# ENGR 204: Electrical Circuits

# Syllabus Spring 2021

Stephanie Bostwick

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building #4 office #210

Credits: 6

Class Time: TBD, & Canvas online classroom

Office Hours:

***NWIC MISSION STATEMENT***

*Through education, Northwest Indian College promotes   
Indigenous self-determination and knowledge*

**Course Prerequisites:** PHYS 123, MATH 238 (co-requisite)

# Required Text

None.

# Course Description

This course is an introduction to electrical engineering. Topics covered include basic circuit and systems concepts and resistors, sources, capacitors, inductors, and operational amplifiers. Students will solve first- and second-order linear differential equations associated with basic circuit forms.

# Course Outcomes

# At the completion of this course students will be able to:

1. Solve electric circuits using node and mesh analysis, Kirchoff’s laws and equivalent resistance
2. Apply Thevenin’s and Norton’s theorems and superposition to circuit analysis
3. Apply mathematical models for basic circuit elements including resistors, sources, capacitors, inductors and operational amplifiers
4. Solve first-order and second-order switched circuits
5. Analyze single-phase and three-phase sinusoidal steady state circuits
6. Design, build, and troubleshoot electrical instrumentation and control systems as specified in a circuit schematic
7. Perform basic circuit analysis using computer-based tools such as PSPICE, TINA, LTSPICE, or MultiSim
8. Analyze the transient step and natural response of first and second order linear direct current (DC) circuits containing resistors, capacitors, and/or inductors
9. Analyze the steady-state response of sinusoidal circuits including frequency-selective circuits by applying the concepts of phasor transforms and impedence

# NWIC Institutional Outcomes

1. Effectively communicate in diverse situations, from receiving to expressing information, both verbally and non-verbally

1. Meet the technological challenges of a modern world
2. Work cooperatively toward a common goal

**Course Requirements and Expectations**

Students who have a valid issue that prevents them from attending class need to notify the instructor prior to the start of class, email messaging is preferred but phone message is acceptable. It is understood in some situations an absence will be unavoidable. In those situations students will be given the opportunity to make up attendance and participation by watching recordings of the class session that has been missed. Embedded in the recorded class session will be participation questions. If those questions are answered and submitted to the instructor within 1 week of the scheduled class session, attendance and participation points will be awarded based on the agreement reached between student and instructor.

Any exceptions to this attendance policy must be approved by the Department Chair and the instructor in writing before the start of the quarter.

***It will not be possible to earn a passing grade if a student misses more than 30% of this class without notifying the instructor.***

**Evaluation & Assessment**

|  |  |
| --- | --- |
| Homework Binder | 10% |
| Labs | 15% |
| Mastering Engineering Homework/Canvas | 15% |
| Quizzes | 10% |
| Midterms | 30% |
| Final Exam | 20% |

Grading will be on a percentage system as detailed below:

* 1. Homework Binder – Each homework assignment will require that select problems are worked out in detail and kept in a homework binder. Binders will be checked 4 times throughout the quarter for completeness. Late binders will receive a 10% deduction for each late day past the due date. Missing assignments will be deducted from total points on a linear basis. weight – 10%
  2. Labs - There will be approximately 12 labs throughout the quarter with lab reports submitted on an individual basis. weight – 15%
  3. Mastering Engineering Homework – Homework will be completed online via MyLab. See calendar for due dates. weight – 15%
  4. Quizzes – There will be weekly quizzes online covering topics from the previous class period and reading assignments. Students must take the quiz online; tablets will be provided at the beginning of lab each week to complete the quiz. The lowest 2 scores will be dropped at the end of the quarter. Quizzes must be completed by the assigned due date/time. weight – 10%
  5. Midterm Exams – There will be 3 midterm exams throughout the quarter – see Canvas for expected dates. No makeups will be allowed without prior permission given by instructor. weight – 30%
  6. Final Exam – Comprehensive exam at the end of the quarter. No makeups will be allowed without prior permission given by instructor. weight – 20%

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# Course and Assignment Schedule:

|  |  |  |  |
| --- | --- | --- | --- |
| Tentative Schedule | |  |  |
| **Week** | **Analysis Skills and Concepts** | **Reading** | **Lab** |
| 4/1 | Course Overview  Circuit Analysis Fundamentals  Circuit Reduction | Ch 1 & 2 | 1.1.1, 1.1.2, 1.3.1, 1.3.2, 1.4.1-1.4.3 |
| 4/8 | Nodal & Mesh Analysis | Ch 3 | 2.3.1, 2.3.2, 2.4, 2.5 |
| 4/15 | Systems & Network Theorems  Operational Amplifiers | Ch 4 & 5 | 3.2.1-3.2.3, 3.3.1-3.3.3 |
| 4/22 | Energy Storage Elements  **Midterm Exam 1 Wed, 4/24/19** | Ch 6 | 4.3.1, 4.4.1, 4.5.1, 4.6.1 |
| 4/29 | First Order Circuits | Ch 7 | 5.4.1, 5.4.2, 5.4.4 |
| 5/6 | Second Order Circuits  **Midterm Exam 2 Wed, 5/8/19** | Ch 8 | 6.2.1, 6.3.1, 6.3.2, 6.4.1, 6.4.2 |
| 5/13 | Intro to State Variable Models | Ch 9 | 7.2.1, 7.3.1, 7.5.1-7.5.3, 8.5.1-8.5.3 |
| 5/20 | Steady-State Sinusoidal Analysis | Ch 10 | 9.3.1, 9.3.2, 10.6.1-10.6.3 |
| 5/27 | Frequency Response & Filtering  **No Class Mon – Memorial Day**  **Midterm Exam 3 Wed, 5/29/19** | Ch 11 | 11.2.1, 11.3.2, 11.3.3, 11.4.1, 11.4.2 |
| 6/3 | Steady-State Sinusoidal Power | Ch 12 | 12.4.1 |
| 6/10 | **Final Exam Monday 6/10 at 3 PM** |  |  |

**Instructor(s) Discretion:**

Should it be deemed necessary, the instructor(s) of this course reserves the right to make alterations, at any time, to the course materials or what is contained within this syllabus in order to improve the course itself, the learning environment or the opportunity for student success. If such a change is made, it will be made in a timely manner so as not to impede the learning process or interfere, in any way, with student success.