# Module: Process Design and Optimization

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<tr>
<th><strong>Code</strong></th>
<th>MLS_S03</th>
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<tbody>
<tr>
<td><strong>Degree Program</strong></td>
<td>Master of Science in Life Sciences (MSLS)</td>
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<td><strong>Cluster</strong></td>
<td>Chemistry</td>
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<td><strong>Specialization</strong></td>
<td>Chemical Development and Production</td>
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<td><strong>ECTS Credits</strong></td>
<td>4</td>
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<td><strong>Workload</strong></td>
<td>120 h: Contact 56 lessons = 42 h; Self-study 78 h</td>
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<tr>
<th><strong>Module Coordinator</strong></th>
<th><strong>Name</strong></th>
<th>Dr. Michal Dabros</th>
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<td><strong>Address</strong></td>
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| **Lecturers** | • Dr. Michal Dabros, HEIA-FR  
• Dr. Charles Guinand, SafEcho (charles.guinand@gmail.com)  
• Guest lecturer(s) |

| **Entry Requirements** | Bachelor of Science in Chemistry or in a related course of study, basic knowledge in chemical reaction techniques and modeling (Bachelor level) |

| **Learning Outcomes and Competences** | After completing the module students will be able to:  
• perform experimental design for a process, analyze the results and model the response surface  
• apply chemometrics to analyze and model multivariate experimental data  
• use direct search methods to explore a response surface in search of a process optimum |

| **Module Content** | • Problem formulation in view of process design and optimization  
• Design of Experiments (DOE) & Response Surface Methodology (RSM)  
• Direct Search Methods (Nelder-Mead Simplex, Genetic Algorithms)  
• Model identification by gradient methods  
• On-line / at-line Spectroscopy applied to process monitoring  
• Chemometrics and Multivariate Analysis (PCA, PCR, PLS) |

| **Teaching / Learning Methods** | • Lectures  
• Individual and group exercises  
• Invited speakers / excursion |

| **Assessment of Learning Outcome** | • Active participation in the module is required  
• Mini-projects, reports / presentations: 25% of the final grade  
• Final examination (oral): 75% of the final grade  
• Reassessment (if final grade 3.5): oral exam or special project |
Bibliography


Documentation: http://cyberlearn.hes-so.ch (requires a login)

Language

English

Comments

The students are responsible for covering any transportation costs involved.

Last Update

17.02.2023 / Michal Dabros