

# ETec377 Course Specifications

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## Catalog Information

**Course Number and Title:** ETec377 - Instrumentation

**Credit Hours:** 4

**Course Description:** An introduction to electronic instrumentation techniques. Topics include sensors, signal conditioning circuits and noise reduction techniques. Typical sensor topics include temperature, force, torque, pressure, flow and acceleration. Typical signal conditioning circuits topics include dc and ac bridges, amplifiers, filters and analog-to-digital conversion. The laboratory consists of experiments with bridges and instrumentation amplifiers and small measurement

**Prerequisites:** ETEC 375 or ETEC 354

**Prerequisite Outcomes:** A strong background in ac circuit analysis using phasors

## Schedule Information

**Quarter:** Fall 2006

**Meeting Times and Rooms**

Days	Times	Instructor	Room(s)
MWF	11:00-11:50	Tom Grady	ES333
T	10:00-11:50	Tom Grady	ET338

**Lab Fee:** \$15.00

**Enrollment Limit:** 18

## Student Resources

**Student Syllabus:** <http://eet.etec.wvu.edu/etec377/377f06syl.pdf>

**Course Website:** <http://eet.etec.wvu.edu/etec377/index.html>

## Facilities and Materials

**Required Text:** Measurement and Instrumentation Principles, Alan S. Morris, Butterworth-Heinmann, 2001

**Lab Equipment:** Oscilloscope, power supply, signal generator, frequency counter, DVOM and breadboards

**Software:** PSPICE demo version, TINA (optional), MathCAD, Excel

## Course Outcomes

1. Specify sensors, amplifiers, filters and A/D converters for use in instrumentation circuits
2. Apply sensors in measurement systems
3. Estimate measurement system error
4. Test and evaluate components and systems in the laboratory
5. Working as a member of a small team on projects
6. Design data acquisition systems
7. Communicate experimental results to peers, oral presentations, laboratory notebook, final written report
8. Use noise reduction techniques to reduce noise and interference in measurement systems.
9. Plan, design and implement and test small measurement system

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### Courses Contribution to the Program Outcomes

P – Primary to the purpose of the course. Course contains significant instruction and opportunities for practice.

S – Secondary to the purpose of the course. Course contains limited instruction and opportunities for practice.

N – Not a significant part of this course.

Program Outcome		Course Contrib	Applicable Course Outcome(s)
a	An appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines.	P	1,2, 3, 4, 6,,8,
b	An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology	P	1,2, 3, 4, 6,8,
c	An ability to conduct, analyze and interpret experiments and apply experimental results to improve processes	P	7,8,9
d	An ability to apply creativity in the design of systems, components or processes appropriate to program objectives	P	5,6,9
e	An ability to function effectively on teams,	P	5
f	An ability to identify, analyze and solve technical problems	P	5,6,9
g	An ability to communicate effectively,	P	7,
h	A recognition of the need for, and an ability to engage in lifelong learning	S	6,9
i	An ability to understand professional, ethical and social responsibilities	S	5,6
j	A respect for diversity and a knowledge of contemporary professional, societal and global issues,	N	
k	A commitment to quality, timeliness, and continuous improvement	S	5,9
A	The application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers to the building, testing, operation, and maintenance of electrical/electronic(s) systems	P	1,2, 3, 4, 6, 8
B	The applications of physics or chemistry to electrical/electronic(s) circuits in a rigorous mathematical environment at or above the level of algebra and trigonometry	S	2, 9
C	The ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems	P	5,6,9
D	The ability to apply project management techniques to electrical/electronic(s) systems	S	5.6.9
E	The ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems	S	8,9

### Outcome Assessment Tools

1. Industrial Module Senior Survey.