

# ECE-240: Circuit Analysis

Professor: Brian Frost

Fall 2019

## References

The most important reference for this course will be my website: [brianfrost.com](http://brianfrost.com). I will post assignments here, along with helpful documents.

The text followed in this class is “Fundamentals of Electric Circuits” By Charles K. Alexander and Matthew N. O. Sadiku. I will not assign problems from the book, but it is suggested that you purchase it as the material therein is very similar to what we cover in class. I use the fifth edition, but any edition should be fine.

## Grading Breakdown

- **Homeworks (20%)** – Homework is assigned approximately every other week in the form of worksheets to be posted to my website. It is graded mostly for effort/completeness.
- **Quizzes (20%)** – About five quizzes will be given throughout the semester, and all will be of the following form: I draw a circuit on the board, and you must correctly determine its conductance matrix. These will begin the first lecture after modified nodal analysis is covered.
- **Exams (60%)** – Three exams are given throughout the semester, each of which is weighted equally (20% of your final grade). You are allowed a single cheat sheet – A4 or 8.5” × 11” sheet of paper (front and back) – on which you can write anything you would like. Exams are to be structured in approximately the following way: 40% of points are short conceptual questions to do with material covered in lecture, 40% of points are computational questions which will echo the homework and quizzes, and 20% of the points are from a single question with multiple parts introducing you to a new concept which builds directly from your working knowledge. Exams will be two hours long, and are only cumulative in the sense that the material is cumulative.
- **Attendance** – While attendance does not directly factor in to your grade, a homework due date, quizz or exam will occur each week. Unless you are excused in your absence, I will not accept homework late. Make-up quizzes or exams will be offered in the case of excused absence.

## Outside of Class

I am generally responsive by email at [b.frost@columbia.edu](mailto:b.frost@columbia.edu). Office hours will be held in 41 Cooper Square upon request, and open office hours will be announced during the first week of class.

## Tentative Course Breakdown

- **Week 1** – Introduction, Basic Definitions
- **Week 2** – Kirchoff's Laws and their Immediate Consequences
- **Week 3** – Analysis Methods (Mesh, Nodal and Modified Nodal)
- **Week 4** – Exam 1
- **Week 5** – Theorems of Superposition and Source Transformation
- **Week 6** – Thevenin and Norton Equivalent Circuits
- **Week 7** – Time Domain Capacitors and Inductors, First Order Circuits
- **Week 8** – Second Order Circuits, Damping
- **Week 9** – Phasor Domain, Sinusoidal Steady-State Analysis
- **Week 10** – Exam 2
- **Week 11** – Continuation of Phasor Domain, AC Power
- **Week 12** – Ideal Op Amps, Introduction to Non-Ideal Op Amps
- **Week 13** – Introduction to s-Domain Analysis
- **Week 14** – Review
- **Week 15** – Final Exam