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
Revised by:	Council for Undergraduate and Masters Education May 2, 2023	**Subject group:**	ST1
		Specialised in:	A1N
Valid From:	Aug 21, 2023	**Main field of study:**	Statistics
Version:	2		

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 Administration 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 assignment (ILOs 1) representing 4.5 credits.
Group assignments (ILOs 1,2,3,4,5,6,7) representing 3 credits.

Registration of examination:

Name of the Test	Value	Grading
Individual assignment[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. At the outset of the course, the programme evaluators in the course must be contacted. In the middle of the course, the examiner should meet the programme evaluators to identify strengths/weaknesses in the first half of the course.

At the end of the course, the examiner should remind students to fill in the survey. The examiner should also call a meeting with the programme evaluators to debrief the course, based on course evaluation data and comments. The next time the course runs, students should be informed of any measures taken to improve the course based on the previous course evaluations.

At the end of each study period, JIBS' Director of Quality and Accreditation crafts a "Course Evaluation Quarter Report", presenting the quantitative results from course evaluation surveys. The Associate Dean of Education, The Associate Deans of Faculty, Programme Directors, and JSA President and Quality receive the report.

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, Tibshirani and Taylor (2023) "*An introduction to statistical learning with applications in Python*".

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