

PHYSICS 204 - Physics for Computer Science II, Section 1 Spring 2020

Aims of the Course:

1. To understand the principles of Physics that can help you design Computer Software and Hardware.
2. To give you experience in thinking to solve problems. Engineers solve (real world) problems.

Lecture/Recitation: Tuesday & Thursday, 1:40 PM – 3:30 PM in Remsen Room 209

Dr. Larry Liebovitch: <http://people.qc.cuny.edu/Faculty/Larry.Liebovitch/>

Office Hours: Tuesday & Thursday 12:30 PM - 1:30 PM in SB B322

Lecture Videos, Powerpoints, and other materials will be posted at:

<https://drive.google.com/drive/u/1/folders/1DF-3sh7qHZfdZj7KIPEWKMKkfsMLt-e9>

Textbooks (OPTIONAL):

Michael G. Raymer. The Silicon Web: Physics for the Internet Age. (Taylor & Francis, 2009).

Barabasi. Linked. (Perseus Publishing, 2002).

Hecht. College Physics, 12th Ed. (Schaum's Outlines, 2017)

Mermin. Quantum Computer Science. (Cambridge University Press, 2007).

Liebovitch. Fractals and Chaos: Simplified for the Life Sciences (Oxford University Press, 1998).

Mazzucato. Entrepreneurial State: Debunking Public vs. Private Sector Myths (Anthem, 2013).

Attendance in Lecture and Recitation is required and attendance will be taken

Grading Policy:

20% Exams

Problems similar to those in the Recitation

Midterm: March 19, 2020 (10% of course grade)

Final Exam: (TBA, May 15-22, 2020) (10% of course grade)

20% Recitation Problems

Done in recitation classes.

MUST ATTEND RECITATION CLASS TO RECEIVE CREDIT FOR THAT RECITATION

30% Projects

TWO executable PROGRAMS illustrating physics from the course, each WITH a VIDEO

#1 program+video due before 3:30 PM Thursday March 26, 2020 (late = 0 credit)

#2 program+video due before 3:30 PM Thursday May 7, 2020 (late = 0 credit)

Topic must be approved, in advance, by the instructor

Each Program+Video (15% of course grade)

10% Tech Meetup

Must attend ONE technology meetup listed on <https://www.meetup.com>

Meetup must be approved, in advance, by the instructor

Print description of meetup (minimum 200 words)

Due before 3:30 PM Thursday April 30, 2020 (late = 0 credit)

20% Lab

Lab reports graded by the lab instructor

100% Course Grade = ALL of the Above

Week	Tuesday	Topic	Chapter	Thursday	Topic	Activity
1	1/28/20	L1: Introduction - Networks	Barabasi: pp. 41-92	1/30/20	R1: Recitation/Problems	Equations, Units
2	2/4/20	L2: Heat & Thermodynamics	Raymer: pp. 112-129	2/6/20	R2: Recitation/Problems	Statistical Physics
3	2/11/20	L3: Statistical Physics: Scaling Laws	Liebovitch: pp.11-43	2/13/20	R3: Recitation/Problems	Files Sizes on YOUR Computer
4	2/18/20	L4: Non-Linear Dynamics (& chaos)	Liebovitch: pp. 115-241	2/20/20	R4: Recitation/Problems	Chaos
5	2/25/20	L5: Electricity & Magnetism & Special Relativity	Raymer: pp. 141-180	2/27/20	R5: Recitation/Problems	Special Relativity
6	3/3/20	L6: Electrical Circuits	Hecht: pp. 281-334	3/5/20	R6: Recitation/Problems	Circuits - I
7	3/10/20	R7: Recitation/Problems	Circuits - II	3/12/20	NO CLASS	COVID-19
8	3/17/20	NO CLASS	COVID-19	3/19/20	L8A: Fourier Transforms R8A: Recitation/Problems	Fourier Transforms + computation times
9	3/24/20	L7: REVIEW FOR MIDTERM EXAM: EXAM POSTED ON LINE AT 3:30 PM		3/26/20	Recitation to answer questions about Midterm Exam and Projects	
10	3/31/20	NO CLASS	Recalibration	4/2/20	L8B: Machine Learning MIDTERM EXAM due: by 3:30 PM	
11	4/7/20	NO CLASS	Wednesday Schedule	4/9/20	NO CLASS	Spring Recess
12	4/14/20	L9: Introduction to Quantum Mechanics - I	Raymer: pp. 299-313	4/16/20	R9: Recitation/Problems	Quantum Mechanics h, algorithms
13	4/21/20	L10: Introduction to Quantum Mechanics - II (Feymann)	Mermin: pp. 1-35	4/23/20	R10: Recitation/Problems	Quantum Mechanics Concepts
14	4/28/20	L11: Introduction to Cryptography		4/30/20	R11: Recitation/Problems #1 Program/Video Due before 3:30 PM	Crypto Keys and Quantum Matrices
15	5/5/20	L12: Quantum Computers	Mermin: pp. 63-87	5/7/20	R12: Recitation/Problems	Quantum Computation on IBM Q
16	5/12/20	L13: Quantum Mechanics: Atoms & Materials	Raymer: pp. 310-367 Mazzucato: Chapter 5	5/14/20	L14: REVIEW for FINAL EXAM	
FINAL EXAM: May 21, 2020, 1:45 - 3:45						