The University of Jordan
School of Engineering
Electrical Engineering Department
2nd Semester – A.Y. 2020/2021

Course: **Power System Reliability – 0963581 (3 Cr. – Elective Course)**

Instructor: Prof. Daifalleh Dalabeih
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Office Hours: Will be posted soon

Course website: http://elearning.ju.edu.jo/

Catalog description: Introduction to the main electrical power subsystems: generation, transmission and distribution. Basic probability theory and distribution. Network modeling and evaluation of systems. Reliability analysis of generation: generating capacity, techniques, indices, interconnected systems, operating reserve. Reliability analysis of transmission: network configuration and indices. Reliability analysis of composite systems. Reliability analysis of distribution: Radial, parallel and meshed networks.

Prerequisites by course: **EE** **0933482** Power System Analysis (II) (pre-requisite)

Prerequisites by topic: Students are assumed to have a background in the following topics:
- Power system protection.
- Economic operation of power systems.
- Power system stability.

Textbook: **Power Distribution System Reliability: Practical Methods and Applications by Ali Chowdhury and Don Koval, Wiley-IEEE Press, 1st edition, 2009.**

References:
1. Reliability Evaluation of Power System by by R.N. Allan and Billinton, Springer, 1st edition reprint, 2013.
2. Power System Dynamics: Stability and Control by Jan Machowski, Janusz Bialek and Dr Jim Bumby, Wiley, 2nd edition, 2008.
3. Electric Power System Reliability by P.E. William H. Smith, Alphagraphics-Roswell GA, 1st edition, 2018.
4. Electric Power Grid Reliability Evaluation: Models and Methods by Chanan Singh, Panida Jirutitijaroen and Joydeep Mitra, Wiley-IEEE Press, 1st edition, 2018.

5. Reliability and Risk Evaluation of Wind Integrated Power Systems by Roy Billinton, Rajesh Karki and Ajit Kumar Verma (Editors), Springer, 1st edition, 2013.
6. Power Systems Resilience: Modeling, Analysis and Practice by Naser Mahdavi Tabatabaei, Sajad Najafi Ravadanegh and Nicu Bizon (Editors), Springer, 1st edition, 2018.
7. Power System Dynamics and Stability by Peter W. Sauer and M. A. Pai, Stipes Publishing Co, 1st edition, 2007.

Schedule: 16 Weeks, 42 lectures (50 minutes each) plus exams.

Course goals: The overall objective is to provide the student with a firm understanding of power sytem reliability evalution by using deterministic and probabilistic techniques.

Course learning outcomes (CLO) and relation to ABET student outcomes (SO):

Upon successful completion of this course, a student will:		[SO]
1.	Understand the application of basic probability theory and distribution to power systems.	[1]
2.	Be bale to identify the main subsystems of a power system and their constituent components.	[1]
3.	Be able to produce mathematical models for generators, transmission lines and loads.	[1]
4.	Be able to apply techniques for reliability evaluation of individual systems.	[1]
5.	Be able to apply techniques for reliability evaluation of composite systems.	[1, 2, 4]

Course topics:

		Hrs
1.	Main subsystems and their constituent components: generation, transmission and distribution.	5
2.	Basic probability theory and distributions.	4
3.	Network modeling (series and parallel).	5
4.	Reliability definition. Comparison between probabilistic and deterministic techniques.	3
5.	Reliability evaluation of generating systems.	8
6.	Reliability evaluation of transmission systems.	7
7.	Reliability evaluation of composite systems.	3
8.	Reliability evaluation of distribution systems.	7

Ground rules: Attendance is required and highly encouraged. To that end, attendance will be taken every lecture. Eating and drinking are not allowed during class, and cell phones must be set to silent mode. All exams (including the final exam) should be considered cumulative. Exams are closed book. No scratch paper is allowed. You will be held responsible for all reading material assigned, even if it is not explicitly covered in lecture notes.

Assessment & grading policy:				
	Assignments	0%	Quizzes	0%
	First Exam	30%	Projects	0%
	Midterm Exam	30%	Lab Reports	0%
	Final Exam	40%	Presentation	0%
			Total	**100%**

Last Revised: March 2021