PHYC 657 Introductory IC Analog Electronics Workshop for Teachers

Course Description

Laboratory-oriented course that acquaints teachers who do not have a strong electronic background with the uses of modern integrated circuitry. Emphasizes the construction and use of circuits that can be presented in the classroom. Introduces analog electronics topics. (2 credit hours)

Prerequisite: PHYC 112 or 122 or permission of department chairperson.

Not open to students who have credit in PHYC 354, 356, 554, 556.

Course Objective

The purpose of this course is to provide science teachers an opportunity to become proficient in using laboratory equipment and greatly increase their understanding of electronics.

Course Rationale

Since the course strongly stresses applications of electronics, it is an appropriate course for all teachers who work in the physical sciences. All of these teachers need experience in the practical application of electronics.

Course Content, Format, and Bibliography

Content

Foundations
   Voltage, current, and resistance
Signals
   Capacitors and ac circuits
Inductors and transformers
Diodes and diode circuits
   Rectification
   Power-supply filtering
Diodes and Transistors
Feedback and Operational Amplifiers
Basic op-amp circuits
Some practical op-amp circuits
Oscillators
Typical Laboratory Work
DC circuits and Kirchoff’s Laws
AC circuits: reactance
Circuit software simulation
Oscilloscopes and Function Generators
Diodes: Power Supplies and Rectification
Transistor Amplifier: Bi-polar and FET
Operational Amplifier Circuits
Oscillators
Modulation

Format
Lectures, Laboratory Experiments, Homework Problems, Final Examination

Bibliography
The Art of Electronics by Paul Horowitz and Winfield Hill
Principles of Electronic Instrumentation by A. James Diefenderfer and Brian E. Holton
PHYC 560 Introductory Nuclear Techniques