

# AE-230-1 Technical Maintenance

SPRING 2005 SYLLABUS ADDENDUM

"Retro" (LH-1) Wednesdays @ 3:15pm

Instructor: Eddie Ciletti (eddieciletti@iprschool.com)

Office Hours: Wednesday and Thursday, 6pm to 8pm at "Retro," (LH-1)

---

## Class Policies

- ? Standard Classroom Policies on Attendance, Tardiness etc.

## Grading Policies

- ? Homework assignments and quizzes are 50% of the participation grade
  - ? Homework Assignments are each worth 10 points
  - ? E-mail correspondence is 15% of the participation grade
  - ? ~~Late assignments are discounted 10%~~
- 

## Required Reading

*The text required for this class:*

- ? Teach Yourself Electricity by Stan Gibilisco

Please purchase the book and bring it to the first class. Students are welcome to read the following chapters in advance as well as read more - a full chapter, for example - in addition to the assigned pages.

- ? Chapter-1: Basic Physical Concepts, pp 11~18
- ? Chapter-2: Electrical Units, pp, 23 ~ 43
- ? Chapter-3: Measuring Devices, pp 44 ~ 64
- ? Chapter-4: Schematic Symbols, pp 65 ~ 68

## Recommended Resources

*In addition to the texts listed in the syllabus, the following resources will be helpful in mastering the concepts covered in this class:*

- 
- 
- ? [www.tangible-technology.com](http://www.tangible-technology.com)

## COURSE SCHEDULE:

6 July WEEK-1: Introduction to Electronics

At the end of this lesson you should be able to:

- Grasp the general concept of Electricity
- Correlate the schematic representation of common electronic components with real world parts
- prepare (strip) wires
- use a soldering iron

 Required Reading for week-2

- ? Chapter-1: Basic Physical Concepts, pp 11~18
- ? Chapter-2: Electrical Units, pp, 23 ~ 43
- ? Chapter-3: Measuring Devices, pp 44 ~ 64
- ? Chapter-4: Schematic Symbols, pp 65 ~ 68

 Recommended Reading / Resources for this lesson

- o [www.tangible-technology.com](http://www.tangible-technology.com)

 HOMEWORK 1      ## pts.      (DUE Week-2)

- 
- o End of chapter exercises

13 July WEEK-2: Direct Current and Basic Circuit Analysis

QUIZ of previous week's material (Schematic Symbols, Resistor Color Code)

 At the end of this lesson you should be able to:

- o Analyze a simple circuit using Ohm's Law (Introduction)
- o Power the circuit and confirm analysis
- o Read a Schematic and probe a commercially manufactured product via test equipment.
- o Translate a schematic into a parts list.

 Required Reading for Week-3

- o Direct Current Basics: Chapter-4 pp 68 ~ 81
  - ? Ohm's Law, series and parallel resistance
- o DC Circuit Analysis: Chapter-5, pp 82 ~ 89
- o Resistors (Color Code): Chapter-6, pp 99 ~ 117
- o Batteries and Cells: Chapter-7, pp 118 ~ 133

 Recommended Reading / Resources for this lesson

- o [www.tangible-technology.com](http://www.tangible-technology.com)

 HOMEWORK 2      ## pts.      (DUE week-3)

- 
- o End of chapter exercises

20 July **WEEK-3: Alternating Current (AC), Transformers and Rectification**QUIZ of previous week's material (Series and Parallel resistance, Ohm's Law, Power Formula, Resistor Color Code) **At the end of this lesson you should be able to:**

- Differentiate between the AC and DC portions of a circuit.
- Read a Schematic and probe a commercially manufactured product via test equipment.
- Layout the component parts of a power supply on paper.
- Drill the box (housing) for the power supply and mount major components.

