

## Syllabus 2020/21

Teacher (name and affiliation)	Giancarlo Capitani (UNIMIB, Dep. Earth and Environmental Sciences) Paride Mantecca (UNIMIB, Dep. Earth and Environmental Sciences) Maurizio Acciarri (UNIMIB, Dep. Material Science)
Title	Scanning and Transmission Electron Microscopy, Principles and Applications
Language	English
CFU	3
Hours	30
Program	<p><b>Aim of the Course</b>          Scanning and Transmission Electron Microscopy (SEM and TEM, respectively) are powerful techniques for the characterization of materials at a very fine scale. They are potentially of interest for all the scientific fields addressed in this Doctoral Course. Exploiting the different signals produced by the electron matter interaction, information on morphology, structure, and composition of hard and soft materials from the micrometre to the nanometre scale is possible. The course will provide with the principles governing electron microscopy, the sample preparation, and the different operational modes available in modern instruments. Some case studies will be presented and practical sessions on the instruments installed at the “Piattaforma di Microscopia” di Milano-Bicocca are planned.</p> <p><b>Detailed Program</b></p> <ol style="list-style-type: none"> <li>1. Brief history of Electron Microscopy development</li> <li>2. Electron-matter interaction</li> <li>3. SEM and TEM sample preparation</li> <li>4. Methods for bio-Electron Microscopy</li> <li>5. Secondary (SE) and backscattered (BSE) observations</li> <li>6. Electron backscattered diffraction (EBSD)</li> <li>7. Bright field (BF), dark field (DF) and high resolution (HR) imaging</li> <li>8. Selected area diffraction (SAD) and diffraction tomography (EDT)</li> <li>9. Energy-dispersive (EDS) and wave-dispersive (WDS) analyses</li> <li>10. Practical use of SEM and TEM</li> <li>11. Electron Microscopy limits and pitfalls</li> </ol>

Evaluation: YES/NO	NO
Calendar	II semester