Course plan for 02409, Multivariate Statistics, Fall term 2018 (E18) **(**Subject to modifications over time! This version is from 29th of August, 2018**)**			
Week no	Date	Lectures: 8:00-10:00	Exercises: 10:00-12:00
36	3. Sep.	Introductory examples on multivariate statistics: The Challenger Disaster and logistic regression, SAS programs. Repetition of basic concepts on random variables. Introductory examples on 2-dimensional distributions. 2D-histograms and the 2-dimensional normal distribution. Book chapter 1.1-1.2, 3.4.3	Installation of SAS University Edition. Introduction to SAS. Exercise-1.1 Problem 2 from Exam 10. December 2013
37	10. Sep	Conditional distribution in two-dimensional and multidimensional Gaussian distributions illustrated by example on height & weight measurements from 25000 individuals. Estimation of parameters. Correlation, partial correlation and multiple correlation. Book chapter 1.1-1.3.	Exercise 2.4, 2.5, 2.3. Analyze Height-Weight relation for 25000 children in SAS.
38	17. Sep	The multivariate normal distribution revisited. Simple, partial and multiple correlations. Principal component analysis. Definition and properties. Test for equality of eigenvalues. Book sections 1.2-1.3+1.5, 6.1	Exercises 7.4, 7.2, 7.1, 7.3 (Principal Component Analysis on equicorrelation data, on the 'Fitness-dataset', on heptathlon data from the 1988 Olympic Games and on beef quality measurements).
39	24. Sep.	Principal Component Analysis revisited. Factor analysis. Principal factor solution. Factor rotation. Computation of factor scores. Examples. Book sections 6.1, 6.3	Problem 2 from Exam 9. December 2011. Exercise 7.5, 7.7
40	1. Oct.	Canonical Correlation Analysis. Illustration of concepts and methods through examples. The elements of discrimination and classification. Prior and posterior distributions. Bayes and minimax solutions. Introduction to the multivariate normal case. Book section 7.2	Exercises on CCA: Exercise 7.6 Problems 4 and 5 from Exam 9. Dec. 2011.
41	8. Oct.	Discrimination and classification. Bayes and minimax solutions. The multivariate normal case and Mahalanobis' distance. Linear versus quadratic discriminant analysis. Estimation of misclassification rates: calibration and test data sets, plug in estimates, cross validation. Canonical discriminant analysis. SAS programs. Book chapter 6	Exercise 6.1 (PROC DISCRIM and PROC CANDISC). Exercises 6.2 and 6.3.
42	15. Oct.	No lectures – Autumn break	No exercises

43	22. Oct.	Discriminant analysis and Canonical Discriminant Functions (CDF) revisited. Introduction to the General Linear Model (GLM). Estimation. Revised chp 6 on DTU Inside (Book chapter 6) Sections 2.1.1, 2.1.2.	Exercise 6.1, exercise 6.4 Problem 3, questions 3.3, 3.4, 3.5, 3.6 from Exam 9. Dec. 2011 Problem 1 from Exam 8. Dec. 2009 Exercise 3.1, Exercise 3.2, questions 1, 2, and the part of 4 that corresponds to 1, 2.
44	29. Oct	The General Linear Model. Estimation, confidence- and prediction intervals, tests. Book chapter 2.	Complete Exercises 3.1 and 3.2. Exercise 3.5 (SAS exercise on GLM) Exercise 3.3, exercise 3.4
45	5. Nov.	Model specification in Proc GLM. Regression analysis, model selection, influence statistics and diagnostics. Book sections 2.2.2, 3.1, 3.3	Exercise 3.5 Exam 7. Dec. 2010 Problem 4. Exam 8. Dec. 2009 Problem 3. Exam 11. Dec. 2012 Problem 5.1-5.4 Exercise 4.1, 4.2
46	12. Nov.	GLM and Regression Analysis revisited. Hotellings test statistics. The Multivariate General Linear Model. Book sections 3.1, 3.3, 3.4.2, 4.1, 4.2.	Exercises 4.3 and 5.1 Exam 11. Dec. 2007, Problem 8 Exam 9. Dec. 2008, Problem 3.
47	19. Nov.	The Multivariate General Linear Model and Multivariate Analyses of Variance (MANOVA). Book sections 4.1, 4.2, 4.3	Problem 8 ex. 10/12 2001 Problem 2 ex. 5/1 2001 Problem 5 ex 7/12 2010 Find the test statistics by using SAS Problem 6 ex 8/12 2009 Problem 4 ex 9/12 2008 Problem 3 ex 9/12 2011.
48	26. Nov.	Multivariate General Linear Model revisited. Example on repeated measurements. Book chapter 4. Additional note.	Mock exam ("prøveeksamen") using last year's Exam Problems
49	3. Dec.	Course wrap up. Selected examples.	Course wrap up. Selected examples.