

Abilene Approval Chart for Curriculum Changes

A = Approve I = Information Item R = Respond In Writing

Course Number: PHYS 342

or Degree Plan(s):

Short description:

Change format to single 3 hour lecture lab course instead of 2 hour lecture plus 1 hour lab. Update course description. See attached page at end.

Note: Separate form also submitted to close PHYS 343 - Measurement Techniques Lab

		Dept./School	College	Dean	TEC	AUAC/Grad	Provost
	Campus-Level Academic Review¹						
	Change to a Course Include signatures from all chairs/program directors for cross-listed courses. ¹						
1.	Title (description unchanged)	A	A	A	I	I	I
2.	Description (not affecting content)	A	A	A	I	I	I
3.	Course term(s)	A	I	A	I	I	I
4.	Content (change of course outcomes)	A	A	A	I	I	A
5.	Number of credit hours	A	A	A	A	A	A
6.	Course number within the hundred	A	A	I	I	I	I
7.	Course number beyond the hundred	A	A	A	A	A	A
8.	Prerequisites	A	A	A	I	I	I
9.	Course restriction (e.g., majors only, junior standing)	A	A	A	A	A	A
10.	Level change (U to G or G to U)	A	A	A	A	A	A
11.	Cross list course	A	A	A	A	A	A
12.	Department of record	A	A	A	A	A	A
13.	Open or close a course	A	A	A	A	A	A
	Change to a Degree Plan						
14.	Educational Program — Revise	A	A	A	A	A	A
15.	Educational Program — Adopt/revise admission requirements	A	A	A	A	A	A
16.	GPA — Revise program-required GPA	A	A	A	A	A	A
17.	Minor — Revise	A	A	A	A	A	A

		Dept./School	College	Dean	TEC	AUAC/Grad	Provost	Campus Faculty	Senior VPAA	President
	Full Review									
	Change to Catalog Information (for Campus)									
18.	General requirements for Bachelor's and Associate Degrees	-	-	-	-	A	A	A	A	I
19.	Policies governing academic probation and suspension	-	-	-	-	A	A	A	A	I
20.	Requirements for graduating with honors	-	-	-	-	A	A	A	A	I
	Change to a Degree Plan									
21.	Educational Program — Add or Discontinue ^{2 3}	A	A	A	A	A	A	A	A	I
22.	Educational Program — Discontinue (Provost-proposed)	R	-	R	A	A	A	A	A	I
23.	Minor — Add or Discontinue	A	A	A	A	A	A	-	A	I
24.	Minor — Discontinue (Provost-proposed)	R	-	R	A	A	A	-	A	I
25.	Degree — Add or Discontinue	A	A	A	A	A	A	A	A	I
26.	Degree — Discontinue (Provost-proposed)	R	-	R	A	A	A	A	A	I

		Dept./School	College	Dean	TEC	AUAC/Grad	Provost	Campus Faculty	Senior VPAA	President
	Change to General Education Requirements for Undergraduates (System)									
27.	Change course outcomes of an included course	A	A	A	A	A	A	-	A	I
28.	Add or drop a required course from the General Education Requirements	A	-	A	-	A	A	A	A	I
29.	Add or drop a course from a menu within the General Education Requirements	A	-	A	-	A	A	-	A	I
30.	Comprehensive revision of General Education Requirements	-	-	-	-	A	A	A	A	I

Notes

² Any change to a cross-listed course requires the signature of both department chairs or program directors overseeing the course to ensure that the courses stay in sync. This includes courses taught at other campuses (e.g., BIBL 101 and BIBO 101).

³ For undergraduate majors, a minimum of 30 hours is required. These programs must have a minimum of 6 elective hours, unless the requirements of external accrediting bodies make it impossible. Master's programs must include a minimum of 30 hours, and doctoral programs must include a minimum of 30 hours beyond the master's.

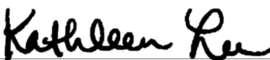
⁴ When a department/school or dean proposes closing a program, approval routing follows the typical process beginning with the department/school. An administrative proposal by the provost or senior vice president for academic affairs would follow the "provost-proposed" routing on the chart.

Department/School(s)

	03/26/26
Chair Signature	Date

Chair/Program Director Signature	Date
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College Academic Council(s)

	04/16/2026
Chair Signature	Date

Chair Signature	Date
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Dean(s)

	4/16/2026
Signature	Date

Signature	Date
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Teacher Education Council

Signature	Date
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**Campus Academic Council:
Abilene Undergraduate or Abilene Graduate**

Signature	Date
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Provost

Signature	Date
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University General Education Council

Signature	Date
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University Faculty

Abilene Faculty Senate Chair signature

Date

Dallas Faculty Council Chair signature

Date

Senior Vice President for Academic Affairs

Signature

Date

President

Signature

Date

Old Course Description:

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Terms Offered: Spring, even years

An introduction to transducers for measuring physical phenomena such as temperature, pressure, and acceleration. Signal processing and statistical concepts related to measured variables are also included. Prerequisite: [PHYS 222](#), [MATH 361](#). Corequisite: [PHYS 343](#).

