

**PHYS 230: Digital Electronics**

Syllabus, Spring 2022



Dr. James McLean

Office: ISC 228G (old Greene)

Phone: 245-5897

Web site: <http://www.geneseo.edu/~mclean/>E-mail: [mclean@geneseo.edu](mailto:mclean@geneseo.edu)Course Websites: <http://www.geneseo.edu/~mclean/Digital/> and in [Canvas](#)**Course Description and Learning Outcomes**

This course has no prerequisites. No prior experience is required. You will learn to use standard digital components, including 7400 series TTL chips and the Arduino Uno R3 microcontroller, to solve practical problems. The laboratory experience is a very important part of the course; you will probably spend more than half of your time designing and building actual circuits, and then debugging them using a digital voltmeter and oscilloscope. Design tools include Boolean logic and either TinkerCAD or LogiSym software. Basic elements of a C-like programming language will be covered for the Arduino.

**Times and places**

Lecture &amp; Lab: ISC 215 (old Greene), Tue 1:00–3:50PM and Thu 1:00–1:50PM

Final Session: ISC 215 (old Greene), Thu, May 19, 12:00–2:30PM

Office hours: Mon 3:00–4:30PM, Wed 1:00–3:00PM, Thu 2:00–3:30PM

I am also available at other times; see the schedule on my web site. Just stop by my office, or if you want to ensure that I'll be there, contact me by phone or email.

**Required materials**

Textbook: None

Laptop Computer: Required for laboratories.

Software: *Arduino IDE* is available to download for all popular computer OS.

Lab Materials: Official Arduino Starter Kit, equipment &amp; supplies for final project

Students may borrow physics department equipment for their projects, with permission of the instructor. This equipment must be returned in good working order at the end of the semester. Failure to do so will result in an Incomplete for the course until the equipment is replaced, at student expense if necessary.

**Grading**

<b>Arduino Projects</b>	pts		<b>Mid-term Project</b>	pts
1: Blinking LED	1		Step 1	4
2: Spaceship Panel	2		Step 2	4
3: Thermal Meter	2		Step 3	5
4: Color Mixing Lamp	2		Step 4	7
5: Mood Cue	2		<i>Total</i>	<i>20</i>
6: Light Theremin	2			
7: Keyboard Instrument	2		<b>Final Project</b>	
8: Digital Hourglass	2		Step 1: Concept Design	3
9: Motorized Pinwheel	3		Step 2: Hardware Check	4
10: Zoetrope	4		Step 3: Hardware Control	5
11: Magic Ball	4		Step 4: Basic Functioning	6
12: Knock Lock	4		Step 5: Public Faire	12
<i>Total</i>	<i>30</i>		<i>Total</i>	<i>30</i>
3D Printing Qualification	5 pts		Lecture Topic Quizzes	15 pts

## General Comments

If you need to return materials to me outside of class, the best option is to bring it to my office. If I'm not in, place in the tray on the door or slide it under my door for greater privacy.

SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. The Office of Accessibility will coordinate reasonable accommodations for persons with physical, emotional, or cognitive disabilities to ensure equal access to academic programs, activities, and services at Geneseo. Students with letters of accommodation should submit a letter to each faculty member and discuss their needs at the beginning of each semester. Please contact the Office of Accessibility Services for questions related to access and accommodations (Erwin 22, 585-245-5112, [access@geneseo.edu](mailto:access@geneseo.edu), <https://www.geneseo.edu/accessibility-office>).

## Calendar Best Guess

The details of this plan are a work-in-progress...

Week of ...	HW due Tue	Tue Lect.	Tue Lab	Wed	HW due Thu	Thu Lect.
Jan 24						
31	1 blink 2 spaceship				3 Love meter	
Feb 7	4 color lamp 5 mood cue				6 Theremin	
14	7 keyboard 8 hourglass				9 Pinwheel	
21	10 zoetrope 11 magic ball				12 Knock lock	
28	3D Printing Qualification					
Mar 7			Dishwasher 1			
14						
21			Dishwasher 2			
28			Dishwasher 3			FP1 Concept design
Apr 4			Dishwasher 4			
11			FP2 Hardware chk			
18			FP3 Drive hardware			
25						
May 2			FP4 Functioning			
9						
16						FP5 Faire