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** Cyril Portmann **Phone** +41 (0)26 429 67 76 **Email** cyril.portmann@hefr.ch **Address** Haute école d'ingénierie et d'architecture de Fribourg, Bd de Pérolles 80, CH-1700 Fribourg
Lecturers	• Cyril Portmann (HEIA-FR) • Olivier Nicolet (HEIA-FR) • Pierre Brodard (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 • Understand and explain physical chemistry methods applied to industrial domains and the capability of a process. • Understand and apply the validation of method in the frame of accredited laboratory. • Understand analytical laboratory accreditation process • Understand and apply NMR spectroscopy to conduct quantitative analyses. • Understand and explain principle and applications of immunoassays • Understand state of the art analytical techniques applied to the field of natural product chemistry • 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 Quantitative NMR (qNMR) Immunoassays • ELISA, Electrochemiluminescence, Western Blot, Lateral Flow Assay • Validation of immunoassays • Applications of Immunoassays Advances analytical techniques in natural product chemistry Particles size distribution characterization Applied environmental analysis Analytical method validation ISO17025, ISO17034
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 within four weeks after the publication of the grades.
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 22.01.2020 / J.-P. Bourgeois 22.05.2020 / J.-P. Bourgeois 21.06.2021 / COPIL MLS