

SYLLABUS FOR BAN404, Spring 2022Teacher: Jonas Andersson, jonas.andersson@nhh.no

Time: 12-14

Place: Zoom or Aud C

Literature: (ISLR) James, Witten, Hastie and Tibshirani, An introduction to statistical learning (2021). Available freely online here: <https://statlearning.com/>

Format of lectures: Streamed lectures from lecture room or Zoom or prerecorded videos or if possible live in Aud C

Format of tutorials: Live on Zoom using breakout rooms or if possible live in Aud C. Students will solve problems on real data with R and implement methods introduced in the previous lectures. Groups of 4 students are advised.

Suggested solutions to exercises in the book: <https://github.com/asadoughi/stat-learning>

<i>Date</i>	<i>Topic</i>	<i>Literature</i>	<i>Exercise(s)</i>
17.1	Lecture: Overview of the course. Business analytics and statistical learning. Inference and prediction. Bias-variance tradeoff. Supervised vs unsupervised learning. Model accuracy.	ISLR, Ch 1-2.	2.8
19.1	Lecture: Linear regression and K-nearest neighbour.	ISLR, Ch 3.	3.8 3.9
24.1	Tutorial	ISLR, Ch 1-3.	
26.1	Lecture: Classification. Maximum likelihood estimation, logistic regression.	ISLR, Ch 4.	4.10a-d (First edition) 4.13a-d (Second edition)
31.1	Lecture: Linear discriminant analysis.	ISLR, Ch 4.	4.10e-i (First edition) 4.13e-i (Second edition)
2.2	Lecture: Resampling methods. Cross validation.	ISLR, Ch 5.	5.5
7.2	Lecture: Resampling methods. The bootstrap.	ISLR, Ch 5.	5.9
9.2	Tutorial	ISLR, Ch 4-5.	
14.2	Lecture: Linear model selection methods. Subset and stepwise selection.	ISLR, Ch 6.	6.8
16.2	Lecture: Regularization. Ridge regression and the LASSO.	ISLR, Ch 6.	6.11
21.2	Lecture: Regression splines and local regression methods. Non-linear models. Regression splines and local regression methods.	ISLR, Ch 7.	7.6 7.9
23.2	Lecture: Smoothing splines and generalized additive models.	ISLR, Ch 7.	7.10
7.3	Tutorial	ISLR, Ch 6-7.	
9.3	Lecture: Tree-based methods. Regression and classification trees.	ISLR, Ch 8.	8.8a-c
14.3	Lecture: Tree-based methods. Bagging and boosting.	ISLR, Ch 8.	8.8d-e 8.11
16.3	Lecture: Support vector machines	ISLR, Ch 9.	9.7
21.3	Lecture: Unsupervised learning	ISLR, Ch 12.	12.8, 12.9
23.3	Tutorial	ISLR, Ch 8-9 and 12	

Evaluation

The final grade will be based on a 8-hour take home exam (using R), May, 19. A passed project report is required to attend the written exam. This project task will be handed out March 7 and is due March 14.