C A M O S U N C O L L E G E

PHYSICS DEPARTMENT

PHYS 214 SCIENCE LABORATORY ELECTRONICS

An introduction to laboratory electronics and instrumentation. Topics: DC circuits, AC circuits, solid state devices, integrated circuits, digital circuits.

OFFERED:	Fall
CREDIT:	4
IN-CLASS WORKLOAD:	3 lecture, 3 lab
OUT-OF-CLASS WORKLOAD:	6
PREREQUISITES:	PHYS 115 or 120 or 125 and MATH 100

OUTLINE

1. Review
   Properties of Electric Charges, Insulators and Conductors, Coulomb's Law, The Electric Field, Potential Difference and Electric Potential, Electric Current, Resistance and Ohm's Law, Resistance and Temperature, Superconductors, Electrical Conduction, Electrical Energy and Power.

2. Resistors in Series and Parallel, Kirchhoff's rules, Superposition Theorem, Thevenin's and Norton's Theorems, Voltage and Current Dividers.

3. Capacitance, Charging and Discharging a Capacitor in a series RC circuit, Series and Parallel Combinations of Capacitors, Energy Stored in a Capacitor.

4. The Magnetic Field and its Properties, Magnetic Flux, Faraday's Law of Induction, Self Inductance, Series RL Circuit.

5. A.C. Waveforms, Phasor Diagrams, Series RC, RL and RLC Circuits, Average and R.M.S. Values, Transformers and Applications of Transformers.

6. Atomic Theory (review)
   Bohr Atom, Bonding in Solids, Band Theory of Solids, Electrical Conduction in Metals, Insulators and Semiconductors, Doped Semiconductors, The p-n Junction and Junction Transistor, The Integrated Circuit.

7. The Operational Amplifier, Basic Logic Functions and Gates, Flip-Flops.

Tools and Supplies

A tool kit is required and supplied by the Physics Department. A $50 deposit will be refunded when the kit is returned in good condition at the end of the course.

Texts and References

Text: Physics for Scientists and Engineers, Serway, 4th edition.
Reference: Introductory Electronics for Scientists and Engineers, R.Simpson, 2nd edition (on reserve in the library).