Module	**Analytics and Characterization**
Code	MLS_S22
Degree Program	Master of Science in Life Sciences (MSLS)
Cluster	Chemistry
Specialization	Chemical Development and Production
ECTS Credits	4
Workload	120 h: Contact 56 lessons = 42 h; Self-study 78 h
Module Coordinator	**Name** Dr. J.-P. Bourgeois **Phone** +41 (0)26 429 67 15 **Email** jean-pascal.bourgeois@hefr.ch **Address** Haute école d'ingénierie et d'architecture de Fribourg, Bd de Pérolles 80, CH-1700 Fribourg
Lecturers	• Olivier Vorlet (HEIA-FR) • Olivier Nicolet (HEIA-FR) • External experts • Guest lecturers
Entry Requirements	Bachelor of Science in Chemistry or in a related course of study including basic knowledge in analytical and physical chemistry.
Learning Outcomes and Competences	After completing the module students will be able to: • Understand and explain time-resolved spectroscopic methods used to measure ultrafast kinetics • Understand and explain high-resolution methods used to image solids and surfaces at the atomic-scale • Explain and apply the ideas proposed by the Process Analytical Technologies (PAT) initiative • Understand and apply the validation of method in the frame of accredited laboratory. • Understand state of the art analytical instrumentations • Elaborate analytical method from sampling to publication of results
Module Content	Advanced methods of physical characterization: • nanosecond fluorescence decay by time-correlated spectroscopy • picosecond/femtosecond kinetics by pump-probe methods (transient absorption, transient grating, fluorescence up-conversion) • atomic-scale topography by scanning probe methods On-line / at-line Infrared Spectroscopy Process Analytical Technologies (PAT) Process capability analysis

	Packaging tightness characterization Particles size distribution characterization State of the art in analytical methods Applied environmental analysis Analytical method validation
Teaching / Learning Methods	• Lectures • Individual and group exercises • Field trip and laboratories visit (mandatory) • Active participation in the module is requested
Assessment of Learning Outcome	• Final examination (oral): 100 % of the final grade • Reassessment: oral exam
Bibliography	• Literature and regulatory guidelines will be provided during lectures.
Language	English
Comments	-
Last Update	05.06.2018 / M. Dabros & R. Marti 29.03.2019 / J.-P. Bourgeois