MASTER OF INTEGRATED SCIENCES PROGRAM
University of Colorado Denver

Project/Thesis Proposal Guidelines

2013.08.19

1) **Preliminary Step: Develop a set of related ideas into a coherent topic.**
   a) Before you even begin writing a proposal, much less a project or thesis itself, you need to have a well-defined topic. To this end, think about the following:
      i) What are the ideas that interest you enough to motivate a sustained, in-depth study?
      ii) What **main question or hypothesis** (your *thesis statement*) arises from your general interest in this topic?
      iii) What scholarly work or other evidence will you use to document the state of the field and place your thesis in context?
      iv) Having reviewed the scholarly material, what research methodology (theoretical and/or experimental) will you use to answer this question in a scientific manner?
      v) Which of the following acceptable formats will suit your investigation best: **research study; scholarly paper; work/internship-related applied project**?
      vi) If you are doing a research study, which research method(s) will you consider using to answer your research question?
   b) Once you have addressed these questions, you can begin to think about your proposal.

2) **Proposal**
   a) Your proposal provides a map for your project. It formally organizes your thinking about the topic, states the question you will answer, or the thesis you will defend. Proposals should include several key components: introduction, description of and motivation for the study, review of the literature, research plan (including methodology, timeline, and how you plan to present your results), and bibliography/references. If you cannot address these components, you are probably not ready to write a proposal. If you can, then follow these guidelines to organize your proposal's content.
   b) **Title**
   Your working title should encompass the scope of your proposed research and gives the reader an indication of what your proposal will address.
   c) **Introduction**
   In a few paragraphs, briefly introduce your research topic. Describe the motivation for the study and your preparation in pursuing the work. State the two (possibly three) scientific disciplines relevant to the study and how your proposed work integrates these disciplines.
   d) **Description of and Motivation for the Study**
   What is your research question or hypothesis? Why is your research question or hypothesis of sufficient originality to be the subject of a Master's project or thesis? What is the scientific merit of the study? How does your work contribute something new to the discipline you are studying?
   e) **Review of the Relevant Literature**
   What is currently known on your question(s) from scholarly, peer-reviewed research? Describe the state of the field as it pertains to your research question/hypothesis with citations to specific work. Cite the work in the body of the proposal, but present the citations themselves in the Reference section at the end of your proposal. A scholarly review of the topic comprises peer-reviewed scientific papers and review articles; popular summaries are rarely appropriate, nor are texts—though there is more leeway with texts than with other non-peer-reviewed material. Your references should provide the background and motivation for not only the study itself, but also the methodology you will use. How does your research question go beyond existing knowledge?
   f) **Research Plan**
      i) Will your study be con-something congeal, combinatorial ***comprehensive, synergetic, (bringing together existing data in a new result or understanding***), theoretical, experimental, or some combination thereof?
      ii) What is the theoretical framework in which your research question resides? Within the disciplines you are integrating, what concepts and approaches are relevant to your question?
      iii) What is your research methodology? How will you design your study so that the data you gather will answer your question? Many studies result in a great deal of information that, in the end, is not useful in answering the question! How will you document your process and results? How will you incorporate cross-checks (i.e. internal validity) to ensure you are consistent and organized? If your project includes human or other animal subjects, discuss the need for such methodology and the appropriate review processes that must be completed before your study can begin. NOTE: For human or animal subjects to be used there is often a lengthy and complex approval process involved. Ensure you are fully aware of these processes and how they will impact your timeline, methodology, and results.
      iv) How will you go about gathering your data, whether from existing sources (literature or database), theoretical work, fieldwork, or an experiment? Defend your choice as being appropriate for the study.

v) How will the data be analyzed (through a rigorous, scientific process), so that the results answer (in whole or in part) your research question? Be clear about the specifics of your integrated methodologies. Again, defend your choices as being appropriate for the study.
vi) What resources are available to you? What additional resources might you need, and what is your plan for obtaining them? "Available resources" include time—what is your schedule for completing the work? What are objective outcomes at specific times that your progress may be measured against? How might the project be "de-scoped" if progress does not meet your schedule, yet still satisfy the requirements of the program?
vii) If possible, consider any potential difficulties that might arise during the course of your project/thesis work. How might you address them? Have you scheduled in a "buffer" in your timeline to ensure you can complete all tasks efficiently?

g) **Bibliography/References**
Document your citations of scholarly work here, using the appropriate style and format of your disciplines.

h) **Other Requirements**
Your proposal should:
i) Be approximately 10-15 pages in length, double-spaced, and with one-inch margins.
ii) Have a well-developed title, with your name, committee member names (if available), and date on the title page.
iii) Include at least ten (10) bibliographical references. Be sure to list these separate from the body of the proposal in an independent section at the end.
iv) Use major headings, and level 2 and 3 sub-headings, as appropriate.
v) Use either footnotes, endnotes, or author/year citations, as appropriate.
vi) Use the APS (American Physical Society), ACS (American Chemical Society), or CSE (Council of Science Editors) style (or any recognized style in your field) that is used correctly and consistently. Citations should be complete—containing all the requisite information for a person to find the source material.

3) References

i) In addition to the above description, refer to the MIS Outcomes Assessment form for Proposals.

ii) For further information on research design and methodology, and regarding the thesis process in general, see the following suggested reading. Feedback regarding additions to this list (or deletions, if the reference no longer appears relevant) is always welcome. Also, if you find one text more, or less, useful, please pass those opinions along as well. In any of these books, you will need to pick and choose the information most suited to your project and to your chosen discipline and approach.

Of the research methodology texts, those labeled "student-oriented" will contain broader information for Ph.D. students as well as specific information on the scientific method, planning and conducting scientific research, and writing a report or thesis. I find the book by Smith most appropriate, though some of you may also find the book by Greenfield more to your taste.

Those labeled "professional" spend little to no time discussing general life as a graduate student but are great references for the scientific method, planning and conducting scientific research, and writing up the results. Of the two, the book by Wilson has been around for a while, but has been "recently" updated (1990). It is very detail oriented, making it highly complete. The book by Creswell has a more applied bent, but also a modern take on the scientific method.

iii) Research Methodology

General, Student-Oriented:

Best: Smith, Robert V., *Graduate Research: A Guide for Students in the Sciences*, 3rd ed., University of Washington Press (1998).

Good: Greenfield, Tony (Ed.), *Research Methods: Guidance for Postgraduates*, Arnold/John Wiley & Sons (1996).

Detailed, Professionally-Oriented:

Best: Wilson, E. Bright Jr., *An Introduction to Scientific Research*, Dover (1990).

Good: Bock, Peter, *Getting it Right: R&D Methods for Science and Engineering,* Academic Press (2001).

iv) Writing—general style, scientific/technical writing, and thesis-specific.

Best: Higham, Nicholas J., *Handbook of Writing,* SIAM (1998).

Good: Booth, W., Colomb, G., and Williams, J. *The Craft of Research*. Univ. of Chicago Press (2008).

Good: Strunk, W. *The Elements of Style*, 4th ed. Boston: Allyn and Bacon (1999).

Good: Turabian, K. *A Manual for Writers of Term Papers, Theses, and Dissertations*, 8th ed. Univ. of Chicago Press (2013).