EE 4000: Power System Reliability

Lecture 1

Amin Kargarian

Contact Information

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Introduce Yourself

- Name
- Department
- Program
- Why are you interested in this course?

Today‘s Lecture

- Course Overview
  - Lecture content
  - Exams
  - Grading
  - Important dates
  - Rules and policies
  - Other required information

Course Overview

- Lecture: Monday & Wednesday & Friday, 9:30am – 10:20am, Tureaud Hall 228

- Lecture Material: Slides and textbook
  - Lectures will be based on notes and handouts provided by the instructor. Therefore, attendance at lectures and your attention is very important.

Course Overview

- Textbook:
  - **Roy Billinton, and Ronald Allan, "Reliability Evaluation of Engineering Systems" Springer. (this is the main textbook for this course)**
  - Roy Billinton, and Ronald Allan, "Reliability Evaluation of Power Systems" Springer.
  - Ali Chowdhury, and Dan Koval, "Power Distribution System Reliability" Wiley & Sons, 2009.

Pre-Requisites

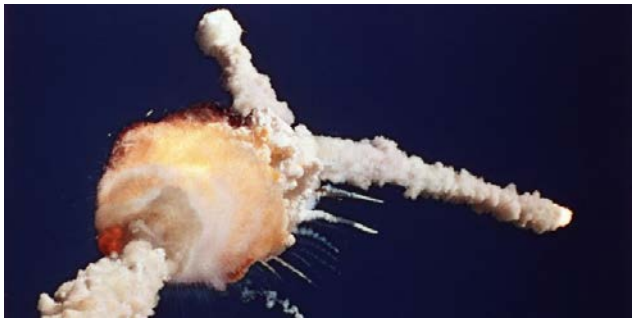
- Any course related to Statistics or Probability Analysis

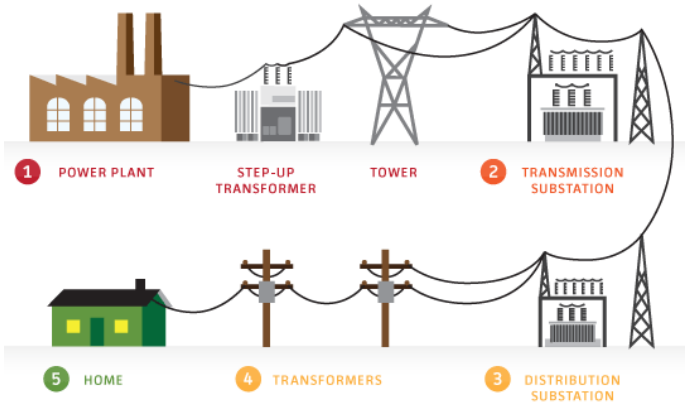
Lecture Content

Overall subject: Basic principles of reliability evaluation of engineering systems with main focus on power systems

- Introduction to reliability
- Basic probability theory
- Application of the binomial distribution
- Network modelling and evaluation of simple systems
- Network modelling and evaluation of complex systems
- Probability distributions in reliability evaluation
- System reliability evaluation using probability distributions
- Distribution systems reliability—basic techniques and radial networks
- Plant and station availability

Lecture Content





Course Calendar

- Starting date: January 11, 2017
- Ending date: April 28, 2017
- Midterm exam: Monday, March 6, 2016

Course Calendar

Session	Topic
2-3	Introduction to reliability
4-6	Basic probability theory
7-9	Application of the binomial distribution
10-13	Network modelling and evaluation of simple systems
14-19	Network modelling and evaluation of complex systems
20-22	Probability distributions in reliability evaluation
23-26	System reliability evaluation using probability distributions
27-34	Distribution systems reliability—basic techniques and radial networks
34-36	Plant and station availability

