

COURSE TITLE: ENGR 202 Electrical Fundamentals II: AC Circuits

CREDITS: 4 **CRN:** 30126 or 33984 (in-person labs) and 30703 (virtual labs)

LECTURE: 3 recorded lectures and 1 virtual lecture Friday 3-3:50 PM each week

LAB:

Virtual Lab on Tuesdays 2:00 - 3:50 PM on Zoom (**For CRN 30126**)

In-person Lab on Thursdays 12:00 - 1:50 PM in IA-215 (**For CRN 30126**)

In-person lab on Thursdays 3:00 - 4:50 PM in IA-215 (**For CRN 33984**)

Note: In order to meet the occupancy guidelines for the lab and maintain appropriate social distancing, each of the in-person lab sections will be split into A/B groups. Each group will attend lab on alternate weeks. You will be assigned a group by the instructor at the start of the term.

INSTRUCTOR: Brian Reed, Ph.D.

EMAIL: 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):

To be determined: (Please fill out the office hour poll to cast your vote for office hour times!)

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

INSTRUCTOR WEBSITE:

Go to www.linnbenton.edu. Click **MyLB**, click **Instructor Websites**, click [Reed, Brian](#).

Course Description:

Covers AC circuit analysis techniques; covers sinusoidal steady state and analysis of three-phase circuits; introduces mutual inductance and transformers; looks at resonant circuits; investigates filters and continue to look at op-amp circuits.

Prerequisite(s):

Prerequisite: ENGR 201 Electrical Fundamentals: DC Circuits with a grade of C or better.

Course Outcomes:

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

1. State how Ohm's Law, Kirchhoff's Laws, Thevenin's Theorem and Norton's Theorem are modified for the analysis of AC circuits.
2. Apply the concepts of frequency-dependent impedance to solve problems involving inductive and capacitive components and the relationships between voltage, current, power and power factor in AC circuits.

3. State and apply circuit analysis laws and theorems to single-phase AC circuits using phasors to calculate power, apparent power and reactive power. Apply circuit analysis laws and theorems to both balanced and unbalanced three-phase circuits to calculate line- and phase-voltage, line- and phase-current, power, and energy.
4. State and apply Faraday's law to both single-phase and three-phase circuits.
5. Solve problems involving self- and mutual- inductance, inductive voltage division and multiplication, and the principle of transformers.
6. Apply the principles of frequency dependence of inductive and capacitive components to analyze passive and active filters.

Required Text:

Alexander, Charles. K. and Sadiku, Matthew, N. O., Fundamentals of Electric Circuits, (3rd, 4th, 5th, or 6th Edition), McGraw-Hill.

Optional Text:

The following is an OER textbook which should be compatible with the course, though it covers some topics in a different order than we will.

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 9: Sinusoids and Phasors
- Chapter 10: Sinusoidal Stead-State Analysis
- Chapter 11: AC Power Analysis
- Chapter 12: Three-Phase Circuits
- Chapter 13: Magnetically Coupled Circuits
- Chapter 14: Frequency Response

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

Quizzes:

Due to the need to move this course to a virtual/online format for Winter term, quizzes in this class will be considered open book and open notes. You may use all materials provided for the course through the ENGR 202 course page, but I ask that you do not use internet resources or consult with your classmates. Quiz 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 page and will be turned in via email by 11:59 PM on the due date. Homework should be scanned in as a pdf and emailed to me. You should also CC yourself on the email as means of confirming that it was sent successfully.

Homework may be turned in for partial credit up to one day late, but will not be accepted after the

solutions are posted unless previously arranged with the instructor. Solutions to the homework problems will be posted on the class schedule two days after the homework is due. Each problem will be checked for a reasonable attempt at solving, and be graded not only the solution, *but the effective communication of the solution process*.

The lowest homework score will be dropped.

Laboratory:

There are two options for ENGR 202 lab being offered this term.

First there is a virtual lab, taught via Zoom (**CRN 30126**). This section meets weekly on Zoom, Tuesdays from 2:00 to 3:50 PM.

Secondly there are two section with in-person labs being offered:

Thursday 12:00-1:50 PM in IA-215 (**For CRN 30126**)

Thursday 3:00-4:50 PM in IA-215 (**For CRN 33984**)

In order to meet the occupancy guidelines for the lab and maintain appropriate social distancing, each section will be split into two groups. Each group will attend lab on alternate weeks. You will be assigned a group by the instructor at the start of the term.

It is very important that you attend the lab section for which you are registered. If for some reason you cannot make your scheduled lab time you must contact me before attending another lab section, as there may not be room to accommodate you!

Each lab report will be graded on conformance with specific criteria, which will be reviewed during the first lab session. Lab reports are due for grading at the beginning of the next lab, with 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 coming to lab.**

Grading:

Section Quizzes	6 x 30	180 pts.
Labs	5 x 20	100 pts.
Homework (best 10 of 11)	10 x 10	100 pts.
Total		380 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 includes being present, asking questions and participating in discussions. You should come to class prepared (this means you should bring your book, paper and pencil, a calculator, and anything else you might need).

No grade will be assigned for attendance in lecture/recitation but to do well in this course it is expected that you will attend ALL lectures, recitations, and labs. If a situation arises that makes it

necessary to miss a class, it is the student's responsibility to obtain notes from a peer.

I expect you to be respectful of everyone in the class, in word as well as behavior. Along these lines, I ask that you turn off your cell phone during class and put it away so as to avoid causing a distraction. If you need to leave class for any reason, please do so quietly.

HOW TO BE SUCCESSFUL IN THIS CLASS

- Attend class.
- Be prepared for class by going over the reading/textbook chapters before lecture. Classroom experiences will be richer for you when you have background information about the subject.
- Work problems **every single day!** A little daily practice will make learning the material much easier.
- Find a group to study with! Working with your classmates is one of the best ways to learn.
- Learn how to ask clarifying questions and how to be a coach for your classmates.
- When confused, challenged, frustrated or having an "aha" moment, stop by the virtual office and tell me about it.
- Review the syllabus and learn policies and procedures for this class. Understand your rights and responsibilities as a student and as a class member.
- Be engaged and prepared to stretch your abilities. You will get out of this class what you put into it.

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 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, **even if you are in the same lab group**. 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.

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 **before end of day 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. LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, gender, gender identity, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws. For further information see Board Policy P1015 in our Board Policies and Administrative Rules. Title II, IX, & Section 504: Scott Rolen, CC-108, 541-917-4425; Lynne Cox, T-107B, 541-917-4806, LBCC, Albany, Oregon.

To report: linnbenton-advocate.symplicity.com/public-report. 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:

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

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. If you believe you may need accommodations but are not yet registered with CFAR, please visit the CFAR website at <http://www.linnbenton.edu/cfar> for steps on how to apply for services or call 541-917-4789.

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.