Module: Statistical Methods of Data Analysis 2 (**PHY525**)				
Degree Program: Physics (M.Sc.)				
Frequency: in WS	**Duration:** 1 week block course	**Semester:** 1st sem.	**Credits** 3	**Work load** 90 h

1	**Module structure**				
	No.	**Element / Course**	**Type**	**Credits**	**Contact hours per week**
	1	Lecture	L	3	Block course
2	**Language:** English				
3	**Content** Building on the lecture "Statistical Methods of Data Analysis", the course covers coverage probabilities (frequentist vs. Bayesian confidence intervals), deepening of the method of least squares with emphasis on applications with low statistics and not a priori known variances, application of multivariate selection methods, deconvolution using density mixture models and as a parameterization problem, Markov Chain, Monte Carlo, separation of signal and background using sWeights, event-by-event efficiencies, harmonic analysis and Lomb periodogram, robust statistics.			
4	**Learning outcome** Students will gain advanced insights into statistical analysis of data, building on lecture PHY523, "Statistical Methods of Data Analysis"				
5	**Examination** Examination: Written module examination (90min) or oral module examination depending on the number of participants.				
6	**Participation Requirements:** Desired: Programming knowledge in a suitable language (FORTRAN, C, JAVA, C++, or similar)				
7	**Module type** Elective module				
8	**Responsible** Prof. W. Rhode		**Faculty in charge** Department of Physics		