



## Computer-intensieve statistische methodes (C003399)

Cursusomvang (nominale waarden; effectieve waarden kunnen verschillen per opleiding)

Studiepunten 5.0      Studietijd 150 u      Contacturen 62.5 u

Aanbodssessies en werkvormen in academiejaar 2018-2019

A (semester 2)	Engels	hoorcollege	22.5 u
		begeleide zelfstudie	40.0 u
B (semester 2)		hoorcollege	22.5 u
		begeleide zelfstudie	40.0 u

Lesgevers in academiejaar 2018-2019

Fiems, Dieter	TW07	Verantwoordelijk lesgever
---------------	------	---------------------------

Aangeboden in onderstaande opleidingen in 2018-2019

	stptn	aanbodssessie
<a href="#">Master of Science in Bioinformatics (afstudeerrichting Engineering)</a>	5	A
<a href="#">Master of Science in Statistical Data Analysis</a>	5	B

Onderwijstalen

Engels

Trefwoorden

Bayesian inference; Simulation of stochastic processes; Monte Carlo integration; Markov chain Monte Carlo.

Situering

This course addresses computer intensive methods in statistics. In particular, the foundations and the use of computer experiments (simulation) in statistics will be discussed.

Inhoud

Chapter 1: Bayesian inference Decision-theoretic foundations; Prior distribution; Posterior distribution; Bayes rule; Non-informative priors; Conjugate priors; Maximum entropy priors; Point Estimation; Confidence regions; Hypothesis testing.  
Chapter 2: Simulation of stochastic processes Quasi-random generators; Generation of random variables; Generation of trajectories of Markov processes; Monte Carlo integration; Variance reduction techniques: antithetic variables, control variables, importance sampling; Perfect simulation.  
Chapter 3: Bayesian calculations Markov chain Monte Carlo; Metropolis-Hastings algorithm; Gibbs sampler; Particle filters; Factor graphs; Sum-product algorithm.

Begincompetenties

Elementary statistics, probability and computer programming

Eindcompetenties

- 1 Have advanced knowledge of a wide range of computer intensive statistical methods for designing studies and analysing data.
- 2 The student can use specialized software in order to correctly and efficiently perform statistical calculations, and to critically validate the conclusions obtained through this analysis.
- 3 The student can report accurately on the design, conduct, analysis, and conclusions of statistical studies.
- 4 The student can express clearly the assumptions on which conclusions are based, by performing a Monte Carlo study that systematically and critically investigates the assumptions underlying the analysis approach.

Creditcontractvoorwaarde

Toelating tot dit opleidingsonderdeel via creditcontract is mogelijk mits gunstige beoordeling van de competenties

#### Examencontractvoorwaarde

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

#### Didactische werkvormen

Begeleide zelfstudie, hoorcollege

#### Leermateriaal

Lecture notes from lecturer are available in electronic form. Geraamde totaalprijs: 10 EUR

#### Referenties

S. Ross: Simulation (Academic Press, 1999)

#### Vakinhoudelijke studiebegeleiding

The practical assignments are supervised by the lecturer.

#### Evaluatiemomenten

periodegebonden en niet-periodegebonden evaluatie

#### Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijk examen met open vragen

#### Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijk examen met open vragen

#### Evaluatievormen bij niet-periodegebonden evaluatie

Werkstuk

#### Tweede examenkans in geval van niet-periodegebonden evaluatie

Examen in de tweede examenperiode is mogelijk

#### Eindscoreberekening

Examination: 80 %

Individual assignment: 20%