# Guidelines for Master's Report and Thesis in the Operations Research & Industrial Engineering Program

## Overview

It is the responsibility of each graduate program to establish its own standards for research at the Masters level. Neither the University nor the Department have promulgated guidelines in this matter so it is up to the supervising faculty to provide direction.

A Master's Thesis is 6 credits, and from the point of view of the OR/IE Program, should contain some amount of original research. This could take the form of new theory, a new algorithm, a novel approach to a difficult problem, the use of known techniques in a new or novel way, or any combination of the above. The goal of this document is not to pin down the definition of "original research," but to give guidelines for students and a standard for faculty. Similarly, it is not possible to quantify the amount of work required to complete a Thesis. The total hours in terms of the effort spent at problem definition, modeling, data collection, computations, validation, and writing may vary considerably. Similarly, there is no fixed length for the final document. In general, though, the effort associated with a Thesis should be roughly equivalent to that required for two graduate courses.

A Master's Report is 3 credits and may or may not contain original research. Typical examples include case studies done in conjunction with a business or organization, the implementation and testing of an algorithm, a comparative study of different methodologies such as simulation versus regression analysis for solving a particular problem, or the simulation of an enterprise to answer design questions or to analyze operational policies. The effort associated with a Report should be roughly equivalent to the amount of work a student is required to do for a typical graduate course.

## Procedure

1. Select a topic in conjunction with an OR faculty member. The supervisor *must* be a member of the OR Graduate Studies Committee.

2. Select a reader or co-supervisor. This person does not have to be a member of the OR Graduate Studies Committee.

3. Fill out form "Proposed Research for Master's Report and Thesis" and give signed copies to supervisor and reader. This form can be obtained from the OR secretary.

4. Write proposal and submit it for approval to supervisor and reader. See guidelines below.

5. Conduct research and write up results following The University of Texas format. See

http://www.utexas.edu/ogs/pdn/

for guidelines.

6. Present document to supervisor and reader for approval. (See same web site for graduation information.)

Note: Students doing a Report must register for ORI 398R in the semester in which they expect to graduate. If they do not graduate in that semester, they must register again in the next semester. Students doing a Thesis must register for ORI 698A and ORI 698B in two successive semesters. They must register for ORI 698B in the semester in which they expect to graduate.

**Proposal**

The purpose of a proposal is to provide an outline of the research to be conducted as well as an estimate of the nature and amount of work to be undertaken. The supervisor and reader must approve the proposal. It should not be viewed as a binding document, though; as the research progresses, some ideas may prove impractical or unpromising, while others may call for further exploration. By its nature, research is uncertain so it is usually not possible to predict the best course of action at the outset of a project.

The supervisor and reader have full discretion on the contents and style of the proposal. Nevertheless, it will be to everyone's advantage if it is a comprehensive document. In most cases, it will serve as the blueprint for the Report or Thesis. Some suggestions follow.

1. Introduction: Discuss the problem to be investigated, state why it is important, state how it is to be tackled, state the expected results.

2. Literature search: Cite relevant research appearing in the literature and summarize past efforts. Mention analytic approaches that have been tried and related computation results. It is not necessary to cite every publication in the area under investigation, especially if the work is obsolete or of secondary importance.

3. Model Formulation: Give a formal statement of the problem and develop a mathematical formulation, if appropriate. Define all notation including parameters, indices, sets, and variables. Try to use standard conventions.

4. Solution Methodology: Discuss the various approaches that you expect to explore in arriving at a solution or in developing a solution methodology. State data requirements, implementation approach (e.g., spreadsheet using VBA, modeling language to generate input then C++ to write algorithm, simulation language, SPSS), analysis to be performed, and expected output. Mention any industry collaboration and testing that might be done. Indicate how the results will be validated.

5. Statement of Work: Outline the steps that you will follow in conducting the research, from problem definition to testing, to writing up the results.

6. Provide a timeline that shows approximately the length of time required for carrying out each step.

7. Provide a list of references at the end of proposal in consistent format.

**Proposed Research for Master's Report and Thesis**
**in Operations Research & Industrial Engineering**

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Student's Name

_____
Date First Graduate Semester in OR/IE at UT

_____
Current Address

_____
Phone (Home, Office) e-mail

_____
Current GPA in relevant OR/IE Graduate Work at UT

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Check one: ☐ Thesis ☐ Report

_____
Title of Research

_____
Supervisor

_____
Reader or Co-Supervisor

**Abstract** (use back of sheet or second page if necessary)