

Teaching

Biomathematics / mathematical modelling Curriculum

We teach biomathematics and mathematical modelling via applications in biomathematics. The best entry point is either the course "Mathematical modelling" or "Introduction to mathematical biology", both offered in the fall semester but in alternate years. However, each biomathematics course can be taken also independently of the others (the course descriptions specify the prior mathematical knowledge assumed).

Most of our courses assume some knowledge of ordinary differential equations. If you are interested in applied mathematics in general or in biomathematics in particular, we recommend that you take a course on differential equations during your BSc studies. We also encourage learning numerical methods and acquiring basic skills in computer programming.

All courses are in English.

[Why study modelling and biomathematics? Why employ biomathematicians?](#)

Note that our courses are part of two MSc programs, Mathematics and Statistics ([MAST](#)) and Life Science Informatics ([LSI](#)). All of our regular courses can be taken as part of the [Mathematical modelling specialization](#) of MAST as well as the [Biomathematics study track](#) of LSI, irrespective of whether the course has a course code in MAST or in LSI.

Regular courses

These courses are given regularly in a 2-year cycle.

- [Mathematical modelling](#) (Stefan Geritz; Fall 2013, Fall 2015, [Fall 2017](#), [Fall 2019](#), Fall 2021)
- [Introduction to mathematical biology](#) (Eva Kisdi; Fall 2012, Fall 2014, [Fall 2016](#), [Fall 2018](#), Fall 2020)
- [Adaptive dynamics](#) (Stefan Geritz; Spring 2014, Spring 2016, [Spring 2018](#), [Spring 2020](#))
- [Evolution and the theory of games](#) (Stefan Geritz; Fall 2014, [Fall 2016](#), [Fall 2018](#), Fall 2020)
- [Stochastic population models](#) (Stefan Geritz; Spring 2013, Spring 2015, [Spring 2017](#), [Spring 2019](#), Spring 2021)
- [Spatial models in ecology and evolution](#) (Eva Kisdi; Spring 2013, Spring 2015, [Spring 2017](#), [Spring 2019](#), Spring 2021)
- [Mathematics of infectious diseases](#) (book reading course, Eva Kisdi; Fall 2013, Fall 2015, [Fall 2017](#), [Fall 2019](#), Fall 2021)

Other courses for students of biomathematics (LSI) / mathematical modelling (MAST)

- [Operator semigroups with applications in biology](#) (Barbara Boldin, Spring 2020)
- [Stochastic differential equations with biological applications](#) (Carlos Braumann, Fall 2018)
- [Dynamics of Lotka-Volterra systems](#) (Ping Yan; Fall 2014, Fall 2017)
- [Introduction to bifurcation theory: Differential equations, dynamical systems and applications I](#) (Ping Yan, [Fall 2016](#), [Fall 2018](#))
- [Introduction to bifurcation theory: Differential equations, dynamical systems and applications II](#) (Ping Yan, [Spring 2017](#))
- [Monotone dynamical systems](#) (Ping Yan; Spring 2015)
- [Qualitative theory of ordinary differential equations](#) (Ping Yan; Fall 2014)

For students of biology

These courses are given in Viikki and targeted to students of biology with no background in mathematics. These courses are therefore not intended for students of LSI and MAST.

- [Speciation theory](#) (Eva Kisdi; Fall 2008, Fall 2010, Fall 2012, Fall 2014, [Fall 2018](#))
- [Mathematical methods in biology Parts 1, 2, 3, 4](#) ([link to a former page with overview of all parts](#)) (Eva Kisdi; full academic years 2005-2006, 2007-2008, 2009-2010, 2011-2012, 2013-2014, 2015-2016, 2017-2018, 2019-2020)

Past courses

- [Modelling health care interventions](#) (Simopekka Vänskä, THL; spring 2017, intensive course)
- [Introduction to dynamical systems](#) (Paolo Muratore-Ginanneschi, Fall 2015)
- [Nonlinear diffusion problems](#) (Odo Diekmann; Fall 2014)
- [Introduction to bifurcation theory: Differential equations, dynamical systems and applications](#) (Tadeas Priklopil; Fall 2013)
- [Mathematical theory of population genetics](#) (Tadeas Priklopil; Fall 2012)
- [Stochastic methods in physics and biology](#) (Stefan Geritz and Paolo Muratore-Ginanneschi, Spring 2010)
- [Monotone competitive dynamical systems](#) (Yi Wang; Fall 2009)
- [Operator semigroups](#) (Mats Gyllenberg; Spring 2005; Spring 2009)
- [Modelling fluctuating populations](#) (Stefan Geritz; Fall 2006)
- [Dynamics of structured populations](#) (Mats Gyllenberg; Spring 2006)
- [The qualitative theory of ordinary differential equations](#) (Mats Gyllenberg; Fall 2005)
- [Mathematical population dynamics](#) (Mats Gyllenberg; Fall 2004, in Finnish)
- [The mathematics of contagious diseases](#) (Mats Gyllenberg)
- [Mathematical models of biological adaptation](#) (Eva Kisdi)

Regular courses given in the past

This list is for our records.

- [Mathematical modelling](#) (Stefan Geritz; Fall 2005, Fall 2007, Fall 2009, Spring 2012)
- [Evolution and the theory of games](#) (Stefan Geritz; Spring 2005, Spring 2007, Spring 2009, Fall 2011)
- [Adaptive dynamics](#) (Stefan Geritz; Spring 2006, Spring 2008, Fall 2010, Fall 2012)
- [Stochastic population models](#) (Stefan Geritz; Fall 2008, Spring 2011, Spring 2013)
- [Introduction to mathematical biology](#) (Eva Kisdi; Spring 2011, Fall 2012)
- [Spatial models in ecology and evolution](#) (Eva Kisdi; Fall 2006, Spring 2009, Spring 2013)
- [Mathematics of infectious diseases](#) (Barbara Boldin; Fall 2009)
- [Mathematics of infectious diseases](#) (Thanate Dhirasakdanon, Fall 2011)
- [Evolution and the theory of games](#) (Tadeas Priklopil; Spring 2013)

Book-reading seminars

- Sean H. Rice (2004): [Evolutionary Theory](#) (Spring 2006, in English)
- [Mathematical population genetics](#) (Stefan Geritz / Mats Gyllenberg; Spring 2005, in English)