II. Structure of a thesis proposal

Your thesis proposal should have the following elements in this order.

- Title page
- Abstract
- Table of contents
- Introduction
- Thesis statement
- Approach/methods
- Preliminary results and discussion
- Work plan including time table
- Implications of research
- List of references

The structure is very similar to that of a thesis or a scientific paper. You will be able to use a large fraction of the material of the thesis proposal in your final senior thesis. Of course, the state of the individual projects at the end of the fall will vary, and therefore also the format of the elements discussed below.

Title page

- contains short, descriptive title of the proposed thesis project (should be fairly self-explanatory)
- and author, institution, department, resreach mentor, mentor's institution, and date of delivery

Abstract

- the abstract is a brief summary of your thesis proposal
- its length should not exceed ~200 words
- present a brief introduction to the issue
- make the key statement of your thesis
- give a summary of how you want to address the issue
- include a possible implication of your work, if successfully completed

Table of contents

- list all headings and subheadings with page numbers
- indent subheadings

Introduction

- this section sets the context for your proposed project and must capture the reader's interest
- explain the background of your study starting from a broad picture narrowing in on your research question
- review what is known about your research topic as far as it is relevant to your thesis
- cite relevant references

- the introduction should be at a level that makes it easy to understand for readers with a general science background, for example your classmates

Thesis statement

- in a couple of sentences, state your thesis
- this statement can take the form of a hypothesis, research question, project statement, or goal statement
- the thesis statement should capture the essence of your intended project and also help to put boundaries around it

Approach/methods

- this section contains an overall description of your approach, materials, and procedures
  - what methods will be used?
  - how will data be collected and analyzed?
  - what materials will be used?
- include calculations, technique, procedure, equipment, and calibration graphs
- detail limitations, assumptions, and range of validity
- citations should be limited to data sources and more complete descriptions of procedures
- do not include results and discussion of results here

Preliminary results and discussion

- present any results you already have obtained
- discuss how they fit in the framework of your thesis

Work plan including time table

- describe in detail what you plan to do until completion of your senior thesis project
- list the stages of your project in a table format
- indicate deadlines you have set for completing each stage of the project, including any work you have already completed
- discuss any particular challenges that need to be overcome

Implications of Research

- what new knowledge will the proposed project produce that we do not already know?
- why is it worth knowing, what are the major implications?

List of references

- cite all ideas, concepts, text, data that are not your own
- if you make a statement, back it up with your own data or a reference
- all references cited in the text must be listed
- cite single-author references by the surname of the author (followed by date of the publication in parenthesis)
  - ... according to Hays (1994)

- ... population growth is one of the greatest environmental concerns facing future generations (Hays, 1994).
- cite double-author references by the surnames of both authors (followed by date of the publication in parenthesis)
  - e.g. Simpson and Hays (1994)
- cite more than double-author references by the surname of the first author followed by et al. and then the date of the publication
  - e.g. Pfirman, Simpson and Hays would be:
  - Pfirman et al. (1994)
- cite newspaper articles using the newspaper name and date, e.g.
  - ....this problem was also recently discussed in the press (New York Times, 1/15/00)
- do not use footnotes
- list all references cited in the text in alphabetical order using the following format for different types of material:
  - Hunt, S. (1966) Carbohydrate and amino acid composition of the egg capsules of the whelk. *Nature*, 210, 436-437.
  - National Oceanic and Atmospheric Administration (1997) Commonly asked questions about ozone. http://www.noaa.gov/public-affairs/grounders/ozo1.html, 9/27/97.
  - Pfirman, S.L., M. Stute, H.J. Simpson, and J. Hays (1996) Undergraduate research at Barnard and Columbia, *Journal of Research*, 11, 213-214.
  - Pechenik, J.A. (1987) A short guide to writing about biology. Harper Collins Publishers, New York, 194pp.
  - Pitelka, D.R., and F.M. Child (1964) Review of ciliary structure and function. In: *Biochemistry and Physiology of Protozoa*, Vol. 3 (S.H. Hutner, editor), Academic Press, New York, 131-198.
  - Sambrotto, R. (1997) lecture notes, Environmental Data Analysis, Barnard College, Oct 2, 1997.
  - Stute, M., J.F. Clark, P. Schlosser, W.S. Broecker, and G. Bonani (1995) A high altitude continental paleotemperature record derived from noble gases dissolved in groundwater from the San Juan Basin, New Mexico. *Quat. Res.*, 43, 209-220.
  - New York Times (1/15/00) PCBs in the Hudson still an issue, A2.
- it is acceptable to put the initials of the individual authors behind their last names, e.g. Pfirman, S.L., Stute, M., Simpson, H.J., and Hays, J (1996) Undergraduate research at ......

III. Order in which to write the proposal

. Proceed in the following order:

1. Make an outline of your thesis proposal before you start writing
2. Prepare figures and tables
3. Figure captions
4. Methods
5. Discussion of your data
6. Inferences from your data
7. Introduction
8. Abstract

9. Bibliography

This order may seem backwards. However, it is difficult to write an abstract until you know your most important results. Sometimes, it is possible to write the introduction first. Most often the introduction should be written next to last.

