



CE240 January 3:0

Uncertainty Modeling and Analysis

Instructor

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Teaching Assistant

To be decided

Email:

Department: Civil Engineering

Course Time: Mon, Wed, Fri, 9:00 - 10:00 AM

Lecture venue: STLH

Detailed Course Page:

Announcements

Brief description of the course

This course is aimed at introducing students, typically from an engineering background to modeling and propagating uncertainty in a probabilistic framework.

Prerequisites

None, but prior knowledge on probability and statistics will be helpful.

Syllabus

Deterministic vs. nondeterministic perspectives. Sources of uncertainty. Epistemic vs. aleatoric uncertainty. Data driven vs. physics driven uncertainty modelling. Different approaches such as probabilistic, interval, fuzzy. Introductory probability and statistics --- point estimation, hypothesis testing, time series. Modelling: connecting data to the probabilistic models. Discretization of random fields. Tools for uncertainty propagation. Computational aspects of uncertainty propagation.

Course outcomes

1) Ability to model various uncertain parameters in a natural or engineering system, specially in a probabilistic way.

2) Propagating this uncertainty via various computational methods to predict the output quantity of interest.

3) Ability to write efficient computer programs related to probabilistic methods.

Grading policy

30% mid-term, 20% homework, 20% project, 30% final exam.

Assignments

Two assignments will be given which will involve computer programming.

Resources

There is no specific book. However, books, papers, and other resources are suggested during the course.