Tests and Grading Criteria

Undergraduate	Graduate
Homework (25%) Quizzes (10%) Up to 6 quizzes over the semester Classroom Participation (5%) Midterm Exam (20%) & Final Exam (30%): - Similar to homework questions - Midterm during the semester, final exam (cumulative) in final exam week Project (10%): - Simulation with a software - Research project	Homework (25%) Quizzes (10%) Up to 6 quizzes over the semester Classroom Participation (5%) Midterm Exam (20%) & Final Exam (20%): - Similar to homework questions - Midterm during the semester, final exam (cumulative) in final exam week Project (20%): - Simulation with a software or - Research project

Tests and Grading Criteria

- $97 \leq p \leq 100$ grade A+
- $93 \leq p < 97$ grade A
- $90 \leq p < 93$ grade A-
- $87 \leq p < 90$ grade B+
- $83 \leq p < 87$ grade B
- $80 \leq p < 83$ grade B-
- $77 \leq p < 80$ grade C+
- $73 \leq p < 77$ grade C
- $70 \leq p < 73$ grade C-
- $67 \leq p < 70$ grade D+
- $63 \leq p < 67$ grade D
- $60 \leq p < 63$ grade D-
- $p < 60$ grade F

- Grades may be affected by curving at the instructor's discretion.

Class Attendance and Bonus

- **Class Attendance:** Your attendance grade will be calculated using the following formula

$$\text{Attendance Grade} = \frac{\text{N} + 3 - (\text{Number of Unexcused absences})}{\text{N}} \times 100$$

where *N* represents the number of class meetings in the semester.

The attendance grade has a minimum of 0% and a maximum of 100%.

- **Bonus**: if you participate in classroom activities, you will receive bonus points which will be added to the final grades.

Course Objectives and Outcomes

- The course will provide students with a fundamental knowledge on the reliability evaluation of engineering systems with emphasis on electric power systems. Models and methodologies for power systems reliability assessment will be studied. Application of probability theory for design and management of power generation, transmission and distribution systems will be presented.

- Upon completion of this course, students should be able to
  - Assess the reliability of engineering systems
  - Apply concepts of the probability theory for power systems reliability evaluation
  - Do basic studies of power generation and transmission reliability
  - Analyze reliability of distribution electricity networks
  - Design (and expand) a system (which fulfill a specific task, e.g., a radial power distribution network) with respect to desired reliability indices

Deadlines

- Each assignment/project milestone has a clear deadline. However,
  - each student gets two jokers which can be used to extend a deadline by **two days**
  - if at the end of the semester a student still has one of the jokers, he/she gets 2 additional percent per joker for the grade of the final exam
  - once the jokers are gone, if assignments are turned in late, 50% will be deducted from the assignment grade
  - assignments handed later than one week of the deadline are graded with 0 points
  - if there is a special situation which makes it difficult for you to hand in your work on time even with jokers, please come and talk to me

How to turn in homework

- In class on due date
- As an email attachment to kargarian@lsu.edu (put EE7400 in subject line)
- Sliding under the door of my office (ERAD 333)

Policies

- **Plagiarism:** Students are responsible for completing and submitting their own course work and preparing their own modules. All work submitted in the course modules must be the student's own work unless outside work is appropriate to the assignment; all outside material must be properly acknowledged. It is also unacceptable to copy directly from your textbook or to use published answer keys or the teacher's edition of a textbook.

- **Collaboration:** Unauthorized collaboration constitutes plagiarism. Collaborative efforts that extend beyond the limits approved by the instructor are violations of the academic integrity policy. Students who study together are expected to prepare and write their own individual work for submission and grading.

Policies

- **Disabilities :** Louisiana State University is committed to providing reasonable accommodations for all persons with disabilities. The syllabus is available in alternate formats upon request.

  If you have a disability that may have some impact on your work in this class and for which you may require accommodations, please see a staff member in Disability Services so that such accommodations can be considered. Students that receive accommodation letters, please meet with me to discuss the provisions of those accommodations as soon as possible.

- **Expectations:** LSU's general policy states that for each credit hour, you (the student) should plan to spend at least two hours working on course related activities outside of class. Since this course is for three credit hours, you should expect to spend a minimum of six hours outside of class each week working on assignments for this course. For more information see: http://catalog.lsu.edu/content.php?catoid=12&navoid=822