Proposed Course Description:

Format: 3 hour lecture-lab format

Credit Hours: 3 hours

Terms offered: Spring, odd years

Introduction to scientific instrumentation. Methods for using various electronic sensors, conditioning their output, and integrating them with control systems or data acquisition systems. Also introduces remote operation and management of common laboratory instrumentation including creating drivers, data acquisition controls, and graphical user interfaces.

Prerequisite: PHYS 135 or ENGR 135

PHYS 342 Instrumentation

Last updated August 2025

About the Course

Course number and title: PHYS 342 Instrumentation

Credit hours: 3 hours

Semester and year: Spring of odd years

Meeting time and place: Onstead Science Center B21 Thursday 2-4:50 pm

Prerequisites/corequisites: PHYS/ENGR 135

Catalog description: Introduction to scientific instrumentation. Methods for using various electronic sensors, conditioning their output, and integrating them with control systems or data acquisition systems. Also introduces remote operation and management of common laboratory instrumentation including creating drivers, data acquisition controls, and graphical user interfaces.

Intended audience: This course is intended for scientists interested in learning more about how electronic sensors interface with data acquisition equipment for experimentation.

About the Instructor

Professor's name, title, or rank: Dr. Larry Isenhower, Professor

Office location (if available): OSC 113B

Phone number(s): 673-6326

Email address: ldi00a@acu.edu

Office hours/Contact expectations: MWF x:xx-y:yy, TR x:xx-y:yy, other times by appointment.

Mission Statements

ACU Mission: The mission of Abilene Christian University is to educate students for Christian service and leadership throughout the world.

College Mission: The mission of the Onstead College of Science and Engineering is to explore and understand God's creation in the natural world and apply the acquired knowledge and principles to address its issues and challenges.

Department Mission: The ACU physics program strongly supports the university's mission of educating students for Christian service and leadership throughout the world. In support of this mission, ACU physics graduates will attain:

- A deep and broad understanding of physics principles and practices as evidenced by professional employment, continued professional development and graduate study in physics or other professional fields.
- An extensive knowledge of the problem solving and experimental design skills unique to physics professionals.
- A thorough understanding of Christian service and leadership as shown in commitments to professionalism, ethics, and service and leadership within the physics profession, church, and society.

Unique Christian Perspective: This course helps students learn skills to better study the universe that is God's creation.

Course Content

Outline of topics: This course will cover the following core topics:

- Types of sensors
- Filtering and amplification circuits used with various sensors
- Basics of analog and digital signal transmission
- Analog to digital conversion
- Foundations of data acquisition systems
- Basic remote instrumentation control using various VISA protocols

Format of Class: This class is a lecture lab course where new material will be introduced theoretically at the start of class and then practical experience will be gained through building and testing example circuits. Students will also have a project that will involve building either a data acquisition or a feedback control system that is built during the course of the class.

Instructional Materials

Textbook:

The Art of Electronics 3rd edition by Paul Horowitz and Winfield Hill, Cambridge University Press, ISBN: 0521809266

Additional materials such as lab procedures will be provided through Canvas.

Course Outcomes

The goal of this course is to familiarize students with techniques used when using electronic sensors for making measurements in a science laboratory. This includes an introduction to types of sensors, their supporting amplification and filtering circuits, signal transmission, and instrumentation control needed for many scientific measurement applications. To support this goal this course has the following specific course outcomes:

	Outcome	Measurement Instrument
1	Demonstrate knowledge of the common types of electronic sensors used in experimental measurements	Lab notebook, lab report assignments, quizzes, exams
2	Demonstrate knowledge of sensor filter and amplification circuits	Lab notebook, lab report assignments, quizzes, exams
3	Demonstrate knowledge of how to use scientific instrumentation, including remote operation.	Lab notebook, lab report assignments, quizzes, exams
4	An ability to apply knowledge gained in this course to build a data acquisition or electronic feedback control system	Lab project

Class Activities and Grading

Attendance: Each class is critical to the material covered in the course and will need to be made up. Missed classes must be made up as soon as possible, within 1 week unless extenuating circumstances preclude this.

Quizzes: Homework quizzes will be given to test your knowledge of the material covered in the class and to give you examples of things that will show up on the exams.

