



DEPARTMENT OF CHEMISTRY

Analytical Division
Environmental Studies Ph.D. Program

GUIDELINES AND PROCEDURES FOR RESEARCH PROPOSALS

Dr. David K. Ryan, Olney 318A, 978-934-3698

Within three (3) months of completing the cumulative exams, each student must prepare a written Research Proposal and give an oral defense of that proposal before their faculty Advisory Committee. The following guidelines have been derived from the National Science Foundation (NSF) Grant Proposal Guide (NSF 94-2 January 1994) and are considered representative of a typical format used by many institutions for grant proposals.

Proposal Organization

The research proposal should include a minimum of the following sections. Additional sections or subsections may be included to aid in the organization of material or clarity of presentation.

Cover Page

Summary or Abstract

Table of Contents

Project Description

Introduction

Goals and Objectives

Significance

Theory and/or Literature Survey (may use one or both sections)

Proposed Work

Experimental Section

Anticipated Benefits

References

Time Line or Milestone Schedule

Approximate Budget

A brief explanation of each section follows:

Cover Page - A cover sheet including the title, date, name of proposer, academic program, and the fact that the document is a proposal presented in partial fulfillment of degree requirements, should be included.

Summary or Abstract - The proposal must contain an abstract or summary that should be approximately one page in length. This summary should be a self contained description of the proposed activities suitable for conveying the nature and scope of the work. The summary should be written in the third person and include a statement of objectives, methods to be employed and the significance of the proposed activity to the advancement of knowledge. It should be informative to other persons working in the same or related fields and, insofar as possible, understandable to a scientifically or technically literate lay reader.

Table of Contents - The document should contain a Table of Contents with the page numbers of all sections listed including Tables and Figures.

Project Description - The Project Description is the main body of the proposal and should be a clear statement of the work and any background information necessary to support the scientific concepts and allow an understanding of the research in its appropriate context.

Introduction - Briefly introduce the area of study stating the problem or hypothesis to be tested and the general approach to be used.

Goals and Objectives - State the goal or objectives for the work as concisely as possible. It is acceptable to use numbered or bulleted items as long as they are presented in a paragraph format using complete sentences to delineate the ideas. A limited set of goals is highly advisable. For example, three (3) general objectives with certain subtasks under each is much more realistic than a list of ten or twelve major goals to be accomplished

Significance - Give both the broad ranging significance of the work as it contributes to the knowledge base in your field as well as the specific contribution that your results will provide. It may be of use to ask yourself "Why is the proposed research important?" and "How will the findings be used?" or "Does the work address a significant information gap?"

Theory and/or Literature survey - This section is designed to allow delineation of specific theoretical concepts that may not be common knowledge in the field and give the background information from the literature that is necessary to put the proposal in its proper context. Theory should not rehash basic principles that are found in elementary texts or are part of standard course work, but, should cover advanced concepts pertinent to the proposed experiments. A review of the literature may be necessary to identify where the proposed work fits with respect to the current state of knowledge in the field.

Proposed Work - As clearly and concisely as possible, the scope of the proposed project should be described. Each step or concept must be fully developed to its logical conclusion. Do not assume the reader knows what you are planning.

Experimental Section - A detailed experimental section must be provided that gives the procedures, reagents and instrumentation to be used. The organization for this may follow a standard journal format. Be sure to give full detail for methods and procedures to be used as well as the general approach. It is usually advisable to divide this section into subsections with subheadings such as Reagents, Apparatus, Procedures, Instrumentation, etc. This section may also contain information on appropriate quality control/quality assurance (QC/QA) measures that may be implemented such as the use of standard reference materials, etc.

Anticipated Benefits - State briefly the broad ranging and specific benefits to be derived from the proposed work. As a concluding Statement this section may summarize the questions that will be answered and the basic contribution that the project will make to the particular field of science.

References - Most any reference format used in a scientific journal is acceptable as long as it is consistent throughout. Often the preferred style is to cite the authors and year parenthetically in the text in the form (Farah and Sneddon, 1993) or (Duggan et al., 1994). The reference list would then contain the full citation including title arranged alphabetically by author as follows:

Ryan, D.K. and Ventry, L.S. (1990) Exchange of comments on fluorescence quenching measurements of copper-fulvic acid binding. *Anal. Chem.* 62,1523-1526.

This general reference style is preferred for proposals because it gives the reviewer the maximum amount of information by which to determine the nature and appropriateness of the citation.

Time Line or Milestone Schedule - This section is not required but is highly advisable for Environmental Studies Ph.D. students who are planning to carry out the proposed work as their dissertation research. The attached pages give two styles of project schedules as examples. Other formats are also acceptable as long as the major components of the work are listed and some thought has gone into planning the sequence of tasks that makeup the proposed project.

Approximate Budget - A brief budget, not to exceed one page should be included at the end of the proposal. Typical budget categories include personnel costs (salaries), supplies equipment, travel and any other costs that might be associated with a project such as the cost of using the nuclear reactor, renting equipment such as boats or other needed facilities.

General Instructions

The written proposal should be typed using a standard font, double spaced with pages numbered and should be free of typographical and spelling errors. The use of proper grammar is also desirable from the perspective of readability and effective communication of ideas. To this end it is encouraged that students have one or two of their peers read over the document and provide both grammatical and technical suggestions.

It is highly recommended that the Project Description (i.e. the main body of the proposal with all its sub sections) not exceed 25 pages. This page limitation does not apply to the Reference List, Tables or Figures, all of which may add many additional pages to the proposal. Other components such as the Cover Page, Table of Contents, Abstract, Budget and Time Line will also add additional pages, but, these sections should be no more than one page each.

The development of Research Proposals should be conducted with the guidance of the students Research Advisor. This includes approval of the selected topic and the development of the actual document. Once the proposal is complete the student should schedule a defense with his/her Advisory Committee giving the faculty ample time to review the written proposal. Approximately two weeks advance notice is recommended in order to accommodate those involved, although shorter time frames may be satisfactory if all members of the committee are in agreement. Notification of the defense to the entire campus should be done one week in advance of the defense.

Finally, it is expected that the Research Proposal, as an academic requirement, will prepare students for their dissertation research as well as give them valuable experience that will benefit them in their future careers. If the student fully plans to conduct the research that is the subject of the proposal, it should be clear that the proposal is neither a contract by which the faculty hold the student hostage nor is it a checklist of tasks that the student follows to get a degree. Research should be considered a dynamic process by which new discoveries are made and innovative concepts are tested. The goals, and the methods for achieving those goals, may change in the course of the project. Ultimately, a Ph.D. dissertation must present sufficient novel and scholarly work for the student to be deemed worthy of receiving the Ph.D. degree. To that end it is clear that the dissertation work should result in manuscripts that are publishable in peer reviewed journals. Publications are really the only way that research can be judged by the global scientific community.