



Course Page

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Course Structure

I intend to run the course somewhat differently than previously. Due to the on-line mode of instruction over the last two years I have two years of recorded lectures. After reviewing these lectures I think that they are a better learning tool than a live lecture. And this presents an opportunity to create some more active learning situations. I will be using the lecture time in this course to create small group learning situations that I will lead. Details on this will be found in the Seminar module. The basic intent is that you will watch the lectures online and then attend seminars during the week. The seminar will be a combination of material highlights and Q and A.

Suggested Reading;

Electronic properties of materials.

Hummel, Rolf E., 1934- 2nd ed. Berlin, Springer-Verlag. 1992 404 p.

CALL NUMBER: QC176.H86 1993

Principles of Electronic Materials and Devices - Safa Kasop (Not sure this is in print anymore)

There is a great deal of material and information (books, lectures, notes, and public domain) dealing with the course material available. It would be wise to do supplemental reading. The lectures will define the material to be covered.

Matlab code for "toy" simulators used to illustrate a number of physical effects are in the git repository at 4700Code. Students are encouraged to goto the repo (it is public) create a branch identified by their name and enhance, debug the code. This effort will be worth bonus marks if significant.

Lectures: On on-line video.

Seminars: 1/2 hour small group seminars for discussion and Q/A. Done during scheduled lecture time.

Mark Breakdown

- Final: 50.00%
- Tests: Four at 11.25% each.
- Seminars 5%
- Excellent Questions 5% (bonus)

The mark weight on any quiz that has a lower mark than that of the final will be automatically transferred to the final.

For example if you get 75% on the final and 74%, 65%, 85% and 90% on the four quizzes, I will calculate that portion of your mark as

$$75%*(0.45+0.20) + 85%*0.10 + 90%*0.10$$

You must complete at least 3 quizzes.

TA info:

N/A

Is available for consultation on the course material. Email him for appointments.

Link Password:

The links in the sections below go to the old website for the course and can be accessed by using the user id 4705 and password model.

Seminars

Some change to the seminar structure.

At the beginning of each Mon/Wed slot at 11:30 I'm going to give a brief review of the material for that week based on the "Key Questions" pdfs -- it will be the same review on both days. So everybody is welcome to come at 11:30 if they wish. The rest of the time will be for questions and you can go and come as you see fit. You can still use the groups if you wish to simply ask questions.

There is also a discussion section at the bottom of the Seminar module where I would like you to enter your questions rather than email them to me. We can thread them by weeks and you can open a new thread if that week has not been initiated.

Due to the on-line mode of instruction over the last two years I have two years of recorded lectures. After reviewing these lectures I think that they are a better learning tool than a live lecture. And this presents an opportunity to create some more active learning situations in small group seminars.

These seminars will run in the regular lecture slots. They will be nominally 1/2 an hour long and you will be assigned to a particular slot on either Monday or Wednesday. This is to create a small group of students. However, you are welcome to come to other slots.

The intent is to create small group learning situations that I will lead. The basic intent is that you will watch the lectures online prior to the seminar and then attend the seminar during the week. The seminar will be combination of material highlights and Q and A. The primary goal of the seminar is to get you to **engage** with the material and get into an active discussion. You should make notes when you watch the lecture material noting:

- When I say something confusing
- When you get lost.
- When I make a mistake.
- If something seems interesting and you want more detail.

Using these notes create questions for the seminar. Ideally add your questions prior to the seminar to the discussion threads, but if not just ask at the seminar itself.

I'm hopeful that these seminars will be an efficient way for you to learn/study the material. I'm aware that you will already be spending time watching the videos which is why I'm only assigning 1/2 hour seminars, but if the seminars are lively I think you will learn a lot more during that 1/2 hour than you would studying by yourself -- saving time overall.

The success of this is in large part down to **you** as it will only work if you are motivated and engaged.

To motivate these discussion I'm setting a 5% mark assignment for seminar engagement and 5% bonus for coming up with great questions.

