

Course plan for 02409, Multivariate Statistics, Fall term 2025 (E25)

(Subject to modifications over time! This version is from 28th of August, 2025)

Week no	Date	Lectures: 8:00-10:00	Exercises: 10:00-12:00
36	1. Sep.	A: Introductory examples on multivariate statistics: The Challenger Disaster and logistic regression. Repetition of basic concepts on random variables. Introductory examples on 2-dimensional distributions. The 2-dimensional normal distribution. Reading: Book chapter 1.1, 1.2.1-1.2.3 and 1.3.1.	Check you have a working installation of R, perhaps RStudio. These will not be needed for today's exercises though. Exercises 1.1, 1.2, E1.
37	8. Sep	B: 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.	
38	15. Sep	C: 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	
39	22. Sep.	D: Principal Component Analysis revisited. Factor analysis. Principal factor solution. Factor rotation. Computation of factor scores. Examples. Book sections 6.1, 6.3	
40	29. Sep.	E: 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 6.2	
41	6. Oct.	F: 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. Book chapter 5	
42	13. Oct.	No lectures – Autumn break	No exercises

43	20. Oct.	G: Discriminant analysis and Canonical Discriminant Functions (CDF) revisited. Introduction to the General Linear Model (GLM). Estimation. Chapter 5 Sections 2.1.1, 2.1.2.	
43	27. Oct.	H: The General Linear Model. Estimation, confidence- and prediction intervals, tests. Book chapter 2 (except section 2.1.3, 2.1.4, and 2.3)	
44	3. Nov.	I: Model specification in glm. Regression analysis, model selection, influence statistics and diagnostics. Book sections 2.2.2, 3.1, 3.2	
45	10. Nov.	J: Gln and Regression Analysis revisited. Selection of best regression. Hotellings test statistics. The Multivariate General Linear Model. Book sections 3.1, 3.2, 3.4, 3.5.1, 3.5.2, 4.1,	
46	17. Nov.	K: The Multivariate General Linear Model and Multivariate Analyses of Variance (MANOVA). Book sections 4.1, 4.2, 4.3	
47	24. Nov.	L: Multivariate General Linear Model revisited, Repeated Measurement Model Book chapter 4, 2.3	
48	1. Dec.	M: Course wrap up. Selected examples from the curriculum.	