	Lecture 6: Understanding in & of the Engineering Sciences. **Topics & themes** • How do we construct a scientific model that explains observed (technologically relevant) phenomena? • What is knowledge in the engineering sciences typically about – How is this different from the natural sciences (physics, chemistry, ..)? • Different types of empirical and scientific knowledge • How are these different types of knowledge constructed? • The role of measurements in constructing scientific knowledge. • The role of parameters and scientific concepts. • Examples **Titles of the video lectures:**	**Readings after video lecture (= preparation for tutorial)**
6.1	Introduction: An engineering perspective at science -- Looking at science as something that is constructed	Ladyman: Ch. 4 (Ch 5 –voluntary) Slides + notes of class 6/7 Assignment 3
6.2	Overview of what we have done so far – Scientific knowledge as *epistemic tool*.	
6.3	Overview of last lecture – What is engineering science?	
6.4	How do we build scientific models?	
6.5	About *what* do the engineering sciences produce knowledge?	
6.6	What do the engineering sciences use knowledge for?	
6.7	Revisiting the question: What are laws of nature? – How laws are constructed in experimental practices.	
6.8	An example of constructing a phenomenological law – introducing new parameters (e.g. a material constant) and scientific concepts.	
6.9	Important conclusions on "What is a phenomenological law": descriptions? / mathematical equations / empirical adequacy / same-conditions – same-effects / operational definitions of parameters / measurement procedure of the parameter.	
6.10	Similarities and differences between (constructing) scientific models and phenomenological laws.	
6.11	The role of measurements in constructing scientific knowledge – how the discovery of a technologically produced phenomenon turns into a measurement apparatus (two examples).	
6.12	The role of parameters in phenomenological laws – inventing parameters as a common strategy to characterize (relatively) stable properties (of specific materials, and also of specific technological systems).	
6.13	What is a scientific concept? – Is it just a name, or a definition. If so, does it consist of a mere description of an observed phenomenon, or is it theoretical as well? And how about scientific concepts of unobservable phenomena?	
6.14	Take home message on the construction of knowledge	