

THAYER SCHOOL OF ENGINEERING

Instructions for Preparing and Submitting Honors Theses and Independent Project Reports

I. PREPARATION OF THE MANUSCRIPT

There are thesis templates available on Thayer Express if you wish to use them. The textual material should be **DOUBLE-SPACED**, except for footnotes and long, quoted passages. **The left-hand margin must be at least 1 1/2 inches wide on all pages of the thesis, including figures, appendices, etc. The top, bottom, and right-hand margins must be at least one inch wide.** It is essential that the manuscript be attractive in appearance and free from error.

Alternatively, text that has been previously published or formatted for submission (e.g., journal articles) may be reproduced in its submitted/published form. In that case, the pages should be cropped to remove any PDF margins and rescaled to fill, but not exceed, the space available between margins that are 1 1/2 inches wide on the left-hand side and at least 1/2 inch wide on the top, bottom, and right-hand sides. For any previously published or submitted text that involves multiple authors, an introductory page must be included describing the respective roles the authors played. It is essential to meet relevant copyright permission requirements, and a statement of compliance with copyright requirements must also be included on the introductory page. If multiple works of this type are included, an introductory page may precede each work, or a summary page describing all works may be included at the beginning of the thesis

Tables and graphs can be color coded if the thesis is published with color images, keep in mind that when tables and graphs are published in black and white, the color scheme may not be readable. Consider using symbols for coding to avoid this issue. If black and white photographs are to be used, care must be taken that they do not have too much contrast. Please keep in mind that margins must be 1 1/2 inches on the left and 1 inch on the top, bottom and right. It is possible to reduce charts and graphs in size by the use of reduced photocopies.

Each student is required to upload a copy of the thesis or report and an abstract to Digital Commons.

II. FORMAT

A thesis or dissertation ordinarily has three main parts: the preliminaries, the text, and the reference matter. The order of these may vary but is usually as follows:

A. The Preliminaries

1. Title page (must conform to the sample title page appended), followed by a blank page. If you wish to copyright your thesis, the copyright notation should be on this otherwise blank page.
2. Abstract (Double-spaced, must not exceed 350 words, see attached sample sheet).
3. Preface, including Acknowledgements (Double-spaced)
4. Table of Contents, with page references (Double-spaced)
5. List of Tables, with titles and page references. (Double-spaced between each one)
6. List of Illustrations, with titles and page references. (Double-spaced between each one)

B. The Text

1. Introduction (Double-spaced)
2. Main body, with the larger divisions and more important minor divisions indicated by suitable heading. (Double-spaced)

C. References

1. Appendices (Double-spaced between each one)
2. Bibliography (Double-spaced between each one)

Each page in a thesis, except the blank page following the title page, should be assigned a number. The following plan of page numbering is recommended:

- 1) For the Preliminaries, small Roman numerals (i, ii, iii, etc.) are used. The numbering should begin with ii; the title page counts as page i, but the number does not appear. The blank page is not numbered or counted.
- 2) For the remainder of the dissertation, including the text, illustrations, appendices, and references, Arabic numerals are used. Each page must be numbered. Do not use letter suffixes such as 10a, 10b, etc. The numbering should begin with 1 and run consecutively to the end of the dissertation. The page number is placed at the center bottom. If the description of an illustration is too long to be placed on the same page, it should be placed on the previous page, not on an unnumbered page.
- 3) When the appendices are bound as a separate volume, this volume should contain a title page duplicating the title page of a textual volume, with the addition of the word "Appendices" or similar descriptive word, just below the title. The pages in this volume are numbered

consecutively with Arabic numerals, counting the title page as 1 (although this number does not actually appear on the title page).

SAMPLE TITLE PAGE

TITLE OF YOUR THESIS

by

STUDENT'S NAME

Thayer School of Engineering
Dartmouth College
Hanover, New Hampshire

Date _____

Approved: _____
Advisor's Signature

Author's Signature

NOTE: Electronic Signatures will be accepted.

ENGS 86/88 Abstract

“TITLE”

(Student Name)

Faculty Advisor:
(Name)

Abstract

(Not to exceed 350 words-Double Spaced) To contain: Statement of problem, procedure, or method, results, and conclusions.)

Solar flares are sudden, intense eruptions of the Sun's surface that release X-rays and high-energy particles. When directed toward the Earth the effects of a solar flare can include disruption and complete loss of GPS and short-wave radio signals and an increase in exposure to harmful radiation, particularly in the polar regions. The incident electromagnetic radiation also affects the composition of Earth's atmosphere, more specifically the ionosphere, by causing a dramatic increase in ionization over a widespread region.

Using a global network of over-the-horizon high-frequency (HF) scientific radars known as the Super Dual Auroral Radar Network (SuperDARN), we are able to observe distinctive signatures of solar flare-induced X-rays in the ionosphere. This thesis investigates several possible parameters that are extracted from the standard operating mode of SuperDARN radars located in the Earth's polar regions. Based on our analysis the best indicator of solar flares is an abrupt drop in the backscattered power observed on multiple beam soundings and simultaneously by more than one radar. An algorithm is given for detecting solar flares and applied to historical SuperDARN data. Skill scores to measure the performance of the algorithm are discussed along with several refinements. The work in this thesis represents a significant advancement toward real-time monitoring capabilities based solely on ground-based measurements obtained from an existing network.