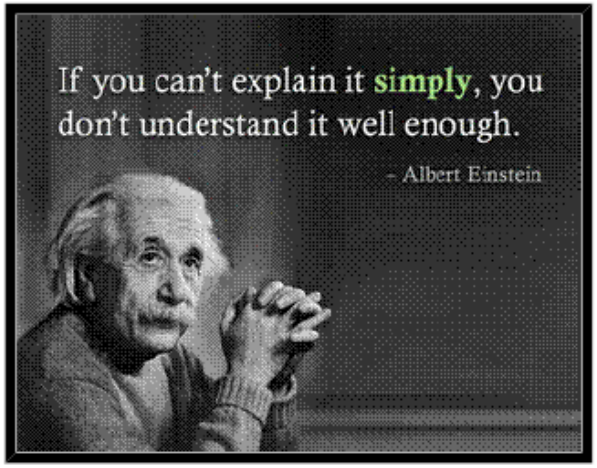
Physics 596 Course Introduction, Fall '15



Physics 596

Graduate Physics Orientation

Fall 2015

The whole of science is nothing more than a refinement of everyday thinking.

—Albert Einstein, Physics and Reality, 1936

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Course Instructors:

Lance Cooper: 218 MRL, 333-2589 (research)
227B Loomis, 333-8702 (departmental)

Celia Elliott: 218 MRL, 215 Loomis, 244-7725 (departmental)

Course Webpage: https://courses.physics.illinois.edu/phys596/fa2015/index.html

Our goals for you in Phys 596

Introduce you to research opportunities in Physics, etc.

Help you connect with a research advisor

Help you improve your abilities in scientific communication

Methods for making your scientific writing and presentations more persuasive

Teach you how to navigate the scientific literature

Researching existing literature is critical for planning future work, writing proposals, writing papers, etc.

Gain practice working in and leading a team

Collaboration is key in science

Provide details into how the “world of science” works

e.g., how publication process works, what happens at scientific conferences, how to find advisors, how to write and research scientific papers/presentations, etc.

$\Rightarrow$ Help you transition from undergraduate to graduate ‘mindset’

Elements of Phys 596

1. Help finding a research group

– Faculty research presentations throughout the semester

Scheduled so far:

Astrophysics: Jeff Filippini, Joaquin Vieira

Biological physics: Aleksei Aksimentiev, Yann Chemla, Klaus Schulten, Jun Song

Condensed matter experiment: Tai Chiang, Martin Gruebele, Greg MacDougall, Dale Van Harlingen

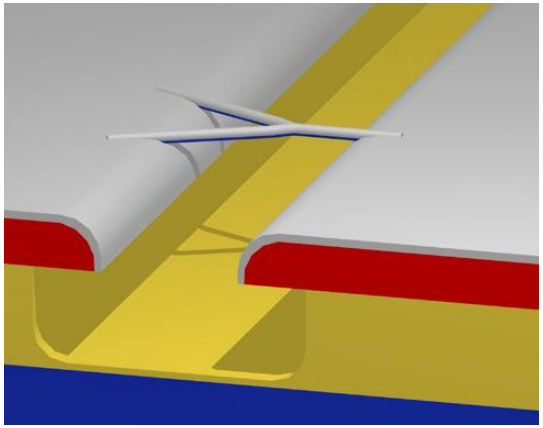
Condensed matter computation/theory: David Ceperley, Karin Dahmen, Taylor Hughes, Lucas Wagner

High energy: Jessie Shelton

Intermediate energy: Liang Yang

Elements of Phys 596

2. Skills essential to researchers



Writing/Presentation Skills

- How to create and present journal club and research talks
- How to write persuasive scientific papers

Scientific Scholarship

- How to use on-line databases useful for research

Learning how to do what scientists do

- Learning to write referee reports
- Learning how the publication process works

*Scientific Ethics

- Discuss real life case studies

*Required by OVCR & NSF

Elements of Phys 596

3. Instruction and practice giving scientific presentations and writing scientific papers

- Create and present a journal club talk
- Write a referee report on your journal club paper
- Design a scientific poster
- Give effective scientific presentations
- Write effective scientific papers and abstracts

Why is Persuasive Writing and Speaking Important in Science?

