

HOW TO CALCULATE MEASUREMENT UNCERTAINTY

PURPOSE

The purpose of this course is to teach you how to estimate uncertainty in measurement for ISO/IEC 17025 accreditation.

LEARNING OBJECTIVES

The learning objectives of this course is to teach you;

- How to estimate measurement uncertainty using the GUM method;
- How to find, quantify, and characterize sources of measurement uncertainty;
- How to create an uncertainty budget to show your calculations;
- How to determine your CMC Uncertainty;
- How to develop your scope of accreditation;
- How to report uncertainty in your test/calibration reports; and
- How to evaluate and validate your estimates of measurement uncertainty.

COURSE STYLE & FORMAT

This is an online training course designed to teach you how to estimate measurement uncertainty through video lectures, guides, and assignments.

This training style and format is different than a traditional classroom.

- First, it requires you to **have the self-discipline** to complete each lesson and assignment.
- Second, your ability to communicate with the instructor and other students is **primarily online**.

- Third, this course requires you to **demonstrate competence and capability** to apply what you have learned.

If this learning format does not suit your needs, contact the instructor and request a refund within the first 7 days.

CURRICULUM

This course includes 12 lectures and 9 assignments.

LESSONS

1. Specify the Measurement Function
2. Identify Sources of Uncertainty
3. Quantify Sources of Uncertainty
4. Characterize Sources of Uncertainty
5. Convert Sources to Standard Deviations
6. Calculate the Combined Uncertainty
7. Calculate the Expanded Uncertainty
8. Evaluate Estimated Uncertainty
9. Creating An Uncertainty Budget
10. Calculating CMC Uncertainty
11. Reporting Uncertainty
12. Creating A Scope of Accreditation

ASSIGNMENTS

1. Specify the Measurement Function
2. Identify Sources of Uncertainty
3. Quantify Sources of Uncertainty
4. Characterize Sources of Uncertainty
5. Calculate the Combined Uncertainty
6. Calculate the Expanded Uncertainty
7. Find Significant Contributors
8. Calculate Effective Degrees of Freedom
9. Evaluate Estimated Uncertainty

INSTRUCTIONS

To complete this course, you are expected to:

1. Watch each video lecture in order,
2. Watch each project video in order,
3. Complete each assignment in order,
4. Submit your results for evaluation,
5. Complete the Course Evaluation Survey.

COMMUNICATION

This course offers several methods of communication.

Email: Most of the communication in this course will be performed via email. Once you join the course, you will receive a series of emails to notify you when new lectures and assignments are available. If you need to contact the instructor, email him at rhogan@isobudgets.com.

Office Hours: If you need help, the instructor will be available to answer questions every Monday through Friday from 12PM to 1PM EST. When you email the instructor, allow up to 24 hours to receive a response.

Telephone Calls: If you have a problem and need assistance, email the instructor and request to schedule a telephone or video conference. Additionally fees may be required for 1 on 1 Coaching.

LECTURES

This course has 12 video lectures. Each video lecture will teach you the fundamentals needed to estimate measurement uncertainty for ISO/IEC 17025 requirements.

Additionally, each lesson contains the power point slides used during the lecture and a guide (where applicable) available for you to download. These resources are optional reading materials to help you learn.

It is recommended to watch the lectures multiple times (as needed) to learn and apply the material.

COURSE PROJECT

This course has 9 assignments to help you estimate uncertainty in measurement and complete your course project.

Each assignment has a video to show you how to complete each task and guide you through the process.

In this course, you will estimate uncertainty for a measurement function that you choose.

To complete the course project, you will need to:

1. Choose a measurement function to estimate uncertainty
2. Identify sources of measurement uncertainty,
3. Quantify sources of measurement uncertainty,
4. Characterize sources of measurement uncertainty,
5. Convert uncertainty sources to standard deviations,
6. Combine uncertainty sources using the GUM method,
7. Calculate expanded uncertainty to 95% confidence,
8. Evaluate your results for appropriateness.

You must complete the course project to complete the course and earn your certificate.

SCHEDULE

This course takes 14 days (minimum) to complete and will begin on the first Monday after enrollment. Each student is expected to dedicate the time required to complete the course.

Lectures may require up to 1 hour each to watch video lectures. Assignments may require 2 to 3 hours each to watch the video guides and complete assignments.

A schedule of course lectures and assignment is provided below.

| DAY 1 | DAY 2 | DAY 3 | DAY 4 | DAY 5 |
|----------------------------------|----------------------------------------------|----------------------------------------------|-----------------------------------------------------------|----------------------------------------------|
| Introduction Meeting | Lesson 1 Project 1 Office Hours 12-1pm | Lesson 2 Project 2 Office Hours 12-1pm | Lesson 3 Project 3 Office Hours 12-1pm | Lesson 4 Project 4 Office Hours 12-1pm |
| DAY 6 | DAY 7 | DAY 8 | DAY 9 | DAY 10 |
| Lesson 5 Project 5 | Lesson 6 | Lesson 7 Project 6 Office Hours 12-1pm | Lesson 8 Project 7 Project 8 Office Hours 12-1pm | Lesson 9 Project 9 Office Hours 12-1pm |
| DAY 11 | DAY 12 | DAY 13 | DAY 14 | DAY 15 |
| Lesson 10 Office Hours 12-1pm | Lesson 11 Office Hours 12-1pm | Lesson 12 | | Office Hours 12-1pm |
| DAY 16 | DAY 17 | DAY 18 | DAY 19 | DAY 20 |
| Office Hours 12-1pm | Office Hours 12-1pm | Office Hours 12-1pm | Office Hours 12-1pm | Project Due |

COURSE LENGTH

This course is 14 days long, but you have up to 21 days to complete the course. If you need longer, notify the instructor to request an extension.

COURSE REQUIREMENTS

To participate and complete this course, you will need the following;

- High-speed internet connection,
- A computer,
- An email account,
- [Microsoft Excel](#) or [Google Sheets](#),
- [Adobe PDF Reader](#)

CERTIFICATE

You will receive a training certificate when you complete this course. Upon completion, it will be available for download and printing.

SURVEY

At the end of this course, you will be given a link to an online survey. It gives you a chance to notify the instructor of what you liked, dis-liked, and what can be improved.

SATISFACTION GUARANTEE

I guarantee that this course will teach you how to estimate uncertainty for ISO/IEC 17025. If you are not satisfied, I will **refund 100% of your money within the first 7 days** of starting the course. After 7 days, I will offer you a free extension to repeat the course and/or provide with a 1-on-1 coaching call.

CANCELLATION & REFUND POLICY

You may cancel your enrollment at any time. To receive a refund, you must notify the instructor and cancel your enrollment within the first 7 days. After 7 days, you may cancel your enrollment but will not receive a refund. To notify the instructor, send an email to rhogan@isobudgets.com.