

Block Course CSZ



UQ and Data Analysis in Applied Sciences

March 2017, HG G 26.1

<http://www.zhcs.ch/>

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
18	19	20	21	22	23	24
	10:00-12:00 UQ1	10:00-12:00 UQ4	10:00-12:00 UQ7	10:00-12:00 CS1	10:00-12:00 CS4	
	13:00-15:00 UQ2	13:00-15:00 UQ5	13:00-15:00 UQ8	13:00-15:00 CS2	13:00-15:00 CS5	
	15:00-17:00 UQ3	15:00-17:00 UQ6	15:00-17:00 UQ9	15:00-17:00 CS3	15:00-17:00 CS6	
25	26	27	28	29	30	31
	10:00-12:00 CS7	10:00-12:00 SM1	10:00-12:00 SM4	10:00-12:00 SM7		
	13:00-15:00 CS8	13:00-15:00 SM2	13:00-15:00 SM5	13:00-15:00 SM8		
	15:00-17:00 CS9	15:00-17:00 SM3	15:00-17:00 SM6	15:00-17:00 SM9		

CSZ Block Course Series

Catalogue Data available [here](#)

Chair of Risk, Safety and Uncertainty Quantification, ETH Zurich (18 hours)

Lecturers: Prof. Dr. Bruno Sudret

Dr. Stefano Marelli

- UQ1. Introduction to uncertainty quantification
- UQ2. Modelling sources of uncertainty
- UQ3. Uncertainty propagation by Monte Carlo simulation
- UQ4. Polynomial chaos expansions (1)
- UQ5. Polynomial chaos expansions (2)
- UQ6. Sensitivity analysis
- UQ7. Structural reliability and rare events simulation (1)
- UQ8. Structural reliability and rare events simulation (2)
- UQ9. Tutorial: UQLab (for participants with laptops)*

Chair of Computational Science, ETH Zurich

System Dynamics Laboratory, University of Thessaly (18 hours)

Lecturers: Prof. Dr. Petros Koumoutsakos
Prof. Dr. Costas Papadimitriou

- CS1. Overview, Probability Fundamentals
- CS2. Bayesian Inference
- CS3. Stochastic Optimization
- CS4. *Tutorial I: II4U software for Bayesian UQ using Python (Dr. Georgios Arampatzis)*
- CS5. Bayesian Model Selection and Uncertainty Propagation
- CS6. Sampling Algorithms
- CS7. Model Reduction and Surrogates Using Machine Learning
- CS8. *Tutorial II: II4U software for Bayesian UQ using C++ (Dr. Panagiotis Hadjidoukas)*
- CS9. Decision Theory and Optimal Experimental Design

Chair of Structural Mechanics, ETH Zurich (18 hours)

Lecturers: Prof. Dr. Eleni Chatzi

Dr. Vasilis Dertimanis

- SM1. Overview – mathematical background (random variables, differential-difference equations, etc)
- SM2. Time series analysis I – Basic concepts, time – series analysis and parametric modelling
- SM3. Time series analysis II – Output-only subspace identification
- SM4. MATLAB Tutorial I (system identification)*
- SM5. Linear State estimation – Luenberger observer/Kalman filter
- SM6. MATLAB Tutorial II (Bayesian Estimators)*
- SM7. Nonlinear State estimation – The Unscented and Particle Filters
- SM8. SIMULINK Tutorial (Nonlinear & Non-stationary systems)*
- SM9. Advanced topics I – Surrogate Model Construction for Nonlinear Systems & Time-Varying Systems