The lecture course *STEM - ACM* will be given in the English language. It is aimed at students of the Master’s programmes of Mechanical Engineering / SEPM and UTRM (special subjects: Materials Engineering and Micro-Engineering) and of the Master’s programme Materials Science and Simulation (MSS). The lecture course teaches the fundamentals that are essential for correct interpretation of microstructural results from electron-microscopic investigations. Gunther Eggeler will cover, in the first part of the course, the structure of matter, important crystallographic methods and the interaction between electrons and solids. In the second part of the course, Christoph Somsen will explain the structure of a transmission electron microscope (TEM) and introduce contrast theory and analytical electron microscopy. In the third part of the course, Victoria Yardley will present the fundamentals and applications of scanning electron microscopy (SEM). Special emphasis will here be placed on orientation imaging microscopy (EBSD). In three exercises, integrated into the lecture plan, the subject matter will be consolidated and illustrated with practical examples.

(1) 12. April 2013  Crystals and glasses  
(2) 19. April 2013  Key crystallography techniques  
(3)  3. April 2013  Electrons and their interaction with matter  
(4) 10. May 2013  Exercise I  
(5) 17. May 2013  Key elements of a transmission electron microscopy (TEM)  
(6) 31. May 2013  TEM diffraction contrast and analysis of defects  
(7)  7. June 2013  Analytical TEM  
(8) 14. June 2013  Exercise II  
(9) 21. June 2013  Principles of scanning electron microscopy (SEM)  
(10) 28. June 2013  Basics of orientation analysis in the SEM (EBSD)  
(11)  5. July 2013  Worked EBSD examples  
(12) 12. July 2013  Exercise III  

**Teaching assistant responsible for this course:**  
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