

Advisor's agreement to supervise the senior thesis for a student in the majors Physics, Applied Physics, or Physics (Astrophysics), 2018-19 academic year

Students taking Physics 182 (the thesis preparation course) are required, in order to pass the course, to obtain the signature of a thesis advisor who endorses their topic and is willing to supervise the thesis. Students whose thesis is a literature review or an independent experiment and are not doing research with a faculty member still need a thesis advisor to guide them in searching the literature and writing their thesis. Performing a fair share of this service for our seniors is an obligation of all ladder-rank Physics faculty and is solicited on a voluntary basis from faculty in other departments (particularly Astronomy and Astrophysics for Physics (Astrophysics) majors) and from research and adjunct faculty.

Your duties as thesis advisor to a senior are

- Helping them define, refine, and (often) narrow down the scope of their topic
- Helping them select, understand, and cite a substantial and appropriate set of references from the refereed literature
- Reviewing their introduction, bibliography, and thesis plan before their deadlines in 182
- Setting an appropriate schedule for you to receive their next-to-final draft, for you to provide comments, for them to address your comments, and for you to read and approve the final version
- Reviewing at least one draft of their thesis and providing comments, making sure it is both correct and sufficiently substantial and **meets all the requirements on the checklist below**; and then making sure that the changes have been adequately addressed
- Promptly providing an electronic signature once you have decided that the thesis meets an appropriate standard and is complete

You are **not** required (or encouraged) to

- Suggest specific wording when pointing out a weak spot in the student's work
- Edit their writing at the proofreading level (although you should tell the student when they need to work on things like spelling and grammar in general and identify general issues)
- Rush your review of their work because the student has failed to give you adequate time
- Approve an inadequate draft because the graduation deadline is imminent (note that students who do not meet this deadline can still participate in the department's graduation and can turn in their thesis and graduate a quarter later without paying to register for classes again).
- Badger the student about their schedule or feel responsible for whether they meet deadlines

Once you approve of the final version of the thesis, the student can fill in the online completion form, and you will be contacted by email for your electronic signature. The deadlines for the student to fill out this form after your approval are 12/7/17, 3/15/18, 6/6/18, and 8/23/18 for graduation at the end of fall, winter, spring, and summer quarters, respectively.

I understand this description of the role of senior thesis adviser and agree to supervise the thesis of

_____ whose expected graduation date is _____

Faculty Name (print)

Department

Signature

Date

Senior Thesis Checklist

The student is requested to go through this checklist carefully before giving a complete draft to their advisor. The advisor is requested to think carefully about each item before checking it off.

General:

- _____ Student appears to understand what they are presenting at all times
- _____ Level of material is suitable (beyond what is presented in any undergraduate class, whether required or elective), and coverage is appropriately complete
- _____ Length of thesis is at least **20 pages** *excluding prefatory material and references*, does not make use of excessive figures or images to reach this length, and is not stretched by unconventional formatting (see formatting requirements below). Partially blank pages (e.g. at the end of chapters) should be counted as only a suitable fraction of a page.
- _____ The thesis is structured into chapters and sections that follow a logical sequence and the material is organized and flows well for a new reader
- _____ The level of presentation is appropriate for *other physics seniors* who are not working in this field: so routine undergraduate material is **not** explained in detail, "journalistic" metaphors for non-scientists are not used, and all terms and physics specific to the field and not known to most seniors **are** explained
- _____ A literature review should be organized around a central question, not just bracketing a subfield, even if the question is a simple or obvious one (this line does not need to be checked if the thesis is based on original research)

References:

- _____ Although there is not a minimum required number of references, it should be unusual for a literature review to need fewer than 15 references or a paper on original experimental work to need fewer than 10 (see specifics below)
- _____ References include both foundational work in the field and cutting-edge, current work (including the work of competitors for theses presenting original research)
- _____ References are used systematically to give credit for first discoveries and important advances, and not just to report what the student happened to read
- _____ (Experimental theses only) Similar work by other authors is cited extensively, whether the student's laboratory work is making a scientific measurement, making material samples, or testing or calibrating instrumentation
- _____ (Experimental theses only) Even if the student's work is only on instrumentation or samples, there will be a significant number of references on the scientific applications of the material, instruments, or technique
- _____ At least 80% of references are refereed journal papers, or arXiv papers *if* unrefered arXiv papers are the standard in the field; and only a small fraction of these are review papers
- _____ Original (primary) references are used when at all possible instead of references to reviews, even refereed ones; a reference to any review should only be in the form of, "A good review of this area is given by ..."
- _____ No informal tutorials are cited (Wikipedia, someone's powerpoint on the web, other webpages, or tutorials uploaded to arXiv that are clearly meant as tutorials for students), unless as the source of a figure
- _____ No news articles are cited, unless as the source of a figure
- _____ The frequency of citation meets the standard of refereed journal articles, i.e. all

claims are attributed to one or more references unless they are truly general knowledge or the result of original research

_____ Citations are of consistent format and in APA style, e.g. (Belanger et al. 2017) or "was shown by Belanger et al. (2017)".

