

# ECE3741 Course Syllabus

## ECE3741

### Instrumentation and Electronics Laboratory (0-3-1)

#### Prerequisites

ECE 3710

#### Corequisites

None

#### Catalog Description

Basic analog and digital electronic circuits and principles. Techniques of electrical and electronic measurements with laboratory instruments.

#### Textbook(s)

Brewer, *Experiments in Analog and Digital Electronics* (6th edition), Kendall/Hunt, 2011.  
ISBN 0757591876, ISBN 9780757591877 (required) (comment: New Edition Available  
Soon Course notes used in lieu of 6th Edition until further notice)

#### Topical Outline

- \*Instrumentation Familiarization
  - Digital Oscilloscope
  - Digital Multimeter
  - Electronics Trainer
- \*First Order Circuits
  - Sinusoidal Response
  - Transient Response
- \*Integrated Circuit Op-Amp Amplifiers
  - Inverting
  - Noninverting
  - Differential
  - Instrumentation
- \*Active Filters
  - Low-, Band-, and High-Pass
- \*Op-Amp Computational Elements
  - Integrator
  - Differentiator
  - State-Variable Filter
- \*Single Stage Discrete BJT Amplifier
  - Common Emitter Single Stage Amplifier
  - Small Signal Behavior
  - Large Signal Behavior

\*Combinational Logic

- Boolean Algebra
- Elementary Two & Three Input Gates
- Half and Full Adders
- Gray Code
- DeMorgan's Theorem
- Karnaugh Maps
- Multiplexers

\*Sequential Logic

- D & JK Flip-Flop
- Counters
- Shift Registers
- Shift Register Sequences
- Seven Segment Display

\*Analog-to-Digital Conversion Systems

- Timers
- Comparators
- Digital-to-Analog Converter
- Tracking Analog-to-Digital Converter
- Successive Approximation Analog-to-Digital Converter