

Phys 485: Senior Honors Seminar

Phys 494: Seminar on Current Problems in Physics

Course Website:

http://www.phys.washington.edu/users/deepg/phys485_494/

Class Meeting Time: Tuesday 130-320pm in Rm A110

Instructor: Subhadeep Gupta, Rm B428.
deepg@uw.edu, 616-9649

Office Hours: Tuesday 330-430pm, Rm B428.
Other times by appointment.

Course Structure

Topic Selection

Select a research topic.

Submit an abstract.

Literature Research

The references should be journal publications

Feel free to discuss your work with the instructor

Oral Presentation

(NEW!) Submit your slides and discuss them with the instructor ahead of your talk (schedule 15 min meeting).

In class presentation: 13 min talk + 7 min discussion

Discussion

Contributions to in-class discussions. WebQ Feedback.

Written Paper

1 Draft and 1 final research paper (at least 5 pages)

Course Schedule

Oct	01	Introduction to Class
	08	Discuss and Finalize Topics
	11	Deadline: Abstract Submission
	15	No class
	22	Talks 1
	29	Talks 2
Nov	05	Talks 3
	12	Talks 4
	19	Talks 5
	22	Deadline: Draft Paper Submission
	26	Talks 6
Dec	03	Talks 7
	09	Deadline: Final Paper Submission
	10	Talks 8 and summary

Course Schedule (some changes)

Oct	01	Introduction to Class		
	08	Discuss and Finalize Topics		
	11	Deadline: Abstract Submission		
	15	No class		
	22	Talks 1 (Slides due	Oct 18, make appt earlier)	
	29	Talks 2 ("	Oct 25, ")
Nov	05	Talks 3 ("	Nov 01, ")
	12	Talks 4 ("	Nov 08, ")
	19	Talks 5 ("	Nov 15, ")
	22	Deadline: Draft Paper Submission		
	26	Talks 6 (Slides due	Nov 22,	")
Dec	03	Talks 7 ("	Nov 29, ")
	09	Deadline: Final Paper Submission		
	10	Talks 8 and summary (Slides due	Dec 06,	")

Grading Policy (some changes)

Participation in Class discussions (Abs sub. 2%) **20%**

WebQ Feedback on fellow student talks **10%**

Your presentation (Slide submission 3%) **30%**

Your final paper (Draft submission 4%) **40%**

There is no final exam.

75% corresponds to a grade of 3.5.

A grade of 0.0 will be given to anyone not completing their paper and presentation.

Sample Research Topics

Fundamental Constants: Eg. G , $g-2$ of electron, muon, fine structure constant α . How are they measured? Current best values? Does α change with time?

Quantum Simulation and Information Science: How can trapped atomic gases model complex quantum systems (superconductors, neutron stars). What is quantum entanglement? Demonstration of quantum logic.

Elementary Particles: Higgs boson at the LHC. Evidence for neutrino mass, current status.

Gravity Waves: What are they? How do you look for them? LIGO and optical cavities.

Atomic Clocks: How does precision spectroscopy result in the time standard and GPS?

Condensed Matter: What makes Graphene exciting? Status of high- T_c superconductivity?

Survey Responses (30/36)

Top Choice

Condensed Matter	4
Precision Measurements	3
Elementary Particles	3
Quantum Sim/Comp	7
Gravity Waves	0
Biophysics	3
Interacting Fermions	5
Other Topics (Nanotechnology, Solar Technology, Cosmology, Nuclear, Green Energy)	5

Survey Responses (71/36)

Additional Choice(s)

Condensed Matter	11.3%
High Precision	7%
Elementary Particles	15.5%
Quantum Sim/Comp	18.3%
Gravity Waves	21%
Biophysics	3%
Interacting Fermions	15.5%
Other Topics (At. Clocks, Plasma, Appl. Phys, Fusion, Plasmonics, Molecular Comp.)	8.5%

Sub Topics (1)

