

**COURSE TITLE:** ENGR 203 Electrical Fundamentals: Signals/Controls

**CREDITS:** 4                    **CRN:** 40096

**INSTRUCTOR:** Brian Reed, Ph.D.

**EMAIL:** [reedb@linnbenton.edu](mailto:reedb@linnbenton.edu) (best method of contact)

**OFFICE:** IA-204 (not used this term)                    **PHONE:** 541-917-4622 (office line checked once weekly)

**VIRTUAL OFFICE HOURS (TENTATIVE):**

Tuesdays 10:00-11:00 AM    Thursdays 11:00-12:00 PM    Fridays 12:00-1:00 PM

\*And by appointment though ZOOM (contact via email to schedule)

**INSTRUCTOR WEBSITE:**

Go to [www.linnbenton.edu](http://www.linnbenton.edu). Click QuickLinks, click Instructor Website, click [Reed, Brian](#).

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**Course Description:**

Covers transient circuit analysis-RL, RC, RLC. 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.

**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<sup>th</sup>, 5<sup>th</sup>, or 6<sup>th</sup> 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.

**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:**

Due to the need to move this course to an online format for Spring term, all exams will be considered open book and open notes. You may use all materials provided for the course through the ENGR 203 course page, but I ask that you do not use internet resources or consult with your classmates. Exam dates and coverage will be posted in advance on the course schedule page as the term progresses.

**Homework:**

Homework problem sets are linked on the course schedule and will be handed in, in class or submitted via email, on the day they are due. Late homework will not be accepted unless prior arrangements have been made with the instructor. Each problem will be checked for a reasonable attempt at solving.

Solutions to the homework problems will be posted on the class schedule shortly after homework is due. Homework received after the solutions are posted will not be taken for credit.

**Laboratory:**

Because this course will be delivered remotely, the labs this term will be simulation based. They will make use of LTspice to model circuits, spreadsheets to manipulate data, and should be typed using Word or a similar program. Lab reports will be done individually.

Each lab report will be graded on conformance with specific criteria, which will be reviewed during the general lab intro and highlighted in the video introduction to each lab. Lab reports will be submitted for grading via email, by the due dates indicated on the course schedule. Late lab reports will lose a half a point per day for each day the report is late.

Links to the experimental procedures can be found on the course schedule, and should be reviewed carefully before starting the lab.

### **Term Project:**

Usually the term project is a group-based activity providing hands-on design experience with electronics associated with signal manipulation. Recreating this experience in an on-line environment will be challenging, but I feel it is an important part of learning this material. I am working to develop an alternative to the term project, and will be providing details as we move through the term.

### **Grading:**

Section Exams	4 x 35	140 pts.
Labs	3 x 20	60 pts.
Term Project		60 pts.
Homework	9 x 10	90 pts
Total		350 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 class. This would normally mean being present and prepared, having done the reading ahead of time, asking questions in class, etc. Now that we are moving to an asynchronous, on-line format 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 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' office hours or via email.
- Don't hesitate to ask questions, whether during 'virtual' office hours or through email. Your instructors are here to help you succeed, stay connected with them!
- Be engaged! You will get out of this class what you put into it. This will be a challenge with the online format adopted this term.

### **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 impact future versions of the course. The Student Evaluations of Teaching (SETs) are anonymous, and links to the form will be emailed to you after the 7th week of the class. The process takes approximately 10 minutes and I encourage you 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. I assume that you are ethical and honest. However, if there is an incident of academic dishonesty (cheating), which includes sharing computer files, 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, you will receive a grade of F for the course and the incident will be reported to the college administration with a recommendation for disciplinary action.

**For laboratory reports** 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.

**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.

**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](http://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.