Seminar questions

Discussion Topic



Lectures



Weekly Lectures and Resources

Lectures are on-line video and you have two years of recordings: 2020 and 2021. The 2021 recordings are the most relevant. You should watch the videos prior to attending your seminar and bring questions.

For example when coming to a seminar in the week of Sept 12 you should have watched and processed the two lectures labeled Sept 12 and 14 (ClassicalPhysics and FundQM2 - Intro to Quantum).

It might be useful to watch the lectures in small informal groups. You can discuss, take notes and collect questions.

Recordings 2021 (and here is 2020)

Week 0 - Sept 7

Introduction

Week 1 - Sept 12

ClassicalPhysics

IntroQM

Week 2 - Sept 19

WavePackets

Wiki on V_g

Electron In a Box

Week 3 - Sept 26

Tunneling

Crystals

Week 4 - Quiz Oct 3 and Seminar Oct 5

Bands and Conduction

Week 5 - Oct 10 (no seminars on Oct 10 all are welcome on the 12th).

Semiconductors

Semiconductors2

Week 6 - Oct 17

Diodes

Week 7 - Oct 31

BJT

MOSFET

Week 8 - Nov 7

Optical Systems

Lasers, LEDs and Detectors

Week 9 - Nov 14

Fabrication

Week 10 - Nov 21

MEMS

Nano1

Week 11 - Nov 28


Nano2

Week 12 -- Dec 7

Review

Introduction.pdf PDF document	✓
ClassicalPhysics.pdf PDF document	✓
ClassicalKeyQue.pdf PDF document	✓
FundQM2.pdf PDF document	✓
FundQMKeyQue.pdf PDF document	✓
WavePackets.pdf PDF document	✓
WavePacketsKeyQue.pdf PDF document	✓
ElectronInWell.pdf PDF document	✓
ElectronInWellKeyQue.pdf PDF document	✓
Tunneling.pdf PDF document	✓
TunnelingKeyQue.pdf PDF document	✓
Crystals.pdf PDF document	✓
CrystalsKeyQue.pdf PDF document	

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CrystalsPlus.pdf PDF document	✓
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Quiz 1 Oct 3 Web Page	✓
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QuantumSolids.pdf PDF document	✓
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QuantumSolidsKeyQue.pdf PDF document	✓
<hr/>	
Semi1.pdf PDF document	✓
<hr/>	
Semi1KeyQue.pdf PDF document	✓
<hr/>	
Semi2.pdf PDF document	✓
 Load More	

Quizzes 

Quizzes

Four Quizzes done in class: Oct. 3, Oct. 19, Nov. 16, Nov. 30.

Drag and drop files here to create and update topics

Example Quizzes



Some old quizzes with solutions.

2019_1_sol.pdf

PDF document



2019_2_sol.pdf

PDF document



2019_3_sol.pdf

PDF document



2019_4Sol.pdf

PDF document



test-1-2017 - Corrected.pdf

PDF document



test-2-2017 - Corrected.pdf

PDF document



test-3-2017 - Corrected.pdf

PDF document



test-4-2017 - Corrected.pdf

PDF document



Old Final



Final18.pdf

PDF document



Old Lectures



These are **very** old lectures in a more discursive form, but they could be useful.

4705_L13.pdf

PDF document



4705_L14.pdf

PDF document



4705_L15.pdf

PDF document



4705_L16.pdf

PDF document



4705_L17.pdf

PDF document



4705_L18_19.pdf

PDF document



4705_L20.pdf

PDF document



4705_L1.pdf

PDF document



4705_L2.pdf	PDF document	✓
4705_L3.pdf	PDF document	✓
4705_L4.pdf	PDF document	✓
4705_L5.pdf	PDF document	✓
4705_L6.pdf	PDF document	✓
4705_L7.pdf	PDF document	✓
4705_L8.pdf	PDF document	✓
4705_L9.pdf	PDF document	✓
4705_L10.pdf	PDF document	✓
4705_L11.pdf	PDF document	✓
4705_L12.pdf	PDF document	✓

Course Content Learning Objectives



Course Content Learning Objectives

Web Page



Academic Accommodation



Academic Accommodation

Web Page

