COURSE TITLE: ENGR 203 Electrical Fundamentals: Signals/Controls

CREDITS: 4 **CRN:** 40096

INSTRUCTOR: Brian Reed, Ph.D. **EMAIL:** reedb@linnbenton.edu (best method of contact)

OFFICE: IA-204 **PHONE:** 541-917-4622

CLASS MEETING TIMES:
This Spring term the ENGR 203 course is being offered as **'hybrid'**, with the following schedule:

- **Monday** and **Wednesday**: Recorded lecture video / activities for you to work on based on your own schedule.
- **Thursday**: In-person lab meeting in IA-215 from 3:00-4:50 PM
- **Friday:** In-person class meeting in IA-215 from 3:00-4:50 PM

STUDENT HOURS / DROP-IN HELP / ADVISING:
Please see my schedule for Drop-in hours and Student Hours by Appointment:
Brian Reed Office Schedule Spring 2022

INSTRUCTOR WEBSITE:
Hopefully updated soon!

Course Description:
Covers transient circuit analysis for RL, RC, and RLC circuits. Introduces the Laplace Transform and its use in circuit analysis, the transfer function, Bode diagrams and two port networks.

Prerequisite(s):

Prerequisite: ENGR 202 Electrical Fundamentals: AC Circuits with a grade of C or better.

Workload Expectation:
Students earning "As" or "Bs" in the course typically spend 10-12 hours per week on this class. This includes time spent in lecture and lab, as well as reading from the textbook, practicing problems, and completing the homework sets.
To make the best use of your time and get the most out of the class, practice a little each day, be prepared for lecture by reading through the text ahead of time, work with your classmates on the homework assignments, and ask questions in class or during student hours.

Course Outcomes:
Upon successful completion of this course, students will be able to:

1. Apply the Laplace transform to analyze the transient behavior of electrical circuits in response to unit-step and unit-impulse inputs.

2. Apply the principles of superposition, transfer functions and convolution to analyze filter circuits.
3. Obtain Bode diagrams for higher order filter circuits with both simple and complex poles and zeros.
4. State the concept of two-port networks and their interconnections and demonstrate the derivation of impedance, admittance, voltage, and current gain parameters.
5. Use the Fourier series to represent non-sinusoidal functions in terms of multiple sine waves.
6. Use simulation tools, including SPICE, to compute the performance of complex passive networks.

Required Text:
Alexander, Charles. K., Fundamentals of Electric Circuits, (4^{th}, 5^{th}, 6^{th} , or 7^{th} Edition), McGraw-Hill.
Note: Copies of the text are on reserve in the library and can be checked out for two hours at a time.

Additional Optional Text:
The following is an OER (Free!) textbook which provides some extra practice and a different perspective on the material we are covering. It is not a substitute for the required text, but may be useful.

Ulaby, F., Maharbiz, M., and Furse, C., Circuit Analysis and Design, Univ. of Michigan Press.
You can download it here: http://cad.eecs.umich.edu/

Course Topics:

Chapter 7:	First-Order Circuits
Chapter 8:	Second-Order Circuits
Chapter 15:	Laplace Transform
Chapter 16:	Application of Laplace Transform
Chapter 17:	Fourier Series
Chapter 18:	Fourier Transform

For a detailed schedule of the class see my instructor website or click here.

Exams:

Friday, April 22^{nd}	**Midterm I**: Subject coverage to be announced in class
Friday, May 13^{th}	**Midterm II**: Subject coverage to be announced in class
TBD	**Final Exam**: Comprehensive, weighted towards week 7-10.

For exams you may bring a handwritten note card for your own use, details will be provided in class. I will provide a table on common integrals when relevant.

Homework:

- Doing the homework throughout the week as material is covered will help you retain information and build your skills more efficiently than doing it all at once just before the due date.
- Homework problem sets are linked on the course schedule page and will be turned in via email by 11:59 PM on the due date.
- Homework should be emailed to me as PDFs (there are instructions on how to use your phone to scan in a pdf using Google Drive on the course page) by 11:59 PM on the due date (see class schedule).
- Each problem will be checked for a reasonable attempt at solving, and be graded not only on the solution, but the effective communication of the solution process.
- Homework will be accepted 1 day late for up to 75% credit and will not be accepted after the solutions are posted.