Graphene

Still doing further research

quantum dots

Coherence/Stability in Quantum Computing

catch bonds

Neutrinos

Laser-Based Acceleration of Nonrelativistic Electrons at a Dielectric Structure

Higgs discovery

Nanotechnology

Optical tweezer applications

carbon based solar cells

Light Trapping

Computational Neuroscience and Neurophysics

Cold Atoms

g-2

Sub Topics (2)

large-scale structure of dark matter

Superconductors

Superheavy Atoms

Topological Insulators

Pumped Heat Energy Storage

Controlled Nuclear Fusion

Quantum Electrodynamics

super conductors

Spin control of nitrogen vacancy centers in diamond

Topological insulators

quantum lattice simulations of larger scale systems

Superconductors

Entangled systems

ion trap with lasers

Graphene

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Talk Schedule (Preliminary)

Oct	01	Introduction to Class
	08	Discuss and Finalize Topics
	11	Deadline: Abstract Submission
	15	No class
	22	CM/F: Shimazu, Prekeges, Vaschillo, L-Cookson, Picard
	29	CM/F: Huntington, Akhyltayev, Finney, Johnson, Stark
Nov	05	QSim/C: Trinh, Goffin, Subramanian, West, Selzler
	12	At/Bio: Li, Fryett, Edgecombe, Doering, Harvey
	19	Prec/EP: Froehlich, McCulloch, Huang, Roth, Lemmon
	22	Deadline: Draft Paper Submission
	26	Other: Huang, Montgomery, Schmitz, Cross, Rund
Dec	03	Talks 7: Not submitted
	09	Deadline: Final Paper Submission
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Abstract

Submit title and abstract (link available on class website)

<https://catalyst.uw.edu/collectit/dropbox/deepg/29158>

Available 5pm today, due by 11pm this Friday!

Abstract: between 100 and 400 words. Summarize topic and your research plan. Topic can be either a survey or a specific experiment/paper.

Submit by deadline to not lose 2% of your grade.

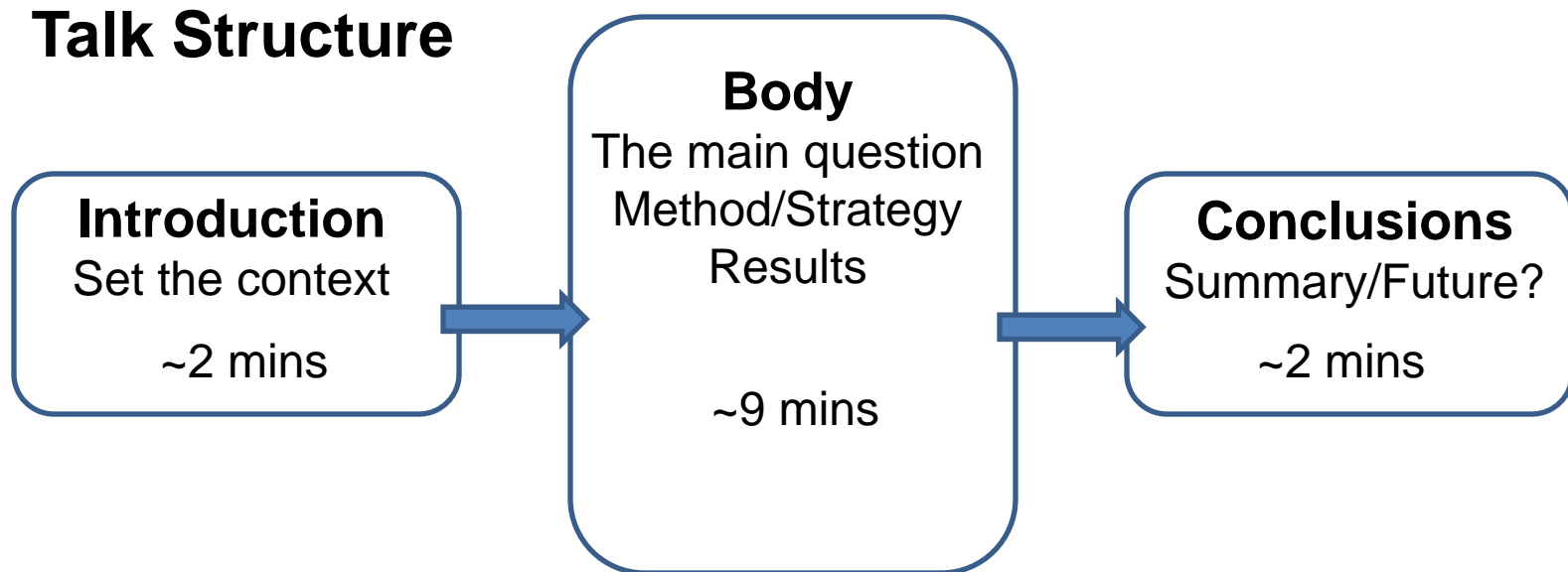
Giving short seminars

Prepare – gauge audience, literature research, figure out main points, make slides.

