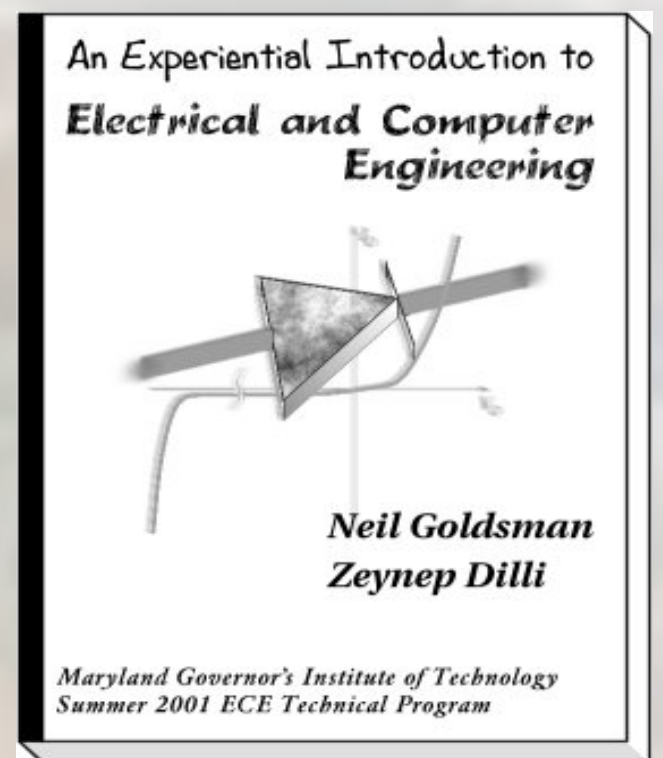




The Maryland Governor's Institute of Technology: The Electrical and Computer Engineering Technical Program

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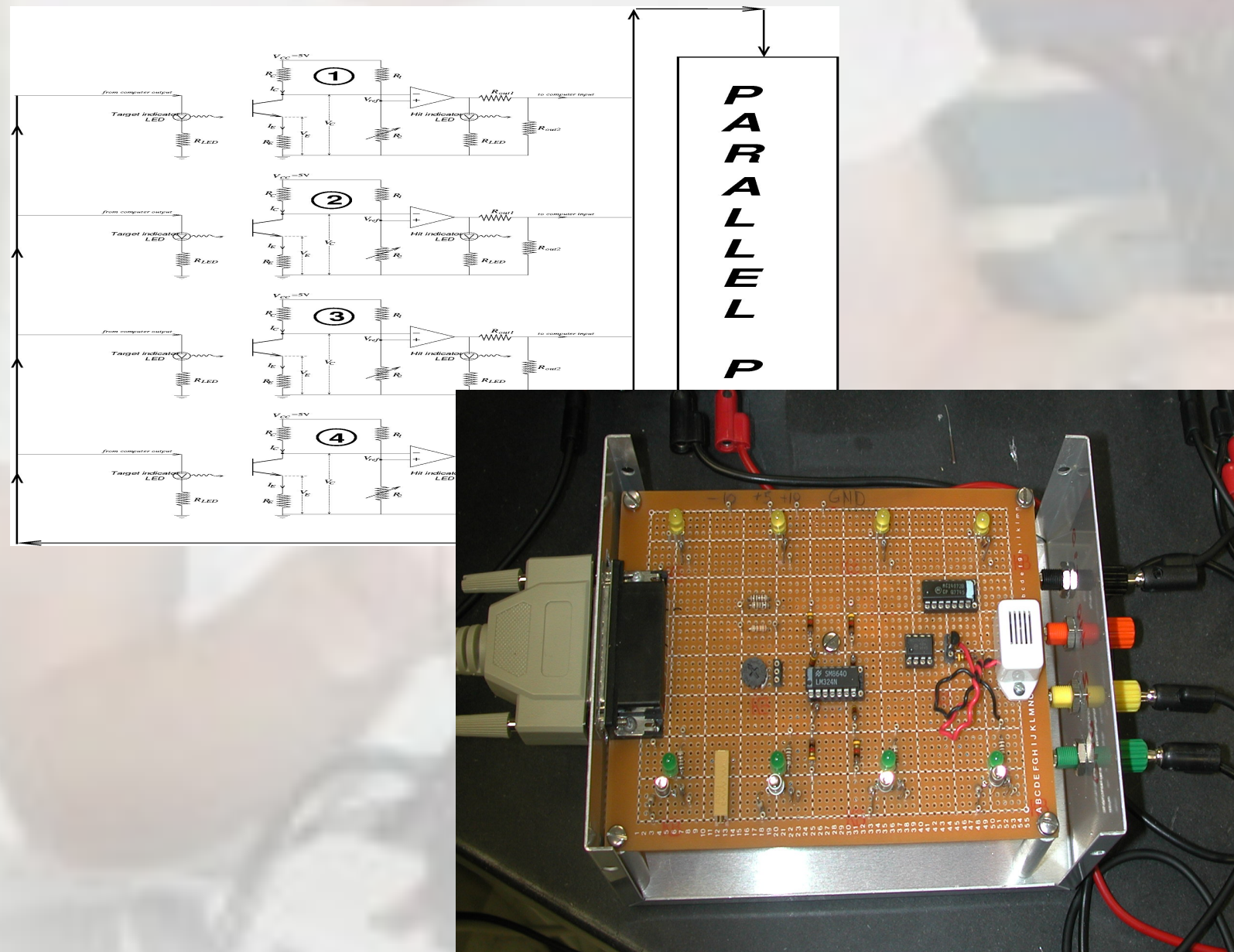
Goals

