

PHY 5420 Advanced Electronics Winter 2021

Online

Monday, Wednesday 3:30-5:17 pm (Please stay tuned)

Instructor: Wei Zhang, Ph.D.

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Office hours: by appointment and online

Email is a very reliable way to communicate with me, as well as the likely way that I will use to communicate with the class. It is good to get in the habit of checking your email on a regular basis, if you don't already do so.

Textbook: **No Textbook required.** I will be using my own developed materials. Useful reference books, in which my materials are partly developed from, include:

R. Jager, "Introduction to Microelectronic Fabrication", 2nd Ed.

S. Datta, "Lessons from Nanoelectronics: A New Perspective on Transport (In 2 Parts: A and B)", 2nd Ed.

M. Nielsen & I. Chuang, "Quantum Computation and Quantum Information", 10th Anniversary Ed.

D. M. Pozar, "Microwave Engineering", 4th Ed.

S. Kasap, "Optoelectronics and Photonics: Principles and Practices", 2nd Ed.

S. Kasap, "Principles of Electronic Materials and Devices", 4th Ed.

M. Wolf, "The Physics and Computing", 1st Ed.

R. Shankar, "Principle of Quantum Mechanics", 2nd Ed.

Topics: The course will cover 4 main panels, and hopefully we can finish them all.

Panel 1: Modern industrial electronics fabrication,

– from concepts, tools, to technologies.

Panel 2: Fundamentals to Nanoelectronics – what

to care about and how?

Panel 3: Microwave devices, magnetic, photonic

and opto-electronic devices.

Panel 4: Novel device research directions –

quantum materials, quantum information science,

neuromorphics, and so on.

Grading policy:

- **In-class short quiz** (25%): in-class quiz questions will be given at selective class-meet days. Typically multiple-choices questions. The answers need to be submitted by the end of that day's lecture.
- **In-class presentation** (35%): A 10-min presentation is expected from each student. Topic selection options will be given around mid-term. Currently scheduled: **Monday, Mar 1st** (tentative)

- **Final report** (40%): A reading report is expected from each student. Topic selection options will be given around the end of the semester. The report is due on: **Wednesday, April 21th**

The relation between the overall percentage and the grade is as follows:

50% -- 1.0, 60% -- 2.0, 75% -- 3.0, 95% -- 4.0

Letter Grade	4.0 Scale	Percent Scale	Letter Grade	4.0 Scale	Percent Scale
A	4.0	95 – 100	C+	2.3 – 2.6	65 – 69
A-	3.7 – 3.9	88 – 94	C	2.0 – 2.2	60 – 64
B+	3.3 – 3.6	81 – 87	C-	1.7 – 1.9	57 – 59
B	3.0 – 3.2	75 – 80	D+	1.3 – 1.6	53 – 56
B-	2.7 – 2.9	70 – 74	D	1.0 – 1.2	50 – 52
			F	0.0	<50

Schedule (Winter 2021):

		Monday		Wednesday
Week 1			6 _{Jan}	Course Introduction
Week 2	11	Begin Panel 1	13	
Week 3	18	MLK - no class	20	
Week 4	25		27	
Week 5	1 _{Feb}		3	Begin Panel 2
Week 6	8		10	
Week 7	15		17	
Week 8	22	WI recess	24	WI recess
Week 9	1 _{Mar}	Presentation day	3	Catch-up day
Week 11	8	Begin Panel 3	10	
Week 12	15		17	
Week 13	22		24	Begin Panel 4
Week 14	29		31	
Week 15	5 _{Apr}		7	
Week 16	12		14	Class review
Week 17	19	Study day	21	Final report due

COVID-19 disclaimer: due to the ever-changing COVID-19 situation, please **stay tuned on email** for any changes and updates regarding the class, including but not limited to, the delivering format and the course schedule.