



## Course Title

Ordinary Differential Equations 1

## Lecturer

Oleg Ivrii

## Semester

B

## Course requirements

## Final grade components

20% homework (10-12 assignments), 80% exam

## Course schedule

Class no. / Date	Subject and Requirements (assignments, reading materials, tasks, etc.)
	Basic examples. Separable equations. Harmonic oscillator. The ideal pendulum. Logistic equation. Lotka-Volterra equations.
	Linear recurrences and ODEs with constant coefficients. Linear systems of ODEs. Exponentiating matrices.
	Exact equations. Integrating factors. Motion of planets around the sun.
	Existence and uniqueness of ODEs. Theorems of Peano and Picard-Lindelöf. Continuation of solutions. Maximal and minimal solutions.
	Second-order ODEs. Wronskian. Finding a complementary solution. Method of variation of parameters. Green's functions. Sturm's separation and comparison theorems.
	Sturm-Liouville Theory. Boundary value problems. Heat and wave equations.

## Required course reading

Course notes will be provided.

## Optional course reading

References: Hirsch, Smale. Differential equations and dynamical systems.  
Birkhoff, Rota. Ordinary differential equations.