- Provide students with a solid conceptual knowledge of underlying mechanisms and principles of ECE and emphasize the prevalence of ECE in daily life
- Provide students with a vantage point from which they can branch into exploring ECE technology practically
- Teach college level material to high school students, creating the analogue of a high-tech Advanced Placement type course

Experiments and Projects

- Multiple experiments in the textbook that doubled as a lab manual
- Sample experiments:
 - Voltage dividers
 - Rectifiers
 - Comparators and level indicators
 - Passive and active filters
 - Small signal gain in a CE amplifier
 - A full adder implementation
 - 7-segment display driver implementation
- Major projects:
 - Audio hi-fi amplifier
 - Computer-interfaced optoelectronics-based arcade game, LaserAim

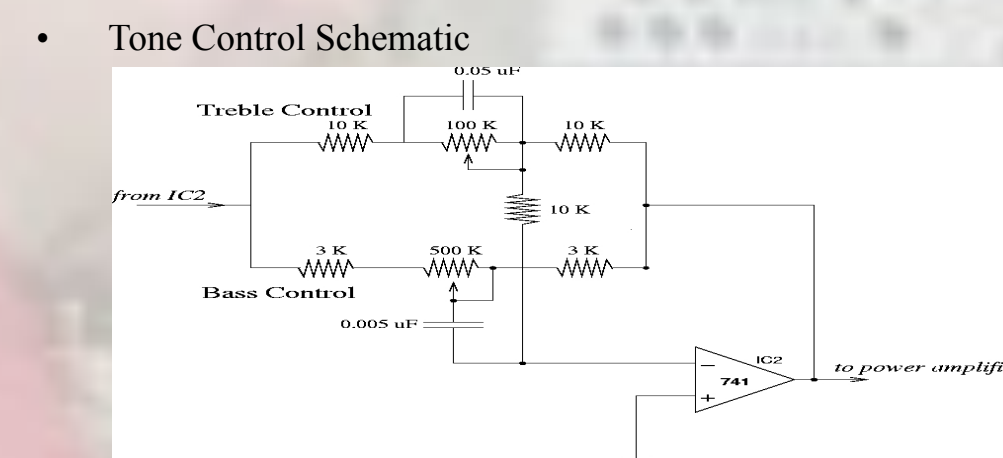
LaserAim Game



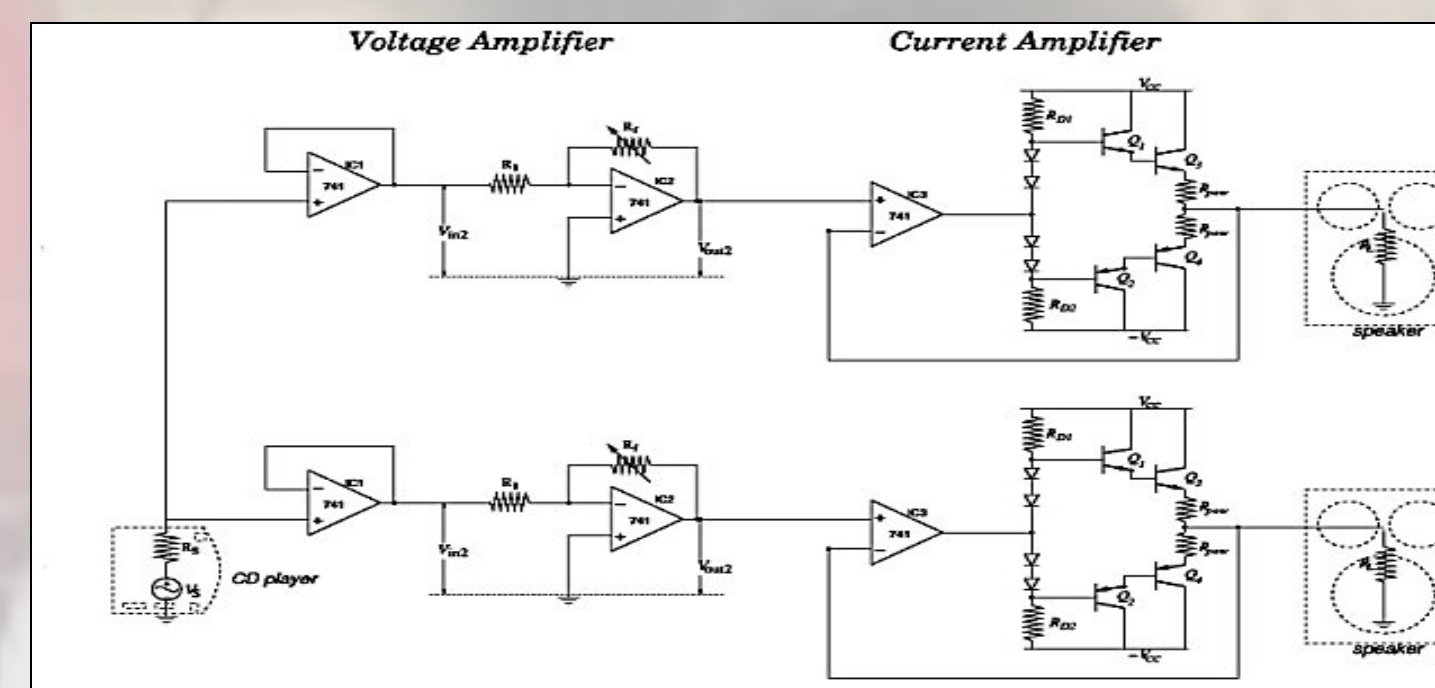
Methodology

- Develop a hands-on concept-based syllabus, which presents a survey of key topics in electrical and computer engineering.
- Teach theory using projects
- Develop unique text written specifically for this course.
- Provide intense five week experiential curriculum that gives solid background in key ECE topics.

