



RTU Course "Computer Aided Solution Processing"

12308 Programmatūras inženierijas katedra

General data

Code	DIP414
Course title	Computer Aided Solution Processing
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Lavendels Jurijs
Academic staff	Jēkabsons Gints
Volume of the course: parts and credits points	1 part, 4.0 Credit Points, 6.0 ECTS credits
Language of instruction	LV
Possibility of distance learning	Not planned
Abstract	Supervised machine learning, regression modelling, linear regression, least-squares method, model evaluation, automatic model building, heuristic search, genetic algorithms, genetic programming, nearest neighbour methods, regression trees and their practical applications.
Goals and objectives of the course in terms of competences and skills	To obtain theoretical and practical knowledge about supervised machine learning, regression modelling, linear regression, least-squares method, model evaluation, automatic model building, heuristic search, genetic algorithms, genetic programming, nearest neighbour methods, regression trees and their practical applications. To be able to apply methods and algorithms according to the problem at hand. To understand their inner workings, to be able to implement them in software and apply them in practice.
Structure and tasks of independent studies	Homework (mathematical calculations, Weka application, programming), course paper (literature review, text on the topic, programming), exam.
Recommended literature	Hastie T., Tibshirani R., Friedman J. The elements of statistical learning: Data mining, inference and prediction, Springer, 2nd edition, 2009, 746 p. Cherkassky V., Mulier F.M. Learning from Data: Concepts, Theory, and Methods, 2nd ed. Wiley-IEEE Press, 2007, 538 p.
Course prerequisites	Algorithm building, programming, mathematics

Course outline

Theme	Hours
Introduction to supervised machine learning and regression modelling, application examples	4
Linear regression, least-squares method	8
Polynomial regression models	8
Basic model evaluation	4
Basic model evaluation (1 h)	4
Automatic model building, state space, heuristic search, search algorithms	4
Genetic algorithms and their applications	4
Genetic programming and symbolic regression	4
K nearest neighbour method	4
Regression trees	4
Machine learning open source software Weka	4
Practical applications of different regression modelling methods	12

Learning outcomes and assessment

Learning outcomes	Assessment methods
Obtained theoretical and practical knowledge about supervised machine learning, regression modelling, linear regression, least-squares method, model evaluation, automatic model building, heuristic search.	Practical work, homework, course paper, exam.

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	4.0	6.0	2.0	0.0	2.0		*	