 **Required Reading for Week-4**

- Magnetism: Chapter-8, pp 134 ~ 152
- Alternating Current ( AC) Basics: Chapter-9, pp 165 ~ 182
- << OPTIONAL >> Inductors: Chapter-10, pp 183 ~ 198
- Capacitors: Chapter-11, pp 199 ~ 214
- AC Power: Chapter-17, pp 305 ~ 316
- Power Transformers and Supplies: Chapter-18, pp 327 ~ 345

 **Recommended Reading / Resources for this lesson**

- [www.tangible-technology.com](http://www.tangible-technology.com)

 **HOMEWORK 3          ## pts.          (DUE week-4)**

- 
- End of chapter exercises

27 July          (WEEK 4): **Circuit Relationships: Power Supplies In Action**QUIZ of previous week's material (Power Supplies with Rectifier Variations and Filter Caps) **At the end of this lesson you should be able to:**

- Build a Basic Power Supply
- Measure and confirm performance with a Multi-Meter and Oscilloscope, troubleshoot if required.

 **Required Reading for Week-5**

- ALT Uses of Diodes: Chapter-20, pp 370 ~ 371
- Power Supplies: Chapter-21, pp 383 ~ 399
  - ? Diode and Rectifier Options @ p 385
  - ? Regulation @ p 392

 **Recommended Reading / Resources** for this lesson

- [www.tangible-technology.com](http://www.tangible-technology.com)

 **HOMEWORK 4**      ## pts.      (DUE week-5)

---

- End of chapter exercises

**3 Aug (WEEK 5): REVIEW**

QUIZ of previous week's material (Rectifier Options, draw various Power Supplies)

 **At the end of this lesson you should be able to:**

- Take the Mid-Term exam and pass it with flying colors
- Be Fluent with Ohm's Law and the Power Formula
- Be able to read a power supply schematic and be able to either troubleshoot a commercial product's supply or build a supply.

 **Required Reading** for this lesson

- Review Weeks 1 ~ 5

 **Recommended Reading / Resources** for this lesson

- [www.tangible-technology.com](http://www.tangible-technology.com)

 **HOMEWORK 5**      ## pts.      (DUE week-6)

---

- Special Assignment

**10 Aug (WEEK 6): MID-TERM EXAM**

 **At the end of this lesson you should be able to:**

- Pass the MID-TERM EXAM and move on to more exciting geek adventures.
- Prove your ability to translate a schematic and turn it into hardware by predicting current requirements, then powering, LEDs and Incandescent Lamps.

 **Required Reading** for this lesson

- See Weeks 1 ~ 5

 **Recommended Reading / Resources** for this lesson

- [www.tangible-technology.com](http://www.tangible-technology.com)

 **HOMEWORK 6**      ## pts.      (DUE week-7)

- 
- Read Chapter 24 pages 433-449 (Amplifiers)

17 Aug WEEK-7: PLUS Practical use of the Operational Amplifier (OP-AMP)

 At the end of this lesson you should be able to:

- Program an operational Amplifier for gain.
- From a schematic, determine and collect parts necessary to build the sidechain circuitry for an LA-3 Compressor-Limiter.
- Assemble the circuit and test.
- Have a functional LA-3 sans metering

 Required Reading for this lesson

- ? Chapter-1: Basic Physical Concepts, pp 11~18
- ? Chapter-2: Electrical Units, pp, 23 ~ 43
- ? Chapter-3: Measuring Devices, pp 44 ~ 64
- ? Chapter-4: Schematic Symbols, pp 65 ~ 68

 **Recommended Reading / Resources** for this lesson

- [www.tangible-technology.com](http://www.tangible-technology.com)

 HOMEWORK 7      ## pts.      (DUE week-8)

- 
- TBD

24 Aug WEEK-8: Circuit Integration

 At the end of this lesson you should be able to:

- Read a schematic and build the Input and Output circuitry for an LA-3 Compressor-Limiter
- Test and confirm operation
- Realize need for voltage regulation

 Required Reading for this lesson

- Direct Current Basics: Chapter-4 pp 68 ~ 81
  - ? Ohm's Law, series and parallel resistance
- DC Circuit Analysis: Chapter-5, pp 82 ~ 89
- Resistors (Color Code): Chapter-6, pp 99 ~ 117
- Batteries and Cells: Chapter-7, pp 118 ~ 133