IV. Tips

Figures

- "Pictures say more than a thousand words!" Figures serve to illustrate important aspects of the background material, sample data, and analysis techniques.
- A well chosen and well labeled figure can reduce text length, and improve proposal clarity. Proposals often contain figures from other articles. These can be appropriate, but you should consider modifying them if the modifications will improve your point.
- The whole process of making a drawing is important for two reasons. First, it clarifies your thinking. If you don't understand the process, you can't draw it. Second, good drawings are very valuable. Other scientists will understand your paper better if you can make a drawing of your ideas. A co-author of mine has advised me: make figures that other people will want to steal. They will cite your paper because they want to use your figure in their paper.
- Make cartoons using a scientific drawing program. Depending upon the subject of your paper, a cartoon might incorporate the following:
  - a picture of the scientific equipment that you are using and an explanation of how it works;
  - a drawing of a cycle showing steps, feedback loops, and bifurcations: this can include chemical or mathematical equations;
  - a flow chart showing the steps in a process and the possible causes and consequences.
- Incorporate graphs in the text or on separated sheets inserted in the thesis proposal
- Modern computer technology such as scanners and drafting programs are available in the department to help you create or modify pictures.

Grammar/spelling

- Poor grammar and spelling distract from the content of the proposal. The reader focuses on the grammar and spelling problems and misses keys points made in the text. Modern word processing programs have grammar and spell checkers. Use them.
- Read your proposal aloud - then have a friend read it aloud. If your sentences seem too long, make two or three sentences instead of one. Try to write the same way that you speak when you are explaining a concept. Most people speak more clearly than they write.
- You should have read your proposal over at least 5 times before handing it in
- Simple wording is generally better
- If you get comments from others that seem completely irrelevant to you, your paper is not written clearly enough never use a complex word if a simpler word will do

http://www.ldeo.columbia.edu/~martins/sen_res/how_to_thesis_proposal.html

Purpose of a proposal

The purpose of the proposal is to help you (as student) to focus and define your research plans. These plans are not binding, in that they may well change substantially as you progress in the research. However, they are an indication to your faculty of your direction and discipline as a researcher. They also help you to prepare your presentation for the Ethics Committee.

The proposal is expected to:

> Show that you are engaging in genuine enquiry, finding out about something worthwhile in a particular context;
>
> Link your proposed work with the work of others, while proving you are acquainted with major schools of thought relevant to the topic;
>
> Establish a particular theoretical orientation;
>
> Establish your methodological approach, and
>
> Show you have thought about the ethical issues

Structure of a proposal

A proposal is likely to contain most of the elements listed in the table below, although your supervisor may require the inclusion or omission of parts. Check first with your supervisor.

Component	Function	Characteristics
Cover page	identifies topic, writer, institution and degree	proposed thesis title (should be descriptive of focus, concise, eye-catching and preferably use key words from the international information retrieval systems) writer's name and qualifications department, university and degree proposal is for
Table of Contents	lists sections of proposal and page references	use a hierarchy for titles and subtitles
Background: (and a more descriptive name)	provides background information relating to the social/political/historical/educational (etc) context of the study	may include historical, cultural, political, social or organisational information about the context of the research

		may include a theoretical starting point
		may include personal motivation
		may include policy
Need for the study. Usually this is combined with the previous section	follows from background to persuade the reader that the study will be useful/interesting	this may include reference to a 'gap' in the research literature, to the need to apply certain ideas in a new context, or to the significance of your particular topic

the ways in which the study may be significant for the educational community may also be discussed |
| Purpose and aims of the study | to state clearly and succinctly the purpose of the study

to outline the key research questions and aims | the purpose is expressed in terms of the broader context of the study

the research question(s) (usually What, How, Why, or What if) should be few, so that the focus is manageable

the aims will be related to the purpose and the questions |
| Review of the literature | to show your supervisor and department that you are aware of significant writers/researchers in the field, and to indicate which issues/topics you will focus on in your review (this may change later)

to show that you can be judicious in your selection of issues to focus on and take an approach of critical inquiry | this is not expected to be extensive for the proposal

you should have done an initial survey of the main theorists and a library information search (CD ROMs etc) to establish your directions and formulate a tentative list of readings

you should demonstrate critical analysis |

		your review should be shaped by your argument and should seek to establish your theoretical orientation
Research design	describes the research plans	includes your understandings of the nature of knowledge and how this affects your choice of research approach

includes description of and rationale (brief) for selection of participants, methods of data collection and analysis, and procedures you will use to ensure ethical practice

includes a statement about the delimitations (boundaries) of the study |
| Timetable/plan (may be part of research design) | depicts the tasks proposed and the stages/times for their completion | this may take the form of a chart, timeline or flowchart (or any other) |
| Proposed thesis structure | describes the focus of each proposed chapter | each chapter's proposed contents is described in a few lines or a small paragraph, or

a proposed table of contents is presented |
Significance/Expected Outcomes of the study	predicts the significance of the study and expected outcomes. These may relate closely to aims	this is only a prediction, and may be excluded if the rationale for the study has been well developed earlier in the proposal
Glossary of terms	lists specialised terms or words and their meanings (eg, from another culture, acronyms, key concepts in a relatively new field)	this is placed in a position which is easy to locate (eg, before or after the main text parts)
Appendices	to display documents which are relevant to main text, but whose presence in the text would disturb rather than enhance the flow of the argument or writing	includes documents, pilot study material, questions for interviews, survey instruments, explanatory statement to participants, etc.
References	list of works that have been	use referencing

	consulted thus far and appear to be useful	conventions recommended by your supervisor