Course Schedule

Class	Date	Day	Topic	Reading (Pre-class)	Notes
1	Mar 10	Thu	Introduction (lectures/intro.pdf)	Pre-Req material; R and Rstudio; Python anaconda; Matlab	HW 0 assigned; Get textbook(s)
2	Mar 17	Thu	Supervised Learning I (Lectures/supervised_1.pdf)	ISL 1, 2.1, 7.1 ESL 1, 2.1-2.4	**HW 0 Completed** supervised_1.R (R/supervised_1.R)
3	Mar 24	Thu	Resampling: Bootstrap and Splines, Cross-Validation (Lectures/bootstrap.pdf, Lectures/crossval.pdf)	ISL 5.1, 5.2, 7.2-7.4 ESL 7.10, 7.11, 5.1-5.3 ISL Chap 3 (review)	**HW 1 Due** bootstrap.R (R/bootstrap.R)
4	Mar 31	Thu	Penalized Regression (lectures/penalized.pdf)	ISL 6.1-6.2 ESL 3.3-3.4	**HW 2 Due** penalized.R (R/penalized.R)
5	Apr 07	Thu	Classification (lectures/classification.pdf)	ISL 4.1-4.6 ESL 4.1-4.4	**HW 3 Due** classification.R (R/classification.R)
6	Apr 14	Thu	Support Vector Machines (lectures/svm.pdf)	ISL 9.1-9.7 ESL 12.1-12.3 or MMDS 12.3	**HW 4 Due** support.R (R/support.R)
7	Apr 21	Thu	Density Estimation (lectures/density.pdf)	IPSUR: pg.209-218 (MLE intro) (https://gitub.com/cran/IPSUR/raw/master/inst/doc/IPSUR.pdf) Maximum Likelihood Estimation: pg. 221-223 (https://www.math.arizona.edu/~jwatkins/O_mle.pdf) IPSUR Chap. 5-7 (Random Variable Review, if necessary) (https://github.com/cran/IPSUR/raw/master/inst/doc/IPSUR.pdf)	**Project proposal Due**
8	Apr 28	Thu	Clustering (lectures/clustering.pdf)	Primary: ISL 10.3, 10.5; ITDM 7.1; 7.5 Secondary: ESL 14.3.1-14.3.8; 14.3.12; ITDM 7.2-7.3	**HW 5 Due** clustering.R (R/clustering.R)
9	May 05	Thu	Tree-Based Methods (lectures/trees.pdf)	ISL 8.1, 8.3 ESL 9.2	**HW 6 Due** trees.R (R/trees.R) trees-demo.pdf (lectures/trees_demo.pdf)
10	May 12	Thu	Boosting	ESL 10.10-10.14 XGBoost paper (https://arixv.org/pdf/1603.02754.pdf), CatBoost paper (https://catboost.ai/docs/concepts/tutorials.html), LightGBM (https://lightgbm.readthedocs.io/en/latest/Features.html)	**HW 7 Due** L2Boosting.R (R/L2Boosting.R)
11	May 19	Thu	Review		**Project Presentation**

Reading

- ISL: **An Introduction to Statistical Learning** by James, Witten, Hastie, and Tibshirani (https://www.statlearning.com/)
- ESL: **The Elements of Statistical Learning: Data Mining, Inference, and Prediction (2nd Edition)** by Hastie, Tibshirani, and Friedman (http://www.-stat.stanford.edu/~tibs/ElemSTatLearn/)
- ITDM: **Introduction to Data Mining (2nd Edition)** by Tan, Steinbach, Karpatne, and Kumar (https://www-users.cs.umn.edu/~kumar001/dmbook/index.php)
- MMDS: **Mining of Massive Datasets** by Jure Leskovec, Anand Rajarman, Jeff Ullman (http://www.mmds.org/)