 **Recommended Reading / Resources** for this lesson

- [www.tangible-technology.com](http://www.tangible-technology.com)

 **HOMEWORK 8**      ## pts.      (DUE week-9)

- 
- TBD

**31 Aug (WEEK 9): Metering and Voltage Divider Review**

 **At the end of this lesson you should be able to:**

- Realize the practical use of a voltage divider in a dynamics processor.
- **Build the Optical Attenuator**
- Realize the need for Metering AC and DC in a circuit

 **Required Reading** for this lesson

- **Magnetism: Chapter-8, pp 134 ~ 152**
- **Alternating Current ( AC) Basics: Chapter-9, pp 165 ~ 182**
- **<< OPTIONAL >> Inductors: Chapter-10, pp 183 ~ 198**
- **Capacitors: Chapter-11, pp 199 ~ 214**
- **AC Power: Chapter-17, pp 305 ~ 316**
- **Power Transformers and Supplies: Chapter-18, pp 327 ~ 345**

 **Recommended Reading / Resources** for this lesson

- ? <http://www.me.utexas.edu/~lotario/me244L/labs/amp/basicamps.html>
- ? [http://www.cs.manchester.ac.uk/Study\\_subweb/Ugrad/coursenotes/CS1231/tutorials/Common%20Mode%20Gain.html](http://www.cs.manchester.ac.uk/Study_subweb/Ugrad/coursenotes/CS1231/tutorials/Common%20Mode%20Gain.html)
- ? [http://www.st-andrews.ac.uk/~www\\_pa/Scots\\_Guide/audio/part8/Page1.html](http://www.st-andrews.ac.uk/~www_pa/Scots_Guide/audio/part8/Page1.html)

 **HOMEWORK 9**      ## pts.      (DUE week-10)

- 
- TBD

**7 Sept (WEEK 10): Metering: VU, Peak, Ballistics and Interface**

 **At the end of this lesson you should be able to:**

- Understand Meter Performance
- Differentiate between Peak, VU and RMS
- Add a VU meter to any audio device
- Calibrate a ProTools HD interface to analog equipment

 **Required Reading** for this lesson

- ? <http://www.tangible-technology.com/audiobasics/levels/level.html>
- **ALT Uses of Diodes: Chapter-20, pp 370 ~ 371**
- **Power Supplies: Chapter-21, pp 383 ~ 399**
  - ? Diode and Rectifier Options @ p 385
  - ? Regulation @ p 392

 **Recommended Reading / Resources** for this lesson

- [www.tangible-technology.com](http://www.tangible-technology.com)
- 

 **HOMEWORK 10**                      **## pts.**                      **(DUE week-11)**

- TBD
- 

**14 Sept**                      **(WEEK 11): Acoustics Measurement**

 **At the end of this lesson you should be able to:**

- ? Evaluate the acoustic idiosyncrasies of a control room with test equipment
- ? Differentiate between the need and practical use of Real Time Analysis (RTA, two-dimensional eval) and Decay Time via the "waterfall" plot (three-dimensional eval).

 **Required Reading** for this lesson

- ? <http://www.tangible-technology.com/acoustics/1/room2move.htm>
- ? <http://www.tangible-technology.com/articles/loudness/bassmanage.htm>
- ? <http://www.tangible-technology.com/microphones/proximity/proximity.htm>
- ? **Chapter 24 pages 433-449**



**Alternate Reading / Resources** for this lesson

- ? Small Budget Recording Studio From Scratch by Mike Shea and F. A. Everest TAB Books)

 **HOMEWORK 11**                      **## pts.**                      **(DUE week-12)**

- TBD
- 

**21 Sept**                      **(WEEK 12): FINAL EXAM**

 **At the end of this lesson you should be able to:**

- **Have basic grasp of electronics**
- **Troubleshoot a problem from system level down to a piece of gear.**
- **Repair a malfunctioning piece of analog gear.**
- **Have a basic grasp of acoustics measurement**

 **Required Reading** for this lesson

- **previous readings detailed above.**

 **Recommended Reading / Resources** for this lesson

- [www.tangible-technology.com](http://www.tangible-technology.com)