_____ References contain all information required by APA style (authors, year, title, journal, volume, page range for journal articles)

_____ The references are arranged in alphabetical order by the last name of the first author

Abstract:

_____ The abstract includes a concise and specific summary of all major conclusions (including numerical values and errors when appropriate)

_____ The abstract does not read like an introduction

Introduction:

_____ The introduction begins with a section that informs the reader of the specific scope and purpose of the work, with just enough explanation for the reader to understand it (this gives the reader motivation and context for reading the full introduction)

_____ (Literature reviews only): The boundary between what is introduction and what is in subsequent chapters is well thought out and implemented

_____ Both the first section of the introduction (overview) and the beginning of the real background material begin with substantial statements of fact that are informative to other physics seniors; they do not begin with broad, vague, or colorful language (e.g. "Gravitational waves have fascinated scientists since the dawn of time")

Sections reporting original research (methods, results, analysis, etc.):

_____ These sections are reported in the past tense, except when describing the way that an experimental apparatus still in use is constructed

_____ The tone is as a report of what, specifically, was done, not the tone of a lab manual (i.e. it must not sound like instructions to another researcher)

Discussion / conclusion / summary:

_____ A discussion section is required that puts the work in a broader context, including (in the case of original research) the results of other workers and (for every thesis) **specifics** of potential future work in the field

_____ As in the introduction, broad, flowery, vague, or enthusiastic language is avoided

_____ A brief summary of results separate from the discussion is recommended. It is similar in content to the abstract but different in style since it assumes that the full thesis has been read

Appendices:

_____ Appendices are well justified as appendices instead of main chapters, contain material that is of potential interest to the reader, and do not contribute to the minimum page count

_____ Raw computer code should not be included as an appendix, but URLs giving access to code can be referenced in the thesis instead; the same goes for data tables exceeding 2 or 3 pages

Figures:

_____ All figures are original or adequately attributed

_____ If a figure is taken from copyrighted work, permission for use has been obtained

according to the journal's policy

- _____ All figures are numbered and referred to in the text, in order; they are referred to by figure numbers ("is shown in Figure 3") and not "is shown above" or "below" or "here:"
- _____ Figures look good, do not invade margins, and all text is legible
- _____ Captions are brief but complete in the sense of describing everything that appears on the figure; interpretation is left to the main text
- _____ Figures are always referred to as figures and not "Graph 1", "Chart 1", etc.

Tables:

- _____ Tables are legible and do not invade margins
- _____ Tables have either full captions below, like figures (Physical Review convention) OR a short title above, with other needed information in footnotes (astronomy convention), and all tables use the same convention
- _____ All tables are numbered and referred to in the text, in order, by table number
- _____ Appropriate and consistent use of significant figures in all tabulated data

Equations:

- _____ Equations that are referred to in the text are numbered and referred to by number
- _____ Each equation is immediately followed by the definition of all symbols not previously identified

Writing:

- _____ Text is divided into paragraphs of reasonable length and recognizable topic/purpose
- _____ The reader is at all times given what they need to understand what comes next (information is presented in logical order, even within paragraphs)
- _____ Neither the active nor passive voice is conspicuous by overuse
- _____ Tone is professional and adult
- _____ Sentences are varied in length appropriately (not conspicuous overall as short or long)
- _____ Writing and vocabulary are not complicated unnecessarily in order to sound exaggeratedly formal, technical, or sophisticated
- _____ Specific technical terms are introduced in the right time and the right way
- _____ Acronyms are spelled out the first time and then consistently appear as acronyms later
- _____ Grammar, spelling, and word choice are at a high level (advisor is not responsible for detailed proofreading and correction, but should point out general problems)

Formatting

- _____ There is a cover page with the usual boilerplate ("...submitted in partial satisfaction..." etc.) followed by a page containing the abstract. Spaces for signatures are no longer required but students who want real signatures on their title page may still use these spaces
- _____ Double spaced; 11 point font size and a conventional font; 1" margins
- _____ Pages are numbered
- _____ There is a table of contents with (correct) page numbers following the abstract
- _____ Figures or tables and their captions are together and not separated by a page break
- _____ Each chapter and the References section begin on a fresh page