

SEMESTER 1 (winter), total 300 hours = 225 O ^{*)} + 75 F ^{**) , ECTS: 31 (23 O + 8 F)}

^{*)} O – Obligatory courses (in yellow)

^{**) F – Facultative courses (in pink)}

no.	courses	type	hours	ECTS	credit
1	Introduction to Nanotechnology - Scaling Laws - The basics of quantum mechanics - Basic concepts of nanomaterials, nanomechanics, nanoelectronics, nanophotonics, nanoscale heat transfer, nanoscale fluid mechanics, nanobiotechnology and nanomedicine	lecture&classes	45 O (30l+15c)	5	exam
2	Introduction to Statistical Data Analysis and Machine Learning methods - Basic concepts of statistical data analysis techniques and machine learning methods - Methods of uncertainties estimation for experimental data - The methods of analysis of experimental data in terms of correlations and trends - The methods of data reduction (e.g. PCA) and visualization (e.g. MDS) - Practical skills on the introduced techniques and methods	laboratory	30 O	4	assessment
3	Physical Laboratory – laboratory exercises on: - Interaction of light with matter - Determination of the chemical composition of matter - Examinations of quantum size effect	laboratory	45 O	4	assessment
4	Atomistic Computer Modeling in Materials Science - General Overview of Computer Modeling: from Classical to Quantum - Methodology of Molecular Dynamics Computer Simulations - Methodology of Monte Carlo Simulations - Acceleration of Calculations – Parallel Programing and Multiscale Modeling	lecture&classes	45 O (15l+30lab)	5	exam
5	European Studies	lecture	30 O	4	exam
6	English language I	classes	30 O	1	assessment
7	Specialist Seminar	seminar	30 F	3	assessment
8	LabVIEW - programming for industry and research - Introduction to the LabVIEW graphic development environment - Developing systems for data acquisition and recording, control of measuring devices and signal analysis - Creation of applications using basic project templates	laboratory	45 F	5	assessment
9	Python - Introduction to Python, types and operations in Python's programs - Virtual environments and numerical computing - Processing files, Monte Carlo simulations and Simple GUI	laboratory	45 F	5	assessment