Practice – many times. Figure out **how** you will say the things you want to say.

Keep to your allotted time

(Web resource linked from class website)



Please use ppt or pdf. PRACTICE MANY TIMES !

Giving short seminars

Some Tips on Preparing Slides:

Avoid cluttering and too much text, too much graphics

Pay attention to font sizes and colors

One central topic per slide

(Mentally) Chop up your talk into smaller sections (see previous slide)

Some tips on delivering the talk:

Spend ~ 1-2 min/slide

Know (ie prepare) what to say AND how to say it.

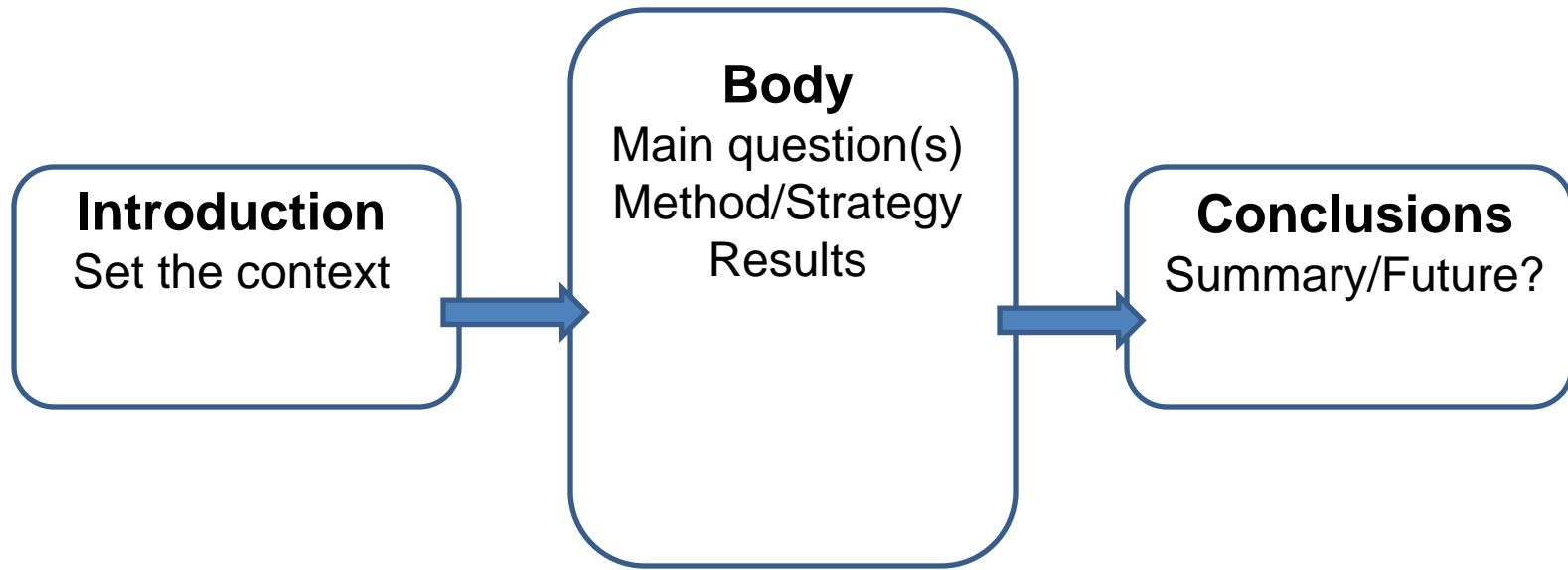
Make eye contact with audience.

Don't read your slides.

PRACTICE PRACTICE PRACTICE !!

Some tips on the research paper

Logical flow remains the same as the talk. More details.



Also:

Title/AuthorList (you)/Abstract

Figures/Tables with captions and sources acknowledged

Bibliography/Reference List

For both talk and paper: Clarity and Accuracy will be the most important criterion.

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