# EE 322/322L Advanced Analog Electronics

**Course title:**
Advanced Analog Electronics

**Instructor:**
Dr. Anders M. Jorgensen
Workman 227
Phone: 505-835-5450
e-mail: `anders@nmt.edu`

**Class hours:**
Monday, Wednesday, Friday 10:00-10:50

**Classroom location:**
Workman 113

**Laboratory hours:**
Monday 14:00-17:00

**Laboratory location:**
Workman 189

**Office hours:**
Monday, Wednesday, Friday 11:00-12:00

**Textbooks:**

1. *Adel S. Sedra and Kenneth C. Smith*, Microelectronic Circuits, Fifth edition, Oxford University Press. (This is the textbook for EE 321)

2. *Paul Horowitz and Winfield Hill* , The Art of Electronics, Second edition, Cambridge University Press. (This book is available at the NMT bookstore)

3. *Ron Mancini, ed.*, Op Amps For Everyone, September 2001 edition. (This book is available as a pdf from the course website)

**Learning objectives:**

1. Apply basic concepts from previous courses to practical analog circuits and techniques.

2. Learn principles and good experimental technique through laboratory exercises.

3. Exposure to a selected variety of practical circuits.

4. Be able to use a new circuit or IC after reading the section in 'Horowitz and Hill' and the spec sheet.

**Prerequisites:**

EE 231 and EE 231L, EE 321 and 321L, EE 341.
EE 322 and EE 322L are integrated and must be taken together.

**Topics covered:**

1. Linear voltage regulators

2. Switching voltage regulators

3. Interference and grounding

4. Noise in circuits

5. Oscillators and comparators

6. Timers

| | 7. Active filters | | 9. Feedback op-amps and stability |
|---|---|---|---|
| | 8. Phase-locked loops | | 10. Differential amplifiers |

## Course work:

1. Reading. You will be required to keep up with the course by reading the assigned sections in the books and writing reading summaries.

2. Active participation in class. Show up and respond to questions.

3. Homework. Assigned approximately weekly.

4. Laboratory exercise. Scheduled most weeks.

5. Tests. Three tests in class during the semester.

6. Final exam. During finals week.

## Grading policy:

**EE 322**

1. Active participation in class 10%

2. Reading summaries 10%

3. Homework 30%

4. Three tests 30%

5. Final exam 20%

**EE 322L**

Please see specific instructions and grading information on laboratory exercises website.

## Approximate Lecture Schedule:

| Week of | Lecture | Test | Laboratory Exercise |
|---|---|---|---|
| Jan 21 | Voltage regulators | | |
| Jan 28 | Switching regulators | | Pspice simulation |
| Feb 4 | Switching regulators, grounding | | Linear regulator |
| Feb 11 | Oscillator | | Switching regulator |
| Feb 18 | Comparators | 1 | Sine oscillator |
| Feb 25 | Timers, Oscillators | | Comparators |
| Mar 3 | Active filters | | 555 timer |
| Mar 10 | **Spring Break** | | |
| Mar 17 | RLC, VCVS | | Matlab filters |
| Mar 24 | Phase-locked loops | 2 | Active filters |
| Mar 31 | Phase-locked loops, Noise | | Phase-locked loops |
| Apr 7 | Voltage/current feedback op-amps | | Noise |
| Apr 14 | Differential pairs | | Current Feedback |
| Apr 21 | Differential amplifier | | Discrete Op-amp - 1 |
| Apr 28 | Differential/multi-stage amps | 3 | Discrete Op-amp - 2 |
| May 5 | Review | | |
| May 12 | | Final Exam | |