

Lecture Announcement - Vorlesungsankündigung

In the **Summer Semester 2018** the lecture series:

“Enhanced Experimentation: From Ideas and Concepts to Industrial Realization”

Will be hosted by the Institut für Technische Chemie, Fakultät für Chemie und Mineralogie, Universität Leipzig. The lecture will take place as two blocks of two days with four sessions per day on

21. and 22.06. and 05. and 06.07.2018,

08:30-10:00 Uhr, 10:30 -12:00 Uhr, 13:30 – 15:00 Uhr and 15:30-17:00 Uhr

in room 257 (Linnéstr. 3, Technikum-Analytikum)

The lecture series is especially suited for students in natural sciences, predominantly in chemistry. The goal of the lecture series is to enable students to get an insight which modern tools are used in industry today to come from ideas and concepts to an industrial realization within a predictable timeframe and learning on how and where to apply these tools.

The lecture series is structured in the following content blocks:

- Ideation: from preliminary idea generation to preparation of a project- or work-plan.
- Planning and Analysis: Strategies and Tools for efficient planning and analysis of experiments and resulting data.
- Experimentation: use of modern tools that allow acceleration of experimental stages or increased insight compared to conventional methods.

Exercises, homework and self-study are approximated with 6 to 8 lecture units. The lecture is held in a largely interactive format, the completion of exercises, homework and self-study will be taken as basis for performance points.

Please express your interest to participate in the course via email to Ms. Petra Hartmann (sek.glaeser@uni-leipzig.de) by 30. April 2018.

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CONTENT OF THE LECTURE COURSE

- Lecture Block 1 (5 lecture units):
 - Background, definitions, scope of the lecture.
 - Idea generation/Tools for idea generation
 - Critical analysis/Feasibility analysis
 - Idea improvement, scoping for improvements
 - Workplan generation, preparation of execution plans
 - Alternative models: “Design-Thinking”

- Lecture Block 2 (4 lecture units):
 - Methods for experimental planning: design of experiments, model based experimental designs, optimization algorithms, sources of data, data analysis and data eco-systems.
 - Design of experiments
 - Statistical design of experiments
 - Full factorial Designs, fractional factorial design, response surface designs
 - Model based experimental designs / Optimal designs
 - Optimization algorithms
 - Analysis of large amounts of data
 - Organisation of large amounts of data
 - Algorithms for the analysis of large amounts of data

- Lecture Block 3 (7 lecture units):
 - High throughput experimentation: concept, basic principles and realization.
 - Understanding how and where high throughput experimentation can be applied best.
 - Workflow development in high throughput experimentation: theory and practice
 - High throughput synthesis and analytics
 - High throughput screening and combinatorial methods for the development of advanced materials
 - High throughput experimentation in heterogeneous catalysis: what is the state of the art for materials and process driven development efforts?
 - High throughput screening for homogeneous catalysis: what benefits does the methodology bring compared to conventional methods?
 - Impact of high throughput experimentation on academic and industrial r&d
 - Towards project realization: taking the final hurdles and steps.