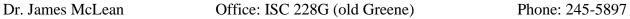
## SUNY Geneseo, Department of Physics and Astronomy

# **PHYS 230: Digital Electronics**

Syllabus, Spring 2022



Web site: <a href="http://www.geneseo.edu/~mclean/">http://www.geneseo.edu/~mclean/</a> E-mail: <a href="mclean@geneseo.edu">mclean@geneseo.edu</a> Course Websites: <a href="http://www.geneseo.edu/~mclean/Digital/">http://www.geneseo.edu/~mclean/Digital/</a> and in <a href="mclean@geneseo.edu">Canyas</a>

## **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 & 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 & 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

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Arduino Projects	pts	Mid-term Project	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	Total	20
6: Light Theremin	2		
7: Keyboard Instrument	2	Final Project	
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
Total	30	Total	30
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.

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#### **Calendar Best Guess**

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

Week	tans of this plan are	Tue			HW due	
	UW due Tue		Tuelsk	Wed		Thu Lock
of	HW due Tue	Lect.	Tue Lab	wea	Thu	Thu Lect.
Jan 24						
	1 blink				3 Love	
31	2 spaceship				meter	
	4 color lamp				6	
Feb 7	5 mood cue				Theremin	
	7 keyboard				9	
14	8 hourglass				Pinwheel	
	10 zoetrope				12 Knock	
21	11 magic ball				lock	
	3D Printing					
28	Qualification					
Mar 7			Dishwasher 1			
14						
21			Dishwasher 2			
28			Dishwasher 3			FP1 Concept design
Apr 4			Dishwasher 4			
7,151			FP2 Hardware			
11			chk			
			FP3 Drive			
18			hardware			
25						
May 2			FP4 Functioning			
9						
16						FP5 Faire