



COURSE SYLLABUS

EG2100 Power System Analysis (6 credits)

HT20

This course deals with basic models and methods that are used in static analysis of electric power systems. These models and methods are fairly general and can be applied to a power system of any scale ranging from a small-scale distribution grid to a national transmission network.

Intended Learning Outcomes (ILOs)

In order to successfully complete this course, the students should be able to:

ILO1. create mathematical models based on which to analyze and perform calculations

- a) under symmetrical conditions,
- b) under unsymmetrical conditions,
- c) for load flow.

ILO2. numerically perform ILO1 by using MATLAB, and present and discuss obtained numerical results.

Prerequisites	Follow up	Language
• SF1624 Algebra and geometry (or equivalent) • SF1625 Calculus in one variable (or equivalent) • SF1626 Calculus in several variables (or equivalent) • SF1519 Numerical methods and basic programming or • SF1546 Numerical methods, basic course or • EL1150 Introductory Matlab course (or equivalent) • EJ1200 Electric power systems (or equivalent)	EG2110 Power System Stability and Control	English

Course structure

The course includes lectures, project work hours, and examination. During the project work hours, the teaching assistants will be available in **the class room** to assist the students with the projects. **Note that teaching assistants will only be available during the project work hours.**

Course staff

Course examiner:	Lecturers:
Mehrdad Ghandhari mehrdad@kth.se phone: 08-790 7758	Mehrdad Ghandhari mehrdad@kth.se phone: 08-790 7758
	Lennart Söder lennart.soder@ee.kth.se phone: 08-790 8906
	Marina Oluic oluic@kth.se

Teaching assistant and course responsible:	Teaching assistants:
Marina Oluic oluic@kth.se	Abolfazl Khodadadi abokho@kth.se
	Umbereen Sayyeda sayyeda@kth.se

Disability

If you have a disability, you may receive support from Funka, KTH's coordinator for students with disabilities, see <https://www.kth.se/en/student/studentliv/funktionsnedsattning>.

Please inform the course coordinator if you have special needs not related to the written exam, and show your certificate from Funka.

- Support measures under code R (i.e. adjustments related to space, time, and physical circumstances) are generally granted by the examiner.
- Support measures under code P (pedagogical measures) may be granted or rejected by the examiner, after you have applied for this in accordance with KTH rules. Normally, support measures under code P will be granted.

Course literature

Lennart Söder & Mehrdad Ghandhari, *"Static Analysis of Power System"*, available in Canvas.

Canvas

Canvas is an electronic communication platform we use in the course where you find course literature, lecture slides, assignments, schedule, etc. Canvas is also the platform where you electronically submit (upload) your reports.

A-number

A unique identification number, called **A-number**, will be given to each student. This **A-number** will be used in the assignments. You receive your **A-number** by sending an email to eg2100@ee.kth.se. Write 'A-number' in the subject of your email, and **your name**, **your personal number** and **your email address** in the body of your message.

The A-numbers will be sent only to students who have been registered for the course.

Assessment

The course assessment consists of

- a written exam (4.5 cr.) with three questions, namely Q1, Q2 and Q3,
- a project (1.5 cr.) with four assignments, namely S1, S2, S3 and LF which are presented in a written report, respectively. The examiner may also ask for an individual oral presentation. A failed oral presentation results in failing the corresponding assignment.

The table below shows mapping of ILOs to the course assessment.

	Assignments	Written exam		
		Q1	Q2	Q3
ILO1 a)		X		
ILO1 b)			X	
ILO1 c)				X
ILO2	X			

Grading criteria

The grades used for assessing the criteria are

- **P/F** for the project,
- **0 p., 1 p., 3 p. and 5 p.** for the written exam.

The following criteria will be used to each assignment.

P	The given instructions for the assignments are fully followed. Correct numerical results are provided, and it is clearly explained how the required results are obtained.
F	If the criteria for the grade P are not achieved.

- *All assignments must be submitted in the current academic year.*
- *To pass the project (1.5 cr.), a grade P must be received for each assignment.*
- *Failed assignments can be revised and resubmitted at the re-exam date.*

For the written exam, the following grading criteria will be applied to each question.

	1 p.	3 p.	5 p.	0 p.
Q1 Q2 Q3	•Solutions demonstrate a sufficient ability to meet ILO1. •Introduced variables and quantities are clearly defined. •Correct answers to some parts of the question.	•Solutions demonstrate the ability to meet ILO1. •Introduced variables and quantities are clearly defined. •Correct answers to the most part of the question.	•Solutions demonstrate the ability to meet ILO1. •Introduced variables and quantities are clearly defined, and the answers are well motivated. •Correct answers to all parts of the question.	If at least 1 p. is not earned

The table below shows the passing grades **A-E** and the grade **F** for the written exam. The points are based on the total earned points from the written exam.

Total earned points	Grade
15	A
11 or 13	B
9	C
7	D
3 or 5	E
If the criteria for passing grades are not achieved.	F

- *To pass the written exam (4.5 cr.), at least 1 p. must be received for each exam question.*
- *FX: If only one exam question has received 0 p., but the given solution has presented a basic understanding of the concepts treated in the question, then an FX supplementary exam will be offered. Once passed, 1 p. will be assigned to the actual question, and the grade will be based on the grades given in the table. No later than 2 weeks after the day on which the exam results are released, the students who have received FX must inform the course coordinator if they will attend the supplementary exam. The course coordinator will decide on the format (oral or written) and the date of the supplementary exam.*

Final grade

In order to successfully complete this course and to earn 6 credits, both the project and the written exam must successfully be completed. The course final grade will be based on the earned grade from the written exam.

Written exam regulations at KTH can be found at

<https://www.kth.se/en/student/kurs/tentamen/tentamen-1.311668>

1. The ordinary written exam is given in January and the re-exam will take place in April.
2. No aids are allowed on the written exam.

Plagiarism

All the submitted reports will be checked for plagiarism, and if the plagiarism of code, texts or figures is found then strict action will be taken against the corresponding student, based on KTH rules. It is of utmost important to know that the rules at KTH related to plagiarism are quite strict.

- *KTH defines plagiarism as “submitting someone else’s work as your own”. Thus, it can be considered as plagiarism if to use—either directly or slightly modified—a text, program code, table or figure that you have not created yourself.*
- *Plagiarism will be considered as a “learning error” if there is no reason to suspect an attempt to deceive; in this case the student will simply fail the assignment. However, any case where there is a suspicion that the plagiarism was intentional will be reported to the President of KTH and may be examined by the disciplinary board. The written assignment is to be written individually and all reports will automatically be checked for plagiarism.*
- *You may not use texts, program codes, tables or figures written by another student as a basis for your own work, and submit a similar or slightly modified solution. This also means that you are not allowed to hand over your solution to another student to use as a basis for the report.*
- *You are allowed to cite and use ideas from the course literature, other textbooks and scientific papers. However, in these cases there must be a clear reference to the source.*
- *It is strongly recommended to read the information on*

<https://www.kth.se/en/student/studentliv/studentratt/disciplinamnden-och-disciplinara-atgarder/disciplinarenden-1.324323>