

**Time, Place:** 4:10 p.m. to 5:30 p.m., TuTh; ERC C-103

**Instructor:** J. Mitra

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Office hours: 3:00–4:00 p.m., TuTh; ERC C-105, or by appointment

**Course Text:** C. Singh, P. Jirutitijaroen and J. Mitra, *Electric Power Grid Reliability Evaluation: Models and Methods*. Wiley-IEEE Press, Hoboken, NJ: 2019. ISBN: 9781119486275.

**Other References:** R. Ramakumar, *Engineering Reliability: Fundamentals and Applications*. Prentice Hall.

J. Endrenyi, *Reliability Modeling in Electric Power Systems*. Wiley.

*IEEE Recommended Practice for Design of Reliable Industrial and Commercial Power Systems*. IEEE.

IEEE Tutorial on *Electric Delivery System Reliability Evaluation*. IEEE.

**Course Outline:** *Part 1:* General reliability modeling and evaluation: introduction to probability and stochastic processes; system modeling for reliability; methods of reliability assessment: state space, cut-set and tie-set analysis, decomposition; Monte Carlo simulation: non-sequential and sequential; synchronous and asynchronous timing.

*Part 2:* Reliability modeling and analysis of electric power systems: bulk power systems, distribution systems, and industrial systems. Component modeling: generator modeling, transmission line modeling, load modeling; capacity outage table; probability and frequency distributions; unit addition algorithm; load modeling algorithm. Generation adequacy assessment using discrete convolution: discrete convolution of generation and load models; generation reserve model; determination of LOLP, LOLF, EUE. Reliability of multi-node systems: methods for multi-area and composite system analysis; contingency enumeration/ranking; equivalent assistance; stochastic/probabilistic load flow; state space decomposition; Monte Carlo simulation, sequential and non-sequential. Analysis of risk in power systems; understanding of causes and remedial measures.

**Evaluation Criteria:** The course grade will be determined as follows:

2 tests, 25% each: 50%

2 projects, 25% each: 50%

Grading scale: 4.0: 93–100%; 3.5: 85–92%; 3.0: 77–84%; 2.5: 69–76%; 2.0: 61–68%; 1.5: 53–60%; 1.0: 45–52%; 0: below 45%.

## Other Information

1. **Academic Honesty:** The [Spartan Code of Honor](#) states, "As a Spartan, I will strive to uphold values of the **highest ethical standard**. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that **honor is worth more than grades**. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do." In addition, Article 2.III.B.2 of the [Student Rights and Responsibilities \(SRR\)](#) states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." The (insert name of unit offering course) adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See [Spartan Life: Student Handbook and Resource Guide](#) and/or the MSU Web site: [www.msu.edu](http://www.msu.edu).)

Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, lab work, quizzes, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the [www.allmsu.com](http://www.allmsu.com) Web site to complete any course work in this course. Students who violate MSU academic integrity rules may receive a penalty grade, including a failing grade on the assignment or in the course. Contact your instructor if you are unsure about the appropriateness of your course work. (See also the [Academic Integrity](#) webpage.)

2. **Accommodations for Students with Disabilities:** (from the [Resource Center for Persons with Disabilities \(RCPD\)](#)): Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at [rcpd.msu.edu](http://rcpd.msu.edu). Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.
3. **Drops and Adds:** The last day to add this course is Wednesday, September 4, 2019. The last day to drop this course with full refund and no grade reported is Monday, September 23. The last day to drop this course with no refund and no grade reported is Wednesday, October 16. You should immediately make a copy of your amended schedule to verify you have added or dropped this course.
4. **Commercialized Lecture Notes:** Commercialization of lecture notes and university-provided course materials is not permitted in this course.
5. **Attendance:** Students whose names do not appear on the official class list for this course may not attend this class. Students who fail to attend the first four class sessions or class by the fifth day of the semester, whichever occurs first, may be dropped from the course.
6. **Disruptive Behavior:** Article 2.III.B.4 of the [Student Rights and Responsibilities \(SRR\)](#) for students at Michigan State University states: "The student's behavior in the classroom shall be conducive to the teaching and learning process for all concerned." Article 2.III.B.10 of the [SRR](#) states that "The student and the faculty share the responsibility for maintaining professional relationships based on mutual trust and civility." [General Student Regulation 5.02](#) states: "No student shall ... interfere with the functions and services of the University (for example, but not limited to, classes ...) such that the function or service is obstructed or disrupted. Students whose conduct adversely affects the learning environment in this classroom may be subject to disciplinary action."