NEW YORK CITY COLLEGE OF TECHNOLOGY

Computer Engineering Technology | Course Outline

Course: CET 3615 - Instrumentation and Data Acquisition
Course coordinator: Prof. Seymour Blank **Revision Date:** Spring 2026

Credits: 4 **Contact Hrs: 6** **Class Hrs: 3** **Lab Hrs: 3** **Recitation Hrs: 0**
This course is: [X]Required [ ]Elective [ ]Selective Elective

Catalog Course Description:
An introduction to the concepts and techniques of instrumentation. Analog and digital techniques are used, taking into account standards, precision, accuracy and sensitivity in the data-acquisition process. Interfacing with mechanical and electronic sensors. The lab emphasizes practical components and system analysis with evaluation of results, and utilizes computer based data-acquisition systems as well as stand-alone instruments.

Pre-Requisites: MAT 1575 or higher, CET 3525, PHYS 1434 or PHYS 1442,

Co-Requisites: CET3615L

Textbook, title, author and year:
Student Reference Manual for Electronic Instrumentation Laboratories (2nd ed);
Wolf and Smith (W&S), Prentice Hall, 2004
Introductory Circuit Analysis by Robert L. Boylestad (13th ed), Prentice Hall, 2016

Course Learning Outcomes

Upon successful completion of this course, the student will be able to:

1. Select and correctly utilize an instrument (analog multimeter, digital multimeter, or oscilloscope) whose input impedance is large enough, relative to the output impedance of the circuit, to make the desired measurement.
2. Determine the frequency characteristics of a given circuit and of a given measuring instrument.
3. Select and correctly utilize an instrument (analog multimeter, digital multimeter, or oscilloscope) which is capable of making the desired measurements, taking into account the frequency characteristics of the circuit and the instrument.
4. Understand the behavior of operational amplifiers and be able to design and build an op amp circuit which will faithfully amplify a signal to be measured.
5. Understand the characteristics of analog-to-digital (A-D) converters and be able to utilize A-D converter hardware and software installed in a personal computer.

General Education Outcomes

SKILLS/Inquiry/Analysis: Employ scientific reasoning and logical thinking.

Student Outcomes listed in the ETAC/ABET Criterion 3 Addressed in this Course	Level
1. Ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering and technology to solve broadly-defined engineering problems appropriate to the discipline;	R
2. Ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;	R
3. Ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;	R
4. Ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and	R
5. Ability to function effectively as a member as well as a leader on technical teams.	R

ABET Program Criteria: Computer Engineering Technology	Level
a. Ability to analyze, design, and implement hardware and software computer systems.	R
b. Ability to apply project management techniques to computer systems.	
c. Ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of computer systems and networks.	

***Legend**: I (Introduce), R (Reinforce) and E (Emphasize). Unmarked means not addressed*

Brief list of topics to be covered:
(Weekly Topic Summary)

1. DC Circuits Analysis / Loading Effects: Boylestsad: Chapters 1-7
2. Network Theorems: Boylestad: Chapters 8,9
3. Sinusoidal Analysis: Boylestad: Chapters 13,14
4. A.C. Measurements (avg & rms values) Boylestad: Pg 576-593, 1124,25
5. Statistical Evaluation of Data; dB: W&S: 28-43
6. R,L,C Circuits, Filters & Frequency Response: Boylestad: Chapters 15 & 21
7. Frequency Response (cont'd)
8. Midterm Exam
9. Operational Amplifiers W&S: 430 - 458
10. Operational Amplifiers W&S: 430 - 458 (cont.)
11. Operational Amplifiers W&S: 430 - 458 (cont.)
12. Data Converters (A/D, D/A) W&S: 115-137; 491-513
13. Data Converters (cont'd)
14. Sensor-Amplifier Systems: W&S: 295-299, 381-426
15. Final Exam

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Course: CET 3615L - Instrumentation and Data Acquisition Lab
Course coordinator: Prof. Seymour Blank **Revision Date:** Spring 2026

Credits: 0 **Contact Hrs:** **Class Hrs: 3** **Lab Hrs: 3** **Recitation Hrs: 0**
This course is: [X]Required [ ]Elective [ ]Selective Elective

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An introduction to the concepts and techniques of instrumentation. Analog and digital techniques are used, taking into account standards, precision, accuracy and sensitivity in the data-acquisition process. Interfacing with mechanical and electronic sensors. The lab emphasizes practical components and system analysis with evaluation of results, and utilizes computer based data-acquisition systems as well as stand-alone instruments.

Pre-Requisites: MAT 1575 or higher, CET 3525, PHYS 1434 or PHYS 1442,
Co-Requisites: CET3615

Textbook, title, author and year: CET3615 Lab Manual

Other supplemental materials:
Student Reference Manual for Electronic Instrumentation Laboratories (2nd ed);
Wolf and Smith (W&S), Prentice Hall
Introductory Circuit Analysis by Robert L. Boylestad (13th ed), Prentice Hall

Course Learning Outcomes

Upon successful completion of this course, the student will be able to:

1. Select and correctly utilize an instrument (analog multimeter, digital multimeter, or oscilloscope)
2. Determine the frequency characteristics of a given circuit and of a given measuring instrument.
3. Select and correctly utilize an instrument (analog multimeter, digital multimeter, or oscilloscope)
4. Understand the behavior of operational amplifiers and be able to design and build an op amp circuit which will faithfully amplify a signal to be measured.
5. Understand the characteristics of analog-to-digital (A-D) converters and be able to utilize A-D

General Education Outcomes

INTEGRATION/Systems: Ability to analyze, design, and implement hardware and software

SKILLS/Inquiry/Analysis: Employ scientific reasoning and logical thinking.

Student Outcomes listed in the ETAC/ABET Criterion 3 Addressed in this Course	Level
1. Ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering	
2. Ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;	R
4. Ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and	R

ABET Program Criteria: Computer Engineering Technology	Level
b. Ability to apply project management techniques to computer systems.	

***Legend**: I (Introduce), R (Reinforce) and E (Emphasize). Unmarked means not addressed*

Brief list of topics to be covered:
(Weekly Topic Summary)

Week	Topic	Lab
1	Your Ears as a Measuring Instrument	Lab #1
2	Input Impedance and Loading Error	Lab #2
3	AC and DC Measurements	Lab #3
4	AC & DC Measurements, cont'd	
5	Introduction to LabView	Lab #4
6	LabView, cont'd	
7	LabView, cont'd	
8	Bandwidth & Frequency Response: Low Pass Filter	Lab #5
9	Bandwidth & Frequency Response: High Pass Filters)	
10	Bandwidth & Frequency Response: Band Pass Filter	Lab #6
11	Gain and Bandwidth of Operational Amplifiers	Lab #7
12	Gain and Bandwidth of Operational Amplifiers, cont'd	
13	R2R Digital to Analog Conversion	Lab #8
14	Weighted R Digital to Analog Conversion	Lab #9
15	3 Bit Flash Analog to Digital Converter	Demo