Laboratory:

The ENGR 203 lab being offered this term is being held face to face on Thursdays from 3 – 4:50 PM.

- Links to the experimental procedures can be found on the course schedule and should be reviewed carefully before coming to lab.
- Each lab report will be graded on conformance with specific criteria, which will be outlined in the lab assignment sheet and discussed during the relevant lab.
- Lab reports should be submitted through email as a single PDF, Microsoft Word, or Google Document. Reports are due by 11:59 PM on the date indicated on the course schedule page.
- *Late lab reports will lose a half a point per day for each day the report is late up.* Reports more than two weeks late may not be accepted for credit.

In Laboratory it is expected that you will work as a team to gather data and discuss your findings, but that unless specified as a group report, each group member will prepare their own reports, create their own documents (including figures/schematics/graphs), perform their own calculations, and discuss their conclusions in their own words.

Term Project:

Usually the term project is a group-based activity providing hands-on design experience with electronics associated with signal manipulation. Transitioning back to in person labs from the online environment of the last two years, I'm working to update the project to include more hands-on elements. More details will be discussed in class.

Grading:

Homework	9 x 10	90 pts
Labs	3 x 20	60 pts.
Term Project		60 pts.
Midterms	2 x 50	100 pts
Final Exam		100 pts
Total		410 pts.

90-100% A, 80-89.9% B, 70-79.9% C, 60-69.9% D, < 59.9% F

Expectations:

I expect that my students will be involved in the class even though some of it is being delivered remotely. This includes **dedicating time to class material regularly throughout the week** and staying current with the topics being covered.

Be prepared, having done the reading ahead of time, asking questions in class, etc. Because we are still partially 'asynchronous' it will be challenging to make sure everyone is on the same page and working through things at the same pace. I won't be able to get immediate feedback from you, and it will be harder for me to sense when people are getting stuck.

I ask that you be proactive in reaching out for help when you need it and that you work with this material every day, so it doesn't pile up on you. This material is challenging, and it takes some time to digest. I'll expect you to read your textbook and work problems as well as follow along with the lectures. You cannot learn this effectively just by watching videos or looking at examples. Doing this remotely will be a challenge, but we can make this work!

How to be successful in this class:

- Even though this term classes are mostly being delivered remotely, make a school schedule and stick to it!
- Be prepared for class by reading the assigned materials promptly when asked. Class lectures will be richer for you when you have background information about the subject.
- Review the syllabus and learn policies and procedures for this class. Understand your rights and responsibilities as a student and as a class member.
- When confused, challenged, frustrated or having an "aha" moment, contact the instructor during their 'virtual' student hours or via email.
- Don't hesitate to ask questions, whether during 'virtual' office hours or through email.
- Be engaged! You will get out of this class what you put into it. This may be a challenge with the hybrid format adopted this term. Your instructors are here to help you succeed, stay connected with them!

Course Evaluations:

Student feedback is important to improve this course and to help the instructor know how to adjust teaching methods. Your feedback is taken seriously and does influence future versions of the course. The Student Evaluations of Teaching (SETs) are anonymous, and links to the evaluations will be

emailed to your student email account after the 5th week of the term. I encourage you to take this opportunity to provide constructive feedback on the class. Thank you in advance for your input!

Academic Integrity:
It is understandable that you will discuss your homework and other assignments with your classmates and that is fine, but you are expected to write up your own results, whether it is on paper or using a spreadsheet or other program.

The use of online platforms such as Chegg for any exams or quizzes is considered cheating and will be taken seriously. I assume that you are ethical and honest. However, if there is an incident of academic dishonesty, which includes providing your work to another student inappropriately, you will receive a score of zero for that assignment/test and the incident will be reported to the college administration for possible further disciplinary action. If there is a second offense or if it is determined that the misconduct extends to multiple assignments, you may receive a grade of F for the course and the incident will be reported to the college administration with a recommendation for disciplinary action**. If you aren't sure if something is allowed or not in your classes, just ask your instructor.**

Drop/Withdraw Policy: If you are withdrawing from the class you must file a Schedule Change Form with Registration or use WebRunner. If you formally drop the class **by Monday of the second week of the term**, you will receive a tuition refund. If you withdraw after the Monday of the second week of instruction through the seventh week a **'W'** will show up on your transcript. No withdrawals are allowed after the end of the seventh week. An instructor may not assign a "W" grade.

