - Statistics Review

3-1 LECTURE: Probability vs Statistics

3-2 LECTURE: Probability vs Statistics

3-3 LECTURE: Random Variables & Probability Distributions

3-4 LECTURE: Random Variables & Probability Distributions

HW4: 3-5 ORA 2 (Graded): Example of Discrete and Continuous Random Variable

3-6 LECTURE: Important Probability Distributions

3-7 LECTURE: Descriptive vs Inferential Statistics

3-8 EXAMPLE: Descriptive Statistics

3-9 LECTURE: Descriptive vs Inferential Statistics

3-10 PRACTICE: Statistics Review

HW5: 3 Homework (Graded)

04\_MEASURE - The Normal Distribution

4-1 LECTURE: The Normal Distribution

4-2 EXERCISE: Normally Distributed Random Variables

4-3 EXAMPLE: Video Example of a Standard Normal

4-4 LECTURE: The Normal Distribution

4-5 PRACTICE: Applying the Standard Normal

4-6 LECTURE: The Normal Distribution

4-7 PRACTICE: Application of the Normal Distribution

4-8 EXERCISE: The Normal Distribution

4-9 LECTURE: Central Limit Theorem

4-10 PRACTICE: Distribution of Sample Average

4-11 LECTURE: Central Limit Theorem

4-12 PRACTICE: Applying the Central Limit Theorem

4-13 EXERCISE: Central Limit Theorem

4 PROJECT: MEASURE - HANWAG Hiking Shoes (Baseline Process Performance)

HW6: 4 Homework (Graded)

4-14 (Optional) GUEST LECTURE: Software Support: Camline Normal Distribution using Cornerstone Software

05\_MEASURE - Process Mapping

5-1 LECTURE: SIPOC

5-2 LECTURE: Process Mapping

5-3 PRACTICE: SIPOC / Process Mapping

5-4 LECTURE: Critical-to-Quality Characteristics

5-5 EXERCISE: Process Mapping

5 PROJECT: MEASURE - HANWAG Hiking Shoes (Process Mapping)

5 PROJECT: MEASURE - Kopschitz Candles (Process Mapping)

HW7: 5 Homework (Graded)

06\_MEASURE - Measurement System Analysis

6-1 LECTURE: Measurement System Analysis

6-2 LECTURE: Gage R&R

6-3 GUEST LECTURE: Gage R&R for Six Sigma Professionals

6-4 LECTURE: Sampling Plans

6-5 PRACTICE: Measurement System Analysis

HW8: 6 Homework (Graded)

07\_MEASURE - Process Capability

7-1 LECTURE: Process Capability

7-2 LECTURE: Process Capability

7-3 LECTURE: Six Sigma Capability

7-4 LECTURE: Attribute & Discrete Capability

7-5 PRACTICE: Process Capability

7-6 EXERCISE: Interactive CP/CPK

HW 9: 7 Homework (Graded)

08\_Quality Topics and Course Summary

8-1 LECTURE: Tolerance Design

8-2 PRACTICE: Tolerance Design

8-3 LECTURE: Failure Mode and Effects Analysis

8-4 LECTURE: FMEA Example

8-5 PRACTICE: FMEA

8-6 LECTURE: More on Capability

8-7 PRACTICE: More on Capability

8-8 LECTURE: Six Sigma Project Guideline

8-9 Course Summary

HW10: 8 Homework (Graded)

Outlook - Yellow & Green Belt

***Duration Course:***8 weeks