Audio Hi-Fidelity Amplifier



Two Channel Amplifier Schematic

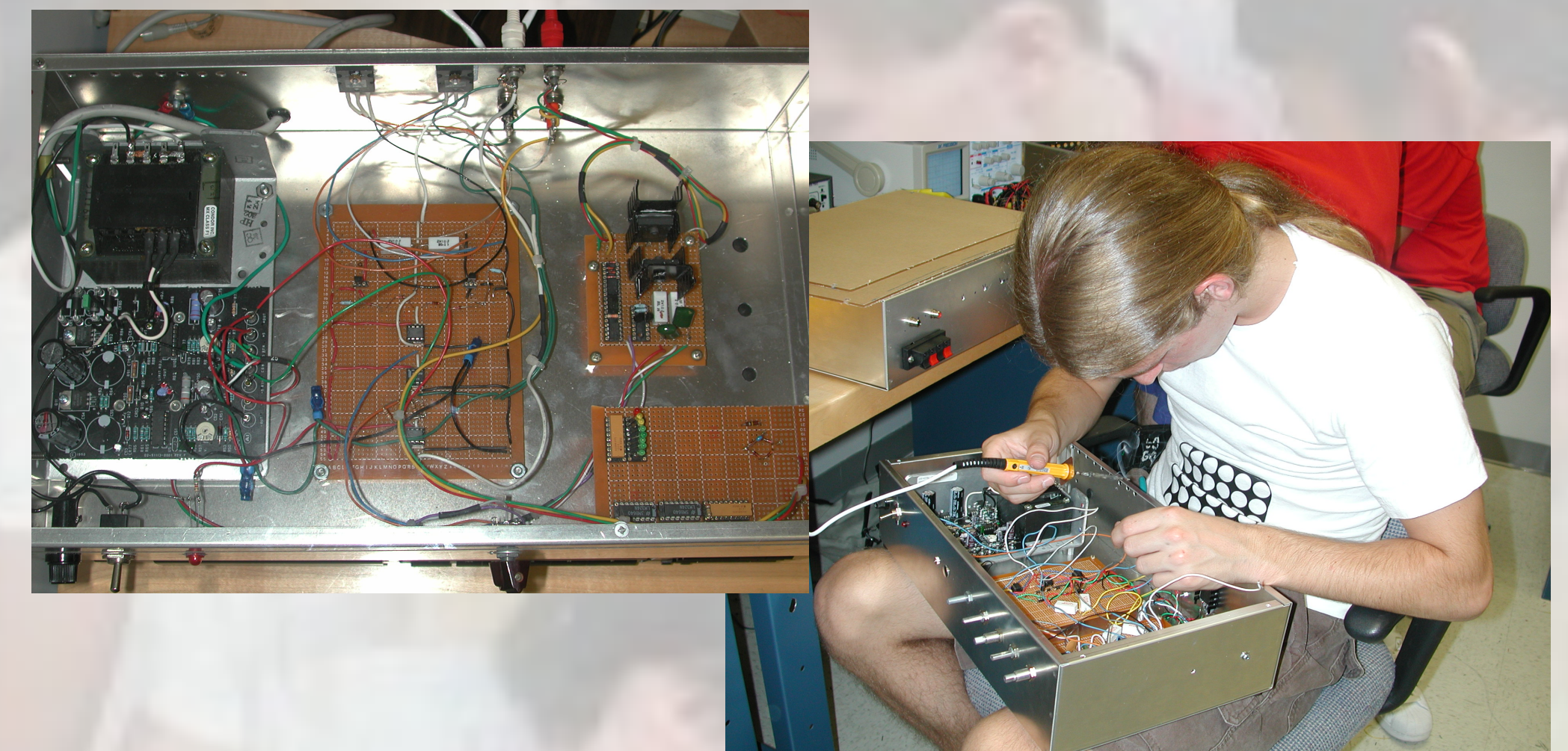


Assessments

- Administered exam containing questions typically found in 2nd and 3rd year classes.
- Result: 1/2 the class scored better than 90%
- All students successfully prototyped audio system and most completed fabrication
- All students completed all laboratory assignments in the 180 page text

Topics Covered

- Analog Electronics: Basic analog components; voltage, current, gain, filtering
- Digital Electronics: Basic gates, binary arithmetic, designing from truth tables
- Computer Architecture: Basic microprocessor structure
- Optoelectronics: Light detection, introduction to fiber optics



Student Evaluations; Conclusion

- Evaluations, focus groups and surveys indicated that
 - Students found the experience enjoyable and worthwhile
 - The methodology, using a conceptual and experiential approach rather than a mathematical one, was successful
 - The course met its aims of
 - Placing ECE in the context of the students' daily lives and emphasizing the ways it improves our quality of life
 - Teaching basic ECE concepts and applications to students without any necessary prior background
 - Supplying students with hands-on experience in an EE lab

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