Physics 171
Introductory Projects in Physics
Fall 2019

Instructor:	Dr. Andrew B. Croll
	Room 212b, South Engineering
	1211 Albrecht Blvd
	Fargo, ND 58108-6050
	Andrew.croll@ndsu.edu
Office Hours:	Monday and Tuesday 12:00 to 3:00

Description: Basic computer controlled instrumentation for automation and data acquisition. Design of simple measurement and control projects covering waveforms, temperature measurement and robotics. Elementary data analysis: curve fitting, Fourier theory and statistics.

Course Objectives: After completing this course, students will be able to interface and control instrumentation using computer software; students will be able to acquire data from instruments, plot the data, and apply curve fits to the data; and students will be able to build and operate simple instruments.

Objectives are met by group-oriented project based learning schemes. Students will be evaluated through their physical progress towards a particular goal, and through the presentation (oral) of their particular solution to each problem and the robustness of the physical outcome (how well conceived is their solution).

Prerequisites: None.

Credits: 1

Class: W 3:00 - 5:00 - NDSU South Engineering, Rm 221. According to NDSU Policy 333, attendance in classes is expected and will be counted toward your overall grade as described below.

Required Course Materials:
(1) Student Version Software (optional)
(2) Software Manual (optional)
(3) Lab Manual (Provided by Department)

Evaluation:

Introductory Concepts	15%
Projects 1	35%
Projects 2	35%
Participation	15%

Grading:

85%	-	100%	A,
70%	-	85%	B,
60%	-	70%	C,
50%	-	60%	D,
0%	-	50%	F.

Introductory Concept Mark: 2 – Group Achieves Project Goal
                                    1 – Group Has Made Progress Towards Project Goal
                                    0 – Group Has Made No Significant Progress

Project Mark: 5 – Chalk Talk: Group must demonstrate the outcome of their project, and demonstrate an understanding of structural and software design.

                      5 – Project: Is the project functional? How well does it accomplish its goal? Style. Completeness. Creativity.

                      10 – Report: A 2 Page (double spaced) report from each individual in a group. The report is a written description of the project, intended to instruct a peer in its purpose, construction and operation.

Participation Mark: 2 – Student attends and contributes to group
                                  1 – Student attends
                                  0 – Student is not present

Make-up Policy: There is no option for make-ups. Participation marks will be forgiven in the case of legitimate absence.

Academic Honesty: The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.

AMERICAN DISABILITIES ACT FOR STUDENTS WITH SPECIAL NEEDS STATEMENT
Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with the instructor and contact the Disability Services Office as soon as possible. Assistance is also available from Disability Services in 212 Ceres Hall (231-8463).
http://www.ndsu.edu/disabilityservices/

Course Schedule:

	Topic	Evaluation:
Week 1	Introduction to Software	Plotting a function
Week 2	Introduction to circuits	Assembly of LED circuit
Week 3	Powering a circuit with software	Flashing LED
Week 4	Measuring DC Voltage with Software	Thermometer
Week 5	Measuring Real Data	Plotting the Noise Spectrum
Week 6	Simple Amplification	Making a Noisy Speaker
Week 7	Op Amps	Make an Integrator
Week 8	Project 1	Participation.
Week 9	Project 1	Participation.
Week 10	Project 1	Participation.
Week 11	Project 1	Chalk Talk Presentations
Week 12	Project 2	Project 1 Report Due. Participation.
Week 13	Project 2	Participation.
Week 14	Project 2	Participation.
Week 15	Project 2	Chalk Talk Presentations.
Week 16	Extra Credit Day	Project 2 Report Due. Extra credit (improving , fixing, finishing project 1 or 2)