

COURSE SYLLABUS

EE 340: Introduction to Electrical Power Engineering

Instructor: Dr. Y. Baghzouz

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Office Hours: Monday and Wednesday 1:00-2:30, 4:00-5:00, and Tuesday 12:00-1:00

Required Book: S.J. Chapman, *Electric Machinery and Power System Fundamentals*, McGraw-Hill, ISBN 0-07-229135-4

Other Recommended Books:

1. Electric Machines and Power Systems, Del Toro, Prentice Hall, 1985.
2. Electric Machinery, A.E. Fitzgerald, C. Kingsley, Jr., and S.D. Umans, McGraw-Hill, 1990.
3. Electromechanical Energy Devices and Power Systems, Z.A. Yamayee and L.L. Bala, John Wiley & Sons, 1994.
4. Electric Energy Conversion and Transmission, S.A. Nasar, Macmillan Publishing Co., 1985
5. Power System Analysis, C.A. Gross, John Wiley, 1990
6. Power System Analysis and Design, J.D. Glover and M.S. Sarma, Thomson Learning, 2002.

Pre- and Co-requisites:

Prerequisites: EE 221

Course Objectives:

- Calculate various powers and correct the power factor in 1-phase and 3-phase power circuits,
- Derive the efficiency, voltage regulation, electrical parameters, and loading on power transformers,
- Synchronous generator electrical characteristics including synchronization and control of power,
- The electromechanical characteristics of 3-phase induction motors.
- Types of power lines and how to determine their electrical parameters, and voltage regulation and efficiency under load, and loading limits
- Learn basic techniques for power flow studies
- Calculate symmetrical fault currents.
- Solve basic economic dispatching of electrical generators
- Utilize software to conduct power flow and fault calculations in complex power systems.

Course Outcomes:

Students should be able to

- Calculate real, reactive and apparent power, and power factor of given electrical loads, and determine appropriate capacitor size for desired power factor correction,
- Analyze three-phase circuits, and derive balancing and compensator elements for unbalanced loads.
- Determine the circuit parameters of power transformers, calculate their efficiency and voltage drop under various loads
- Determine the circuit parameters of transmission lines, and means of controlling real and reactive power flow as well as line compensation and limitations.
- Determine the equivalent circuit parameters of synchronous machines, synchronize these machines to a power system, and control the active and reactive power generation.
- Have an understanding of the workings of three-phase induction motors in terms of equivalent circuit parameters and torque-speed curves.
- Derive the Y-bus matrix and power flow equations of a given network and perform such a study using a software package.
- Derive the short-circuit equations of a given network and perform such a study using a software package.
- Solve basic economic dispatch problems.

Computer Usage:

PowerWorld

Tests:

Midterm	Covers first half of course material	30 Pts
Homework	Most require use of computer simulation tool	20 Pts
Quizzes	Nearly every 10 days	30 Pts
Final	Covers all course material	40 Pts
Total		120 Points

Grading:

$A \geq 100 > B \geq 80 > C \geq 70 > D \geq 50 > F$

Notes:

- Some homework problems will be assigned but not collected. Everyone is highly encouraged to do the assigned homework problems as some of the test problems will be similar to these.
- There will be no make-up tests or quizzes.
- There will be no extra credit work for individuals.
- Class attendance and participation is highly encouraged.

Academic Misconduct – Academic integrity is a legitimate concern for every member of the

campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

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UNLV complies with the provisions set forth in Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. The DRC is located in the Student Services Complex (SSC-A), Room 143, phone (702) 895-0866, fax (702) 895-0651. For additional information, please visit: <http://drc.unlv.edu/>.

Religious Holidays Policy – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor no later than the first two weeks of classes of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. This policy shall not apply in the event that administering the test or examination at an alternate time would impose an undue hardship on the instructor or the university which could have been avoided. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=4&navoid=164>.

Tutoring – The Academic Success Center (ASC) provides tutoring and academic assistance for all UNLV students taking UNLV courses. Students are encouraged to stop by the ASC to learn more about subjects offered, tutoring times and other academic resources. The ASC is located across from the Student Services Complex, #22 on the current UNLV map. Students may learn more about tutoring services by calling (702) 895-3177 or visiting the tutoring web site at: <http://academicsuccess.unlv.edu/tutoring/>.

UNLV Writing Center – One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are

requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>

Rebelmail – By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu.