

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: 11:00am-12:30pm Tuesdays in 3119A Chamberlin + email
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 (H&H, except for intro)
1	Jan 20	Linear Circuit Theory			Sprott Ch.1
	Jan 22	More LCT			Sprott Ch.2
2	Jan 27	Time-dependent Circuits	Jan 28	Oscilloscope Intro*	Sprott Ch.3
	Jan 29	Phasors & Transmission Lines			Sprott 4.1-4.5
3	Feb 3	Bipolar Junction Transistors	Feb 4	Transmission Lines	Ch.2, Sprott 8.1-8.3
	Feb 5	Transistor Amplifiers			Ch.2, Sprott 8.4
4	Feb 10	Difference Amplifier	Feb 11	Transistor Amplifier	Ch.2
	Feb 12	Op-amps I			Ch.4
5	Feb 17	Op-amps II, Feedback	Feb 18	Op-amps I	Ch.4
	Feb 19	MIDTERM EXAM			
6	Feb 24	Noise I	Feb 25	Op-amps II	Ch.8
	Feb 26	Noise II			Ch.8
7	Mar 3	Lock-in amplifiers	Mar 4	Johnson Noise	8.14
	Mar 5	Fourier Transforms			Handout
8	Mar 10	Oscillators, Positive Feedback	Mar 11	Phase Detector	Ch.7
	Mar 12	Digital Logic			Ch.10
9	Mar 17	Digital Circuits	Mar 18	Oscillators	Ch. 10
	Mar 19	Integrated Circuits			
10	Mar 24	MIDTERM EXAM	Mar 25	Digital Circuits	
	Mar 26	Phase Locked Loops			13.13
Mar 28 – Apr 5		Spring Break			
11	Apr 7	DACs and ADCs I	Apr 8	Phase Locked Loops	13.1-13.12
	Apr 9	DACs and ADCs II			13.1-13.12
12	Apr 14	Advanced Logic	Apr 15	DAC & ACD	
	Apr 16	Finite State Machines			
13	Apr 21	Circuit Simulation	Apr 22	Circuit Simulation	
	Apr 23	FPGA I			Appendix J
14	Apr 28	FPGA II	Apr 29	FPGA	Ch. 11
	Apr 30	Review			
Sunday, May 3, 10:05am-12:05pm		FINAL EXAM			

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