Lab notebook: You will maintain a lab notebook with notes about work completed during the practical portion of class. This is a critical resource as you will be allowed to use it on quizzes and exams.

Lab reports: This is a short summary of each day's practical experience. You should reflect on how the theoretical expectations and experimental results compare and discuss applications of the covered material.

Exams: There will be 2 exams during the semester. These are effectively longer quizzes intended to make sure you can retain and recall the knowledge gained during the course.

Lab Project: The lab project will be a semester long project where you will pick a specific sensor type to build a full data acquisition or feedback control system. An example feedback system could be: a light sensor like a photodiode used to adjust the output of a light source in order to achieve a specific light pattern. An example data acquisition system could record data from a temperature sensor and then perform an analysis of the data to achieve some specific measurement. Students will prepare a written report submitted during the last week of class, and an oral presentation of their project will be presented for the course final.

Late work: All coursework must be completed on time. No late work will be accepted without a university approved excuse (sickness with Doctor note, advanced approval form, etc.).

Example:

Activities	Weighting
Attendance and Participation	10%
quizzes	10%
Lab notebook	20%
Lab reports	10%
Lab project	30%
Exams	20%
Total	100%

Range of Points	Final Letter Grade
90%-100%	A
80%- 89%	B
70%-79%	C
60%-69%	D
Below 59%	F

Rules for discussing grades: Any questions about grades should be made only with the instructor of the course.

University Resources

I care about your class experience. The university also has a number of resources in place to support the ACU community both in this class and all aspects of university life.

Reporting Violations / Concerns / Complaints

Incident reports alleging violations of Student Conduct or concerns/complaints can be submitted [here](#). Please use the form to submit information about an incident to Student Life / Office of the Dean of Students.

SOAR (Student Opportunities, Advocacy, and Resources):

SOAR partners with faculty, staff, parents and students to assist ACU students and connect them to resources available to support their path to success. For more information about SOAR or to make a SOAR recommendation, see <https://acu.edu/soar-program/>.

Mental Health Resources

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. Abilene Christian University is committed to supporting students addressing any of these concerns.

You can contact the [Medical and Counseling Care Center](#) at counseling@acu.edu, or by calling 325-674-2626. In addition, you can access free confidential counseling services through the Timely Care app by downloading their app on any device.

In a crisis situation contact the National Suicide Prevention Hotline open 24/7 by dialing 988, or call the Police at 911.

Another wonderful resource to help you learn how to manage your stress as a student can be found in your Compass app. The Wellness Badge is designed to help you understand how to manage your stress and how to do so on our campus. Completing each of the pathways earns you a chance at incentives, and completing the entire badge will earn you 200 chapel points. You can find the badge in your Compass app.

University and Course Policies

ADA Compliance Policy:

Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The ACU website provides more information at <https://acu.edu/about/uap/overview-2/about-2/>.

Please contact me to discuss any approved accommodations that you require for this class.

Title IX Policy:

At ACU, we strive to comply with all applicable legal requirements prohibiting, preventing, and responding to sexual misconduct against any member of the ACU community. The full Title IX policy and process can be found at <https://acu.edu/human-resources/title-ix-and-sexual-misconduct-information/>.

Academic Integrity Policy:

Academic integrity is demonstrated by behavior that honors the learning environment, regardless of setting, context, location or modality. ACU's Academic Integrity Policy can be found at <https://acu.edu/office-of-the-provost/academic-policies/>.

Technology use: We will make extensive use of computers and other technology during this course. The goal of this course is to prepare you for real world situations where use of AI will likely be expected to save time, but we also know that undisciplined use of AI can easily lead to a severe lack of learning. Therefore in this class we will allow limited use of AI tools. You are expected to carefully check the output of any AI tools and ensure that any outputs are edited to be easily understandable by the appropriate audience and verified to be accurate. Use of unedited AI output that does not meet this goal will lead to a warning on the first occurrence and if repeated will result in a zero for the grade on that particular assignment.

Calendar

Week	Topic	Major Assignments
Week 1	Course introduction	
Week 2	Resistive Sensors	
Week 3	Capacitive Sensors	
Week 4	Voltage Sensors	
Week 5	Current Sensors 1	Project topic and outline
Week 6	Current Sensors 2	
Week 7	Signal Transmission	Exam 1
Week 8	Analog to Digital conversion (ADC)	
Week 9	ADCs and FPGAs	
Week 10	FPGAs	Project mid-point check in
Week 11	Analog Feedback	
Week 12	Analog Feedback	
Week 13	Digital Feedback controls	Exam 2
Week 14	Data Acquisition	
Week 15	Remote operation	Project report due

* This schedule is the course plan but circumstances may require things to be modified. Any changes will be communicated through Canvas.