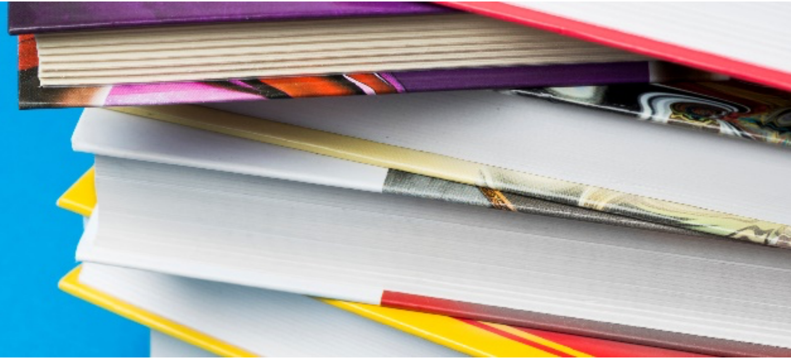
TEL AVIV UNIVERSITY אוניברסיטת תל אביב

# Full Syllabus



## Course Title

Models in Population Biology

## Lecturer

Yoav Ram

## Semester

Bet

## Course requirements

Python, Mathematics A & B, Statistics, Intro to Biology C or Ecology, Evolution or Molecular Evolution or Population Genetics

## Final grade components

Grading will be based on bi-weekly assignments and a final project at the end of the course. Assignments will include implementation of existing models and methods; final project will require students to design a new model or extend an existing one and implement it.

## Course schedule

| Class no. / Date | Subject and Requirements (assignments, reading materials, tasks, etc.) |
|---|---|
| 1 | Introduction to models in biology |
| 2 | Continuous-time univariate deterministic model: population growth models |
| 3 | Continuous-time multivariate deterministic model: Lotka-Volterra model |
| 4 | Discrete-time univariate deterministic model: Haploid selection |
| 5 | Discrete-time multivariate deterministic model: Age-structured populations |
| 6 | Discrete-time stochastic model: Wright-Fisher model |
| 7 | Continuous-time stochastic model: SIR model |
| 8 | Maximum likelihood estimation: Molecular clock |
| 9 | Bayesian inference: Neutral theory for species abundance |
| 10 | Generalized linear models 1: Exponential growth |
| 11 | Generalized linear models 2: Demography with count data |
| 12 | Likelihood-free inference: Animal social networks |
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## Required course reading

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## Optional course reading

A Biologist's Guide to Mathematical Modeling in Ecology and Evolution / Sarah P. Otto and Troy Day

## Comments

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