

Advanced Wind Energy  
Andreas Hermann Schmidt

# Dynamics and Control of Grid-Connected Wind Turbines

Ablaufplan



**PUBLIKATION DER BILDUNGSALLIANZ MINT.ONLINE:  
UNIVERSITÄT OLDENBURG, UNIVERSITÄT KASSEL, UNIVERSITÄT STUTT GART, FERNUNIVERSITÄT IN  
HAGEN, FRAUNHOFER-GESELLSCHAFT, DLR-INSTITUT FÜR VERNETZTE ENERGIESYSTEME (EHEMALS  
NEXT ENERGY)**



GEFÖRDERT VOM



Bundesministerium  
für Bildung  
und Forschung

Das diesem Bericht zugrundeliegende Vorhaben wurde mit Mitteln des Bundesministeriums für Bildung, und Forschung unter dem Förderkennzeichen 16OH12044 gefördert. Die Verantwortung für den Inhalt dieser Veröffentlichung liegt beim Autor/bei der Autorin.

Sem.-Nr.	Phases	Phases	Content/Tasks
1	1st phase: Class-room seminar	building up basic competences	Information about Content, Concept and Organisation of the Course AND Guided Tour through ForWind-OL-WindLab
			Homework: Enrolling into course and finding together to groups
2			Lecture: Reactive Power; The Three-Phase-Grid
			HOMEWORK: make a Program with matlab or Excel: Given is a One-Phase-System with $U_{eff} = 230V$ (50Hz); Make a little Program or Excel-Sheet, where $I_{eff}$ and the $\cos \Phi$ can be selected and the Program plots:
3		Lecture: Grid connected 3-phase generators Repetition: behaviour of wind turbine rotor	
		HOMEWORK: Read the uploaded slides of Wind Energy Utilisation Read in the Gasch-book the chapters:6.2, 6.3, 6.5, 6.6.1, 6.7, If you have a question: Don't hesitate to ask it in the next seminar. Present your question in the next seminar; you may even use the blackboard, powerpoint slides etc. Questions will be investigated in plenum.	
4		Lect.:Short test (anonymous) –assessment of knowledge and competences Current research: The "big siblings" of our wind-to-grid simulator	
		Homework: develop basic competences by means of given literature: Read in Gasch book chapters: 11.2.1, 13.1, 13.1.1, 13.1.2, 13.1.3, 13.1.4	
5		Lect.: Generator torque characteristics Power Control Drivetrain Concepts Homework of Sem 05	
6		Presentations and discussion of the Homework of Sem. 05: 5 min Presentation 10 min discussion x 6 groups = 90 min	
7		Homework:self-contained learning on the provided materials Introduction to the experimental system and safety instruction Homework:self-contained learning on the provided materials	
8		investigating standard situations and functional interaction by means of the experimental system	Instead of weekly session: Individual appointments with each of the 6 groups: Testing out standart situations and manoeuvres with the experimental system 6 h equiv. 4 x 90 minutes
9			
10			
11			
12	introduction to current research	Homework: Reading one or two papers from the field of the experiment; answering questions on Stud.IP; formulation of at least one question resulting from current learning or from the content of the paper (NOT the research questions for the experimental work); prepare 2 slides for presentation of the found question In Plenum: discussion of the learning questions: 5 min Presentation 10 min discussion x 6 groups = 90 min	
13	defining an own research question	Homework:Definition of PRELIMINARY research question for YOUR EXPERIMENT; Preparing a 5-minute-presentation of planned experiment In Plenum: discussion and detailed specification of the found PRELIMINARY research questions s: 5 min Presentation 10 min discussion x 6 groups = 90 min Homework: Thorough definition of the research question; First draft of the experiment; First draft of a paper abstract ; Preparing a 5-minute-presentation of planned experiment	
14	In Plenum: discussion and detailed specification of the found research questions: 5 min Presentation 10 min discussion x 6 groups = 90 min		

Sem.-Nr.	Phases	Phases	Content/Tasks
15	1st phase: Class-room seminar	defining an experimental strategy	Homework: Thorough definition of the research question; PLANNING THE EXPERIMENT ; Preparing a 5-minute-presentation of planned experiment
			In Plenum: discussion of the EXPERIMENTS: 5 min Presentation 10 min discussion x 6 groups = 90 min
16			Homework: Planning of the experiment
17			Presentation and discussion of the planned experiments: -Each group 15 min Presentation -15 min discussion 6 Groups=> 2 x 1.5 h
18	2nd phase: Laboratory work	set-up, execution, data acquisition and decommissioning of the experiment	Set-up, execution, data acquisition and decommissioning of the experiment; min. 2 days à 6 hours per group; 12 h equiv. to 8 x 1.5 h sessions
19			
	3rd phase: Evaluation and documentation	evaluating the experiment	Homework: Evaluation of the experiment
20		documentation with a short report (paper)	individual timing
21			Homework: Completing the report;
22		Presentation - Publication	individual timing
23			Homework: Preparing a presentation
24			individual timing
25			
26	4th phase: Presentation - Publication	Presentation - Publication	Presentation session: -Each group 15 min Presentation -15 min discussion 6 Groups=> 2 x 1.5 h
27			Presentation session: -Each group 15 min Presentation -15 min discussion 6 Groups=> 2 x 1.5 h