If you received financial aid or veteran's benefits, PLEASE talk with associates at the appropriate office to determine what effects on eligibility dropping a course will have. Don't jeopardize your eligibility!! You can contact the Financial Aid Office by calling (541) 917-4850 or by visiting the Financial Aid Office in Takena Hall.

If you stop attending the course without formally withdrawing you will continue to accumulate grades (zeroes for all assignments not turned in) and will receive the grade assigned by the instructor. You will also be held accountable for all charges on your account.

Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the Roadrunner Resource Center for support (resources@linnbenton.edu , or visit us on the web www.linnbenton.edu/RRC under Student Support for Current Students). Our office can help students get connected to resources to help. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to provide any resources that they may possess.

Nondiscrimination and Non-Harassment: Linn-Benton Community College is committed to providing an atmosphere that encourages individuals to realize their potential. We embrace diversity and inclusion of all persons. The college prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, marital status, disability, veteran status, or age in any area, activity or operation of the college. In addition, the college complies with related federal, state, and local laws (Civil Rights, Disability & Rehabilitation Acts, Veterans Acts).

LBCC is committed to providing equal opportunity in all of its programs, policies, procedures, and practices, and the college shall promote equal opportunity and treatment through application of this

policy and other college efforts designed for that purpose. For further information see Administrative Rule No. 1015-01 at http://po.linnbenton.edu/BPsandARs/

Center for Accessibility Resources:

You should meet with your instructor during the first week of class if

- You have a documented disability and need accommodations,
- Your instructor needs to know medical information about you, or
- You need special arrangements in the event of an emergency.

If you believe you may need accommodation services, please contact the Center for Accessibility Resources (541) 917-4789. If you have documented your disability, remember that you must make your request for accommodations through the Center for Accessibility Resources Online Services web page every term in order to receive accommodations.

Veterans and active duty military personnel with special circumstances are welcome and encouraged to communicate these, in advance if possible, to the instructor.

Students Rights, Responsibilities, and Conduct Policy:

LBCC students have rights: the right to free speech, the right to assemble, the right of a free press, etc. LBCC students also have responsibilities to their community: the responsibility to participate and engage in class, the responsibility to advocate for their needs (ask for help), the responsibility to support a respectful teaching and learning environment, the responsibility to treat all persons with respect, the responsibility to be truthful and honest in all work and communications, and the responsibility to follow staff directions, local, state, and federal laws. Rights and responsibilities balance together to create the best learning environment. For example, while you have free speech in the café or courtyard, in class the instructor decides whose turn it is to talk and what the topics for conversation will be. Students are free to believe what they believe, but instructors may require students to learn and recite concepts, principles, or theories for a class even if the student does not believe those concepts. You play a role in creating a positive community at LBCC. Please review your rights and responsibilities at this link: www.linnbenton.edu/go/studentrights.

If you believe a student is violating your rights, ask to be treated with respect. If that does not resolve the situation, report to Associate Dean Dr. Lynne Cox, Takena 107. If you believe a faculty member or LBCC employee is violating your rights, please report to Human Resources, Scott Rolen, CC-108.

In cases of immediate danger, report to Public Safety, Red Cedar Hall (RCH-119), 541-926-6855. (We encourage all students to enter this Public Safety phone number into their cell phone.)

Personal Empowerment Through Self-Awareness:

LBCC is launching a new training called “Personal Empowerment Through Self-Awareness.” This training is an online video series on dating, sexual consent, and on preventing sexual violence or partner violence. Every student has a right and healthy learning climate. Every new student is required by federal law to complete this training to learn how to safeguard yourself and others from sexual assault. We ask students to watch for email notification and to ensure that they complete this new training. (For example, do you know the number one date rape drug? It’s not what you think! Check out the training.) This online series reviews federal and Oregon law and is designed for your safety. The training will also direct you how to report dating, sexual, or partner violence to LBCC officials.

Note: The instructor reserves the right to make changes to the course syllabus and schedule.