JÖNKÖPING UNIVERSITY
Jönköping International Business School

COURSE SYLLABUS
Predictive Analysis with Machine Learning, 7.5 credits

Predictive Analysis with Machine Learning, 7,5 högskolepoäng

Course Code:	JPAR22	**Education Cycle:**	Second-cycle level
Confirmed by:	Council for Undergraduate and Masters Education May 28, 2020	**Disciplinary domain:**	Technology
Valid From:	Aug 22, 2022	**Subject group:**	ST1
Version:	1	**Specialised in:**	A1N
		Main field of study:	Statistics

Intended Learning Outcomes (ILO)

On completion of the course the student will be able to:

Knowledge and understanding

1. Explain common methods in predictive modelling using machine-learning techniques for quantitative and qualitative data.

2. Explain model selection, validation and dimension-reduction techniques.

Skills and abilities

3. Use statistical software to apply machine-learning methods for predictive analysis.

4. Apply a suitable data mining technique based on a problem description.

Judgement and approach

5. Evaluate the suitability of the chosen method.

6. Choose between a set of methods for a given empirical problem.

7. Analyze empirical results from common machine-learning techniques.

Contents

This course is an introduction to machine learning and its application to make decisions in business and economics. The machine-learning methods are introduced by starting from a regression perspective and all methods covered are related to the standard regression analysis. The methods covered are regression analysis and classification (starting from the logistic regression-model). We include linear models, non-linear models and tree-based models. We also discuss regularization techniques such as lasso, ridge regression and elastic nets. Further, model selection techniques including information criteria and cross-validation are covered. We also cover bootstrapping methodology, which is a powerful tool for statistical inference.

Connection to Research and Practice

This course covers predictive modelling using machine-learning techniques. This is a fast-growing branch of statistics where analysis of big data is used for predictive and forecasting

purposes. Most organizations today use big data for their decision making. The statistical methods introduced in this course enables government organizations, businesses etc. to use the data they collect in a strategic way to improve their operations. Further, they can be used in economic research directly to draw conclusions about unknown economic characteristics in the society.

Type of instruction

Lectures and lab sessions.

The teaching is conducted in English.

Prerequisites

The applicants must hold the minimum of a bachelors's degree in Business Aministration or Economics equal to 180 credits including 15 credits in Mathematics/Statistics/Econometrics

Examination and grades

The course is graded A, B, C, D, E, FX or F.

The examination consists of two parts:
Individual written exam (ILOs 1,2,4,5,6) representing 4.5 credits.
Group assignments (ILOs 1-7) representing 3 credits.

Registration of examination:

Name of the Test	Value	Grading
Individual written exam[I]	4.5 credits	A/B/C/D/E/FX/F
Group assignments[I]	3 credits	U/G

[I] All parts of compulsory examination in the course must be passed with a passing grade (A-E or G) before a final grade can be set. Grade is set in accordance with JIBS grading policy.

Course evaluation

It is the responsibility of the examiner to ensure that each course is evaluated. There must be course evaluators identified among the students. The evaluation is carried out continuously as well as at the end of the course, through a survey. After the course the course Examiner meets with student evaluators to discuss the survey results and possible improvements. A summary report is also created. The report is followed up by program directors and discussed with faculty and relevant others (e.g. Associate Dean of Education, Associate Dean of faculty, Director of PhD Candidates, Dean, or Director of Studies). The next time the course runs, students should be informed of any measures taken to improve the course based on the previous course evaluation.

Other information

Academic integrity
JIBS students are expected to maintain a strong academic integrity. This implies to behave within the boundaries of academic rules and expectations relating to all types of teaching and examination.

Copying someone else's work is a particularly serious offence and can lead to disciplinary action. When you copy someone else's work, you are plagiarizing. You must not copy sections of work (such as paragraphs, diagrams, tables and words) from any other person, including another student or any other author. Cutting and pasting is a clear example of plagiarism. There is a workshop and online resources to assist you in not plagiarizing called the Interactive Anti-Plagiarism Guide.

Other forms of breaking academic integrity include (but are not limited to) adding your name to a project you did not work on (or allowing someone to add their name), cheating on an examination, helping other students to cheat and submitting other students work as your own, and using non-allowed electronic equipment during an examination. All of these make you liable to disciplinary action.

Course literature
James, Witten, Hastie and Tibshirani (2013) *"An introduction to statistical learning with applications in R"*.

A supplementary list of articles will be supplied at the course introduction.