Module	***Structure Physics***
Code	72502
Instruction language	English
ECTS credits	6
Credit hours	5
Duration	1 semester
Cycle	Summer semester
Coordinator	Dean of Physics Studies
Instructors	Prof. Dr. Ute Kaiser, Prof. Dr. Harald Rose
Allocation to study programmes	Physics M.Sc., elective module, 1st or 2nd semester Wirtschaftsphysik M.Sc., elective module, 1st – 3rd semester
Formal prerequisites	None
Recommended prerequisites	Undergraduate physics and mathematics, some experience in programming would be helpful
Learning objectives	The objective of this course is to teach fundamental principles and introduce the state-of the art instrumentation for probing atomic (and electronic) structure with electrons (X-rays, neutrons), along with the skill to transfer the theory taught during the course to practical computer code or talk. Each student will have to solve a dedicated problem related to one of the topics addressed during the lectures. These problem will be addressed in a student talk, along with a detailed explanation of the background of the implemented theory or a numerical solution. The student will also perform two experiments on our Cs-corrected TITAN80-300 on high-resolution TEM.
Content	Topics discussed during the lectures include: - basics of crystallography - basics of geometrical optics - basics of electron optics - basics of Fourier optics - basics of contrast formation in the TEM - basics of high-resolution TEM
Literature	Links to relevant literature and programming guides will be provided on the course website http://www.uni-ulm.de/einrichtungen/hrem/lehreteaching.html
Teaching and learning methods	Two block for 1 week each (corresponding to 3 hours per week) Seminars/Exercises/Experiment (2 hours per week)
Workload	45 hours lecture (attendance time) 30 hours exercise (attendance time) 105 hours self-study and exam preparation Total: 180 hours
Assessment	The final grade will be composed as follows: 50% for the programming project and the oral presentation of it + 50% for a final written exam.
Basis for	Research in the fields of condensed matter physics