

# Physics 623 Syllabus

## Spring 2026

Lecture in 2223 Chamberlin, TR 1:00 – 2:15 pm  
Labs in 3119A Chamberlin, Wed. 2:25-5:25 pm and 7:00-10:00 pm

### Instructors:

Dan McCammon (Labs)  
Office hours: 4-5pm Mondays (tentative) in 6207/6242 Chamberlin + phone or email  
6207 Chamberlin Hall  
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Mitch McNanna (Lectures/Exams)  
Office hours: TBD  
6246 Chamberlin Hall  
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Course homepage: <https://www.physics.wisc.edu/courses/home/spring2026/623/>

**Text:** “The Art of Electronics” by Horowitz and Hill, Cambridge 3rd Ed.

**Useful General References (pdf's available on course website):**

#### Alternative Introductory Texts:

“[Introduction to Modern Electronics](#)”, J. C. Sprott (Wiley) [**recommended supplement**]  
“All About Circuits” on-line open source text: <http://www.allaboutcircuits.com/textbook>  
“Basic\_Engineering\_Circuit\_Analysis”, Irwin&Nelms  
“Electronic circuits-fundamentals and applications”, Tooley - 5th ed  
“Fundamentals-of-electric-circuits”, Alexander-5th-ed

#### Other references:

“The Art and Science of Analog Circuit Design”, Jim Williams  
“Troubleshooting\_Analog\_Circuits”, Pease  
“Learning the Art of Electronics A Hands-On Lab Course”  
These and many more useful resources available on the course website.

### Evaluation:

50% Laboratory (understanding, skills development, **notebook**, prelabs)  
50% Lecture: Exams (70%), homework (30%)

Final has double weight of a midterm. Will drop your lowest midterm or half the weight of the final.  
Scale: 90^=A, 80^=AB, 70^=B, 60^=BC, 50^=C, 40^=D. No curve. Everyone can get an A. Study together. Come to office hours, these are used as a discussion session. Please don't skip any labs. Makeups are freely given — if you miss a lab due to research activities or illness, please see the lab instructor as soon as possible (must be before lab except in case of illness).

The homework is assigned two ways. Each week for the laboratory, there is a worksheet that you must complete and turn in before starting the lab. Some weeks, this is extensive enough that it constitutes the homework for that week (and will count on your homework grade as well). Other weeks, homework problems will be assigned on Thursday in class and due the following Thursday in class. Late homework is not accepted. Please see the lecture instructor if you will miss a homework assignment or lecture.

# Physics 623 Lectures and Labs — Spring 2026

Week	Date (TR)	Lecture Topic	Lab (W)	Laboratory	Text reference
1	Jan. 20	Linear Circuit Theory			Ch. 1
	Jan. 22	More LCT			Handout
2	Jan. 27	Time-dependent Circuits	Jan. 28	Introduction-Scope*	Ch. 1
	Jan. 29	Phasors & Transmissions Lines			Ch. 1
3	Feb. 3	Transistor Amplifiers	Feb. 4	Transmission Lines*	Ch. 2
	Feb. 5	Difference Amplifiers			Ch. 2
4	Feb. 11	Negative Feedback	Feb. 11	Transistor Amplifier	Ch. 4
	Feb. 12	Op-amps I			Ch. 4
5	Feb. 17	<b>MIDTERM EXAM</b>	Feb. 18	Operational Amps 1	
	Feb. 19	Op-amps II			Handout
6	Feb. 24	Noise I	Feb. 25	Operational Amps 2	Ch. 8
	Feb. 26	Noise II			Ch. 8
7	Mar. 3	Lock-in amplifiers	Mar. 4	Johnson Noise	Ch. 8.14
	Mar. 5	Lock-in applications			Ch. 8.14
8	Mar. 10	Oscillators and positive feedback	Mar. 11	Phase Detector	Ch. 7
	Mar. 12	Digital Logic			Ch. 10
9	Mar. 17	Digital Circuits I	Mar. 18	Oscillators	Handout
	Mar. 19	Integrated Circuits			
10	Mar. 24	<b>MIDTERM EXAM</b>	Mar. 25	Digital Circuits	
	Mar. 26	Phase Locked Loops			
March 28 – April 5		<b>Spring Break</b>			Ch. 13.13
11	Apr. 7	DACs and ADCs	Apr. 8	Phase Locked Loops	Ch 13.1-13.12
	Apr. 9	DACs and ADCs			Ch 13.7-13.8
12	Apr. 14	Circuit Simulation	Apr. 15	DAC & ADC	
	Apr. 16	FPGA I			Appendix J - Handouts
13	Apr. 21	FPGA II	Apr. 22	Circuit Simulation	Ch. 11
	Apr. 23	Modulation and communication			Handout
14	Apr. 28	Digital computers	Apr. 29	FPGA I	Handout
	Apr. 30	Review			
Sunday May 3, 10:05 AM – 12:05 PM		<b>FINAL EXAM</b>			

\*Read Appendix “O” on oscilloscopes in Horowitz & Hill. Also scope tutorials and manuals on course website.