ELEG 5503
Design of Advanced Power Distribution Systems

Instructor: Dr. Juan Carlos Balda
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Office Hours: MWF 8:00am-10:00am

Course Description
Design considerations of electric power distribution systems, including distribution transformer usage, distribution system protection implementation, primary and secondary networks design, applications of advanced equipment based on power electronics, and use of capacitors and voltage regulation. Students cannot receive credit for both 4503 and 5503.

Required Prerequisite Knowledge
ELEG 3304

Required Materials
Textbook: ELECTRIC POWER DISTRIBUTION SYSTEM ENGINEERING, Turan Gonen, CRC Press
Instructor PowerPoint slides
Additional references: FLEXIBLE AC TRANSMISSION SYSTEMS, Zhang, Rehtanz and Pal. This textbook is available as a NET BOOK through the UA Library site using INFOLINKS.

Course Objectives
The main goal of this course is to provide the student with the required background for designing electric power distribution systems. The first topic on “Smart Grid – Advanced Power Electronic Controllers in Distribution Systems” is part of this course to provide a basic background on various pieces of equipment for distribution systems based on power electronics. Each topic starts with its learning objectives.

Overview of Class Structure
The material covered in this online course has been divided into the following main seven topics:

1. Smart Grid - Advanced Power Electronic Controllers in Distribution Systems (0.5 week)
2. Chapter 3: Application of Distribution Transformers (2 weeks)
3. Chapter 4: Design of Sub-transmission Lines and Distribution Substations (1 week)
4. Chapter 5: Design Considerations of Primary Systems (0.5 week)
5. Chapter 10: Distribution System Protection (2 weeks)
6. Chapter 9: Distribution System Voltage Regulation (1 week)
7. Chapter 8: Applications of Capacitors to Distribution Systems (1 week)
The learning will consist of video about the material of a specific topic complemented with homework assignments. The student understanding of a particular topic will be done through four tests as explained in the next section.

**Grading Policy**
The student knowledge will be evaluated as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>Tests</td>
<td>75%</td>
</tr>
<tr>
<td>Homework Assignments</td>
<td>25%</td>
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</tbody>
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The first test covers the topics on Smart Grid and Chapter 3, the second test Chapters 4 and 5, the third test covers Chapter 10, and finally, the fourth test covers Chapters 9 and 8.

The grading system is the following:

A ≥ 90, 90 > B ≥ 80; 80 > C ≥ 70; 70 > D ≥ 50

Cutting a test will result in a zero grade; i.e., THERE IS NO MAKE UP TEST UNDER ANY CIRCUMSTANCE. A formula sheet with only numbered equations from the textbook is allowed in each test. Drawings, equivalent circuits, solved problems ARE NOT ALLOWED on the formula sheet; failure to satisfy this will be considered academic dishonesty. Please, refer to [www.ieee.org/about/whatis/code.html](http://www.ieee.org/about/whatis/code.html) for the IEEE Code of Ethics.

**Late Submission Policy**
No late submissions are allowed unless that arranged beforehand.

**Institution and Course Policies**
The University of Arkansas provides a number of academic support services and student support services. Students are encourage to contact Dr. Balda via email.

**Accessibility Policy**
The University of Arkansas Academic Policy Series 1520.10 requires that students with disabilities are provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact me privately at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through the Center for Educational Access (contact 479.575.3104 or visit [cea.uark.edu](http://cea.uark.edu) for more information on registration procedures).

**Academic Honesty**
As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail. Each University of Arkansas student is required to be familiar with and abide by the University’s ‘Academic Integrity Policy’ at [honesty.uark.edu](http://honesty.uark.edu). Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.
Communication Policy
It is important that all participants in online courses be aware of proper online behavior and respect each other. Use appropriate language for an educational environment:
- Use complete sentences
- Use proper spelling and grammar
- Avoid slang and uncommon abbreviations
- Do not use obscene or threatening language
Remember that the University values diversity and encourages discourse. Be respectful of differences while engaging in online discussions.

Technical Competencies
This course will be conducted through the Blackboard system, and you will be required to meet basic computer competencies for success in an online course:
- Have a computer and a stable Internet connection
- Understand of basic computer usage (creating folders/directories, switching between programs, formatting and backing up media, accessing the Internet)
- Able to use a word processing program such as Microsoft Word to create, edit, save, and retrieve documents. You can find tutorials in a variety of locations, including the Microsoft Training Page.
- Must be able to use a Web browser to open Web pages, open PDF files, manage a list of Web pages (bookmarks/favorites), and search the Internet
- Must be able to use an e-mail program to send, receive, store, and retrieve messages
- Must be able to download and install programs (and/or plugins, widgets, etc.) from the Internet

Computer Access/Technical Difficulties Policy:
This course is an online course and you are expected to ensure that you can access all course material on a regular basis either from the university or from home. Additionally, certain technical abilities will be required, such as installing necessary plug-ins, upload files.
If you have a problem with a personal computer or interrupted network connection, know that you are still responsible for submitting your work on time.
If there is a problem with the Blackboard system, notify your instructor and Blackboard support 479.575.6804 or email bbhelp@uark.edu.

If you need general computer help, IT Services has a Web site where you can search for and request help: http://askit.uark.edu or call their Help Desk at 479.575.2905

If you have questions specific to Blackboard, you can search for and request help at: http://bbsupport.uark.edu/help/ or call 479.575.6804 (business hours and some evenings – consult http://bbsupport.uark.edu for evening hours.)