**Thesis Proposal Form**

1. **Proposing Student**
   1. **Name:**
   2. **E-mail address:**
   3. **Signature, Date:**

Complete each section below. The final section with your advisors’ signature(s) will indicate **they have read and approved your thesis proposal and timeline**. This document is meant to guide you through your final thesis document by serving as an initial outline / draft. In general, it is recommended that you make this document as complete as possible; this will allow for (1) more constructive feedback from the Thesis Review Committee, and (2) efficient progress toward completion of your final thesis document.

**New requirement: All students must list and be able to articulate which competencies (included at the end of this proposal form, beginning on page 5 of this uncompleted form) are involved in their respective thesis projects. Thus, you must list the competencies addressed within the scope of your project. You may refer to them as follows:**

MSB1.1, MSB1.2, etc. for the MS in Biostatistics Core Competencies

PHA1.1, PHA1.2, etc. for the Population Health Analytics Competencies

SB1.1, SB1.2, etc. for the Statistical Bioinformatics Competencies

SMP1.1, SMP1.2, etc. for the Statistical Methods and Practice Competencies

**Students must select at minimum five (5) competencies total: a minimum of three (3) core competencies and a minimum of two (2) from their respective concentration competencies. These competencies should guide your thesis project, and these competencies should be discussed with your advisors to ensure they are in agreement as well.**

Your advisory committee (primary and secondary advisors) must review and approve this proposal prior to submission.

1. **Primary Thesis Advisor** – Must be a faculty member in the Department of Preventive Medicine at Northwestern University *unless* specific permission has been granted for an exception.
   1. **Name:**
   2. **E-mail address:**
   3. **Signature, Date:**
2. **Secondary Thesis Advisor** – In general, this person will be an expert in the specific field to which your thesis applies
   1. **Name:**
   2. **E-mail address:**
   3. **Signature, Date:**
3. **Working thesis title:**
4. **Scientific background and rationale**

This section should be at minimum one to two paragraphs.

1. **Study question / specific aims**
2. **Data source**
3. **Target journal for submission (if identified)**
4. **Study variables**This section should briefly detail the study variables you have identified, and anything statistically relevant about them (time-to-event, binary, continuous, missingness, etc.)
5. **Statistical analysis plan**

This should be the longest section of your proposal. At minimum, text should include a brief discussion of planned analyses / statistical methods, and a discussion on planned content for tables and figures (Recall, you are required at least two tables and one figure). You may include table and figure “shells” or “templates” if you choose.

1. **Competencies noted**

Identify the competencies you anticipate your thesis project covering. Refer to pages 5-7 in the uncompleted form for the list of competencies.

1. **Timeline and planned advisory meetings**

You must, at minimum, plan for **three** advisory meetings prior to the thesis due date (April 25, 2022). Depending on the nature of the collaboration, more meetings may be necessary to present updates and discuss findings. **It is the student’s responsibility to schedule these meetings at times that work with his/her advisors.** *You may use and adapt the example template below to list the milestones and meeting times. NOTE: this example has more than the required number of meetings, and it is meant to be tailored to the needs of the student and advisors.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Meeting Time** | **Location** | **Meeting Purpose** | **Milestones Due Prior to Meeting** |
| 01/31/2021 | 9am-9:45am | Dr. X’s office | Review proposal and next steps | Target journal identification, manuscript outline |
| 02/21/2021 | 9am-9:45am | Dr. Y’s office | Review initial analysis results and identify issues | Descriptive statistics and table drafts |
| 03/14/2021 | 9am-9:45am | Dr. X’s office | Finalize results and discuss key findings | Draft methods and results text, table and figure revisions |
| 04/04/2021 | 9am-9:45am | Dr. Ys office | Discuss outstanding issues prior to final thesis | Penultimate draft of thesis to advisors |
| 04/22/2021 | 9am-9:45am | Dr. X’s office | Signature attainment and feedback / evaluations | Final thesis document |

1. **References**

It is strongly encouraged that students begin to format references (using EndNote, LaTeX, or some other software) by this stage of their thesis project as this is the expectation for the final document.

**MS in Biostatistics Competencies**

1. Apply classic methods for continuous and categorical data analysis, including regression and other appropriate statistical approaches;
2. Use computer-based statistical analysis package(s) to manage data;
3. Develop visualized data using computer-based statistical analysis package(s);
4. Analyze data employing computer-based statistical analysis package(s);
5. Implement sample size and power calculations for a range of experimental designs;
6. Interpret results of a health research study, including the relation to findings from other studies, potential biological or social mechanisms, study limitations, and public health implications;
7. Communicate written and oral findings in a scientifically sound manner;
8. Calculate epidemiological measures of association between risk factors and disease;
9. Apply methods and strategies to evaluate and reduce bias in health research;
10. Use criteria to distinguish between association and causality; and
11. Apply ethical and regulatory standards to human subjects’ research.

**MS Concentration-Specific Competencies**

**Concentration in Population Health Analytics**

1. Design an epidemiologic study to address a question of interest;
2. Describe practical considerations for the conduct of health research studies;
3. Access publicly available data resources for population health research;
4. Critically review the scientific literature, synthesize findings across studies, and make appropriate recommendations based on current knowledge; and
5. Develop a clear description of the rationale, methods, results, and overall interpretation of an epidemiologic investigation.

**Concentration in Statistical Bioinformatics**

1. Develop computer files of high-dimensional data for analysis using high performance computing data management techniques;
2. Determine and execute appropriate statistical analyses, in particular techniques relevant to bioinformatics, to address a study question;
3. Access publicly available databases for bioinformatics research;
4. Develop statistical and bioinformatics analysis results in written, graphical and verbal format in response to an analysis request; and
5. Identify theoretical underpinnings of advanced statistical models.

**Concentration in Statistical Methods and Practice:**

1. Develop computer files of raw data for analysis using data management and statistical analysis software;
2. Execute appropriate statistical analyses to address a study question;
3. Apply classic methods for the analysis of time-to-event and clinical trial data;
4. Develop statistical analysis results in written and verbal format in response to an analysis request; and
5. Identify theoretical underpinnings of advanced statistical models.