

Course title	Dynamical systems
Volume (number of credit points)	4
Volume (number of contact hours)	64
Number of lectures	48
Number of seminars	16
Course level: 1-4 – bachelor; 5-6 – master	5-6
Prerequisites	Ordinary differential equations
Science field, science sub-field	Mathematics, differential equations
Equivalent course	

COURSE DESIGNER

<i>Name</i>	<i>Surname</i>
Andrejs	Reinfelds

COURSE ABSTRACT

The aim of course is to give the introduction in the qualitative theory of dynamical systems and differential equations.

RESULTS

Students are responsible for all topics covered by the course “Dynamical Systems” and are able to solve examples.

REQUIREMENT for AWARDING CREDIT POINTS

Report at seminar

Examination – oral exam (2 theoretical questions and example).

COURSE PLAN

<i>No..</i>	<i>Topic</i>	<i>Planned amount in hours</i>
1.	Classical theory of dynamical systems	6
2.	Linear dynamical systems	
3.	Dynamical systems in one and two dimensions	6
4.	Stability via Liapunov’s method	
5.	Classification of linear dynamical systems	
6.	Classification of dynamical systems in the neighbourhood of hyperbolic point	
7.	Principle of reduction	
8.	Nonlinear dynamical systems	

LITERATURE

Basic textbooks

1.	L. Perko. Differential equations and dynamical systems. Springer, 2001
2.	V. Arnold. Ordinary differential equations. Springer, 2006
3.	V. Arnold. Geometrical methods in the theory of ordinary differential equations. Springer, 1988
4.	L. Reiziņš. Stabilitātes teorija., LVU, 1979
5.	A. Reinfelds. The reduction of discrete dynamical and semidynamical systems in metric space. In: Six lectures on dynamical systems. World Scientific, 1996, p. 267-312

Further reading

1.	M.W. Hirsch, S. Smale, R. Devaney. Differential equations, dynamical systems and introduction to chaos. Elsevier, 2004
2.	A. Katok, B. Hasselblatt. Introduction to the modern theory of dynamical systems. Cambridge University Press, 1995
3.	L.C. Robinson. An introduction to dynamical systems. Continuous and discrete. Prentice Hall. 2004
4.	P. Hartman. Ordinary differential equations. Birkhauser, 1982

Periodicals, internet resources and other sources

1.	E.R. Scheinerman. Invitation to Dynamical Systems, 1996 http://www.mts.jhu.edu/~ers/book.pdf
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