It's not just all about good data/calculations: you will be judged as much for the quality of your thinking and presentation as for the quality of your results

It will be particularly important for you to communicate your results to non-experts

- prelims and dissertation defenses
- proposals
- colloquia
- public lectures

$\Rightarrow$ we'll emphasize this in this class

Elements of Phys 596

4. Practice in collaboration: working in teams

Team	Student
	Amerikheirabadi, Fatemeh
1	Angonga, Jackson
	Boyd, Christian
	Chatterjee, Purba
	Cai, Huacheng
2	Chertkov, Eli
	Choi, Sang Hyun
	Cote, Alexandra
	Chou, Han-Yi
3	Choudhary, Adnan
	Dungan, Kristina
	Zhang, Shuyi
	Germany, Chad
4	Ghita, Vlad-Bogdan
	Yang, Kexin
	Zhang, Muxin
	Han, Chong
5	Howard, Sean
	Iaia, Davide
	Inafuku, Daniel
	Johnson, Thomas
6	Karydas, Matthaios
	Kaur, Davneet
	Li, Tianhe
	Khan, Asad
7	Lam, Albert
	Li, Shaolei
	Long, Alan
	Lu, Suoang
8	Munoz, Alexander
	Newton, Destry
	Rubeck, Samantha
	O'Boyle, Michael
9	Phipps, Michael
	Prather, Benjamin
	Rito, Thomas
	Rozum, Jordan
10	Scully, Timothy
	Slattery, Lucas
	Slimak, John
	Sun, Lunan
	Symon, Gray
11	Tan, Lu
	Xu, Dong
	Yan, Jialu

https://courses.physics.illinois.edu/phys596/fa2015/courseinfo.html

Grading Policy

- Complete the assignments
- You'll critique each other's work. Your work won't be graded so much on content as on the fact that it has been completed conscientiously!
- Attendance is required!!

Don't worry about your grade in this class!!

⇒ You'll do well if you complete the assignments

⇒ The skills you develop will be far more important than the grade you get here!!

Our agenda

https://courses.physics.illinois.edu/phys596/fa2015/syllabus.htm

Physics 596 - Course Syllabus - Fall 2015

(Syllabus is subject to change!)

Week	Date	Topics	Lectures	Assignments	Reading
1	Aug 28	Introduction and course expectations How to find an advisor Creating/giving a journal club presentation	slides slides slides	Major Group Assignment Create and present a group Journal Club PowerPoint talk + individual referee reports	
2	Sep 4	Research in Theoretical Condensed Matter Physics - Prof. Karin Dahmen Research in Condensed Matter/Scanning Tunneling Microscopy - Prof. Martin Gruebele Tips for reading a scientific paper Publication process; How to write a referee report	slides slides		

Our agenda (cont.)

3	Sep 11	Research in Theoretical Condensed Matter Physics - Prof. Taylor Hughes Research in Theoretical Biological Physics - Prof. Jun Song How to use on-line scientific resources On-line research with SCOPUS	 slides slides	mini-Assignment #1 On-line resource activities	Resource Activities Prof. Casey Miller's (U. South Florida) advice on using scientific resources
4	Sep 18	Research in Experimental Astrophysics - Prof. Jeff Filippini Research in Experimental Biological Physics - Prof. Yann Chemla			
5	Sep 25	Research in Computational Biological Physics - Prof. Klaus Schulten How to write a scientific abstract	 slides	mini-Assignment #2 Write an abstract for selected paper	Abstract Papers

Our agenda (cont.)

6	Oct 2	Research in Computational Condensed Matter Physics - Prof. Lucas Wagner Research in Computational Condensed Matter Physics - Prof. David Ceperley			
7	Oct 9	Research in Experimental Condensed Matter Physics - Prof. Tai Chiang Research in Computational Biological Physics - Prof. Alek Aksimentiev			
8	Oct 16	Ethics in research	slides		Ethics Case Studies
9	Oct 23	Research in Experimental Astrophysics - Prof. Joaquin Vieira Research in Experimental Condensed Matter Physics - Prof. Dale Van Harlingen			

Our agenda (cont.)

10	Oct. 30	Research in High Energy Theoretical Physics - Prof. Jessie Shelton Research Talk -			
11	Nov 6	Research in Experimental Condensed Matter Physics - Prof. Greg MacDougall Research Talk -			
12	Nov 13	Research Talk - Research Talk - Giving effective scientific presentations	slides		Scientific Poster Example/Template
13	Nov 20	Journal club presentations:			
	Nov 27	THANKSGIVING BREAK			
14	Dec 4	Journal club presentations:			