Course VL 2233120 Information & Overview Membrane Materials & Processes Research Masterclass

Faculty of Chemical and Process Engineering
Institute for Advanced Membrane Technology (IAMT)

Contact: Prof Dr.-Ing. Andrea Iris Schäfer, 22Karlsruhe Institute of Technology (KIT)
Professor of Water Process Engineering, Faculty of Chemical and Process Engineering
Institute for Advanced Membrane Technology (IAMT)
Building 352, Office 217, Campus North
+49 721 608 26906, Andrea.Iris.Schaefer@kit.edu, http://iamt.kit.edu

WS2023/4, Masters, Elective course (offered first time in 2023/4)

Location: Campus North, Building 352, IAMT Seminar Room, on Thu 14-17.15

The course is held in English and the examination is an individual report prepared on a membrane materials & processes research topic of choice that applies the course content and a related oral presentation.

Effort: 6 LP which requires typically an effort of 150 hours, of which 56 h (4 SWS) are contact time during lectures and tutorial time, 54 h self study and 40 h preparation of report and presentation.

Assessment: Research report of 10 pages and an oral presentation of 10 minutes (individual work). The grade will be a composite of the report (**submission in week 13 before class**) and oral presentation (**all day workshop with researcher participation**). The work will be applied to a specific research data set and contain a self-reflective element on the course content.

Course Contents: The course assumes basic knowledge of membrane materials and processes applied to water treatment as well as the course on proposal writing. Those missing the relevant background are expected to read a textbook from the course recommended reading list or consult relevant materials on the proposal writing course. The content teaches required knowledge to carry out research in the field, including formulation of a research problem and research questions, experimental design, data validation and storage, as well as presentation of research in spread sheets, graphs, schematics and communication in publications, oral & poster presentations.

Learning Goals: The student will learn basic skills in research at the example of membrane materials and processes applied to water treatment. The skills will assist in conducting research at master, PhD, or postdoctoral levels, in particular when background or training differ. Technical skills include the design of experiments to answer specific research questions, performance parameters through to data collection, storage, manipulation, validation, error estimation and interpretation, while the soft skills encompass health and safety aspects of experimental research, research communication (publication) and research integrity.

Course Organization and Student Information: The course will be held at IAMT at Campus North and be integrated with ongoing research in an international environment. To carry out experimental work exam registration is required. Attendance is required for the completion of the module, in particular for the full day workshop. Learning will be most successful with an interactive participation of participants. Tutors are available during the course time (only) to assist and answer questions.

Course Schedule

**The start of this course will be delayed by one week in 2023, with the first lecture taking place on 2 November 2023 (instead of 26 October).*

Week	Date	Lecture	Tutorial	Comments
1	26/10/2023	-	-	Travel commitment
2	2/11/2023*	Membrane principles: Overview lecture	IAMT Tour	School holidays
3	9/11/2023	Performance parameters in membrane research	Calculation examples from IAMT research & Introduction to symbols	List of symbols
4	16/11/2023	Filtration systems and protocols	EXPERIMENT (by appointment, full day at IAMT)	Travel commitment
5	23/11/2023	Mass Transfer in membrane systems	Tutorial on mass transfer calculation	
6	30/11/2023	Data acquisition and storage	Labview and Excel spreadsheets	
7	7/12/2023	Making good graphs: Origin	Making good schematics: MS Visio	Travel commitment
8	14/12/2023	Health and Safety Induction: Risk assessment and laboratory conduct	Material safety data sheets	
9	21/12/2023	Water analysis: methods, calibration & data validation	Maintenance of instrument books	Feedback session
		Lecture free period		
10	11/1/2023	Material characterization: methods, calibration & validation	Sample analysis requests	
11	18/1/2023	Error estimation	TUTORIAL	
12	25/1/2023	Publication Part 1: Research problem, aim, research questions, parameter identification and experimental planning	Literature: from Search to Endnote	Travel commitment
13	1/2/2023	Publication Part 2: Scientific writing from concept note (CON) to manuscript and submission of research works to appropriate journals	Research Integrity: DFG Codex, authorship, responsibility, citations, rankings	
14	8/2/2023	How to prepare and oral/poster presentation; key conferences in the field	Preparation of Oral Presentation	
	15/2/23	IAMT Research Workshop: Oral presentations		FULL DAY