Test and Product Engineering Courses

Use of automated test equipment to validate the specifications for integrated circuit chips including:

- Analog integrated circuits
- Mixed-Signal integrated circuits (DAC and ADC)
- Microcontrollers

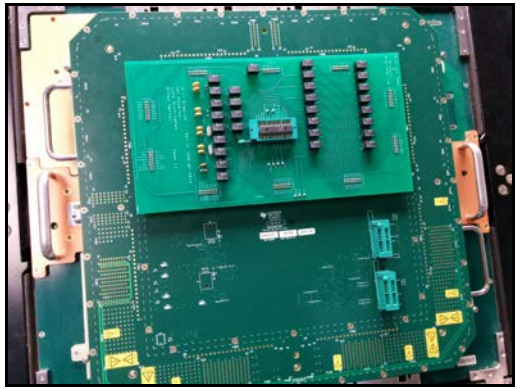
Course and lab opportunities designed to develop critical thinking skills

Emphasis on test-time vs. test-accuracy tradeoff

Hands-on labs provide student use of industry-grade test equipment and experiences with industry test procedures

Course and labs developed in conjunction with industrial partners:

TEXAS INSTRUMENTS
TERADYNE
MICROCHIP



Required Courses

ECE351: Analog Electronics
Prerequisites: ECE205, ECE250
Already required for EE majors
Needed for CPE majors

Choose two test and product engineering courses:

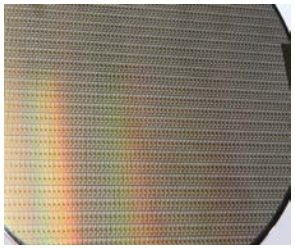
ECE531: Digital Test and Product Engineering
Prerequisites: ECE230, ECE233, ECE250
Testing strategies for microcontrollers, digital systems, and memory. Common digital system fault modeling, test generation, and design for testability.

ECE557: Analog Test and Product Engineering
Prerequisites: ECE300, ECE351
Foundations of test and product engineering including fabrication, test equipment, test plans, and statistical analysis of results. Test-time versus test-accuracy tradeoff explored with op-amps. DSP testing techniques to improve test time.

ECE558: Mixed-Signal Test and Product Engineering
Prerequisites: ECE233, ECE300, ECE351
Testing of mixed-signal chips such as comparators, DACs, and ADCs. Understanding of common mixed-signal circuit structures.

Elective Courses

Elective courses provide background in peripheral areas including: integrated circuit design, board design, system design, integrated circuit fabrication, and statistical validation of data.



Choose three elective courses:

Integrated Circuit Design
ECE551: Digital VLSI
ECE552: Analog Integrated Circuit Design
ECE553: RF Integrated Circuit Design

Board Design
ECE343: High-Speed Digital Design *(required for CPE majors)*

System Design
ECE454: System Level Analog Design

Integrated Circuit Fabrication
ECE416/ECE516: Intro to MEMS
ECE419/ECE519: Advanced MEMS
PH405: Semiconductor Materials and Devices I
EP406: Semiconductor Materials and Devices II

Statistical Validation of Data
MA385: Quality Methods Engineering
MA387: Statistical Methods in Six Sigma

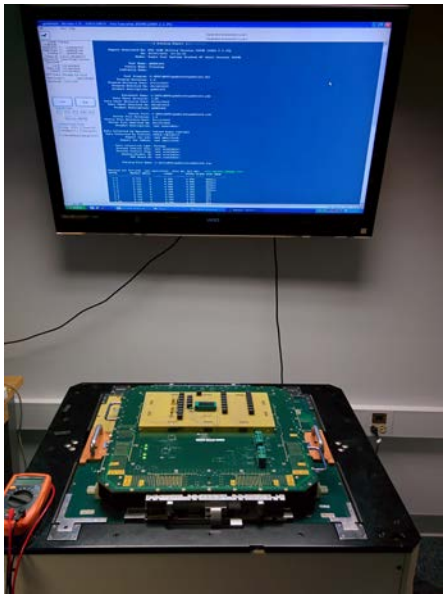
Any testing course not used in the required section.

Certificate Benefits

Demonstrate to potential employers student interest and specialized coursework in the integrated-circuit field.

Students obtain

- real-world experiences on an industry-grade tester
- enhanced problem solving skills, debugging skills, data analysis skills, and creative thinking



Industry obtains students with

- a solid foundation in integrated-circuit testing
- a rich experience with open-ended problems
- improved critical thinking skills
- some breadth in the integrated-circuit area

Process for Obtaining Certificate

- Take ECE351, two test and product engineering courses, and three elective courses
- Obtain certificate form from Sue Dayhuff in the ECE department
- Fill out form showing which courses were taken to complete the certificate
- Have your academic advisor validate that all courses have been completed and sign the form
- Have the certificate advisor, Tina Hudson, and department head, Bob Throne, sign the form
- Return the form to Sue Dayhuff. She will have the certificate verified by the registrar's office and provide a certificate upon graduate.

For More Information

Please contact the certificate advisor:

Tina Hudson
hudson@rose-hulman.edu

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Certificate Program In *Test and Product Engineering*

Rose-Hulman Institute of Technology
Electrical and Computer Engineering Department