Title: *TET4555 – Power System Operation and Analysis, Specialisation Course*	
Credit value: *7.5 ECTS*	
Mandatory/Optional: *Mandatory*	
Semester: *1*	
Lecturer/s: *Professor Irina Oleinikova (Course Coordinator), and several other lecturers from the Dept. of Electric Power Engineering.*	
University: *Norwegian University of Science and Technology (NTNU)*	
Department: *Department of Electric Power Engineering*	
Rationale: *Specialisation courses are designed to supplement the background and knowledge required by the students to initiate and conduct supervised research in their subsequent thesis work.*	

Objectives:

This specialisation course is given in two independent blocks as follows:

Block 1: Methods and algorithms for power systems: The core of this block consists of several advanced methods/techniques for power system analysis. Students will get hands-on opportunity to further build on their programming skills with respect to select-few applications in advanced power system analysis.

Block 2: Wind power in electric power systems: The objective of this block is to give a thorough introduction to a variety of topics related to the integration of offshore and onshore wind power in electric power systems. Some specific topics covered are as follows:

- *Electrical systems in a wind energy generation system*
- *Control systems in a wind turbine*
- *Wind farm control approaches*
- *Issues related to the grid integration of large-scale wind power plant*
- *Operation of power systems with significant wind power penetration*

Skills: *(according to the list of skills provided)*

Subject skills	More Master Skills						
	L2.1	**L2.2**	**L2.3**	**L2.4**	**L2.5**	**L2.6**	**L2.7**
L3.1. Obtain specialised exposure to select-few topics on the advanced methods and algorithms for power systems	X	X	X				
L3.2. Obtain specialised exposure to select-few topics on wind power in electric power systems	X	X	X				
L3.3. To acquire skills in group work and in working independently, acquire critical thinking through analysis and synthesis, systematically organize information, and create effective assignment/project reports.						X	X

Teaching and learning methods:

The course methodology includes various techniques such as individualised and group learning methods, combining both throughout the whole learning process. Lectures, tutorials, and project are typically used:

1. Lecture format with oral and audiovisual presentations. Also includes guest lectures.
2. Assignments/project work.
3. Individual/group monitoring of the learning process is done through mentoring/guidance by the lecturers.

Assignment/Project tasks will also be based on the usage of ready-made simulation tools and self-created software tools using Matlab/Python/Julia.

Allocation of student time:

A typical estimate is as given below.

	Attendance (classroom)	**Non attendance (lecture preparation, self study…)**
Lectures	56 hours	84 hours in total of self-preparation; this also includes group project work.
Assignments/Project	28 hours	

Assessment:

The Assessment rules might vary from year to year. The students will be notified at the beginning of the semester of such changes. For further details, the student is referred to the course webpage at NTNU.

Sample procedure for assessment of the course:
In Block 1, there are five mandatory individual assignments that require submission and presentation. In Block 2, a major component of assessment is the preparation of a technical paper in the IEEE style and an associated poster. Further, students are required to conduct a relevant mini-project.

Assessment Matrix:

Note that this is a sample example of just one of the several assessment options that could be put in use. The exact assessment scheme will be made available at the semester start.

Subject skills	Assessment method					
	Exam	**Presentation**	**Homework**	**Report**	**Lab Participation**	
L3.1.			100%			
L3.2.			50%	50%		
L3.3.			50%	50%		

Programme:

Depending on the coordination among different teachers involved in the course, the course schedule will vary from year to year; the schedule will be released at the start of the semester. The two blocks may run simultaneously, or consecutively, or with some overlap.

Resources:

Classroom, Blackboard, laptop, projector, audio, computer room.
All the material necessary to follow the course is facilitated by the course instructors during the course, through 'eLS' (e-Learning System) platform (known as 'Blackboard).

Bibliography:

The required lecture material, notes, and supplementary material will be provided through the e-learning platform.

Further comments:

Deviations: Since the teaching and learning processes are adaptive, there may arise minor deviations in the course schedule and content. For all authoritative information, the student is required to visit the NTNU coursepage and the Blackboard coursepage at the start of the semester.