

Courses in English

Course Description

Department	06 Applied Sciences and Mechatronics
Course title	Scanning Probe Microscopy
Hours per week (SWS)	4
Number of ECTS credits	6
Course objective	<p>After completing this module successfully, students possess or have improved their competencies in the following fields:</p> <ul style="list-style-type: none">- They have a profound understanding of fundamental scanning probe techniques;- They know and are able to describe a selection of advanced scanning probe techniques;- They can explain feedback mechanisms;- They can point out the potential and technical limitations of scanning probe techniques in order to develop autonomy for the choice of these techniques for individual needs as advanced users.
Prerequisites	Basics in physics, especially solid state physics
Recommended reading	
Teaching methods	seminaristic teaching with exercises
Assessment methods	written exam, 90min
Language of instruction	English
Name of lecturer	Andreas Ruediger
Email	ruediger@emt.inrs.ca
Link	
Course content	<ul style="list-style-type: none">- Brief review of surface and tunneling physics and atomic interaction potentials- Cantilever mechanics and tip-fabrication- ip-sample mechanics: extreme cases- Ambient atmosphere and vacuum approaches - Basic modes of operation<ul style="list-style-type: none">-- Scanning tunneling microscopy-- Contact mode atomic force microscopy (AFM)-- Intermittent mode AFM-- Non-contact mode AFM and shear-force AFM-- Measuring in liquids - Functionalized modes<ul style="list-style-type: none">-- Conductive AFM-- Piezoresponse AFM-- Scanning capacitance and Kelvin Probe-- Magnetic force microscopy and the hard disc drive-- Near-field microscopy-- Tip-enhanced Raman spectroscopy
Remarks	only in summer 21