

**Thesis and Dissertation  
Writing Instructions**

**Instructions for the preparation of theses and dissertations at the South  
Dakota School of Mines and Technology (SDSM&T)**

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## ***INSTRUCTIONS FOR THE PREPARATION OF THESES AND DISSERTATIONS AT SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY (SDSM&T)***

### **1. INTRODUCTION**

These instructions are effective for all theses and dissertations completed in the fall semester of 2012 or later.

Master's and professional theses and doctoral dissertations are placed in the Devereaux Library collection at the South Dakota School of Mines and Technology (SDSM&T). In addition, they may be submitted to University Microfilms Incorporated (UMI), a commercial dissertation archiving and distribution company. This manual contains the requirements and regulations of the Office of Graduate Education, the Faculty, and UMI, for uniform style and format of these documents. The standards are flexible to be consistent with the specialized requirements of primary publications in associated fields.

Division of responsibilities for preparing a thesis or dissertation:

- Faculty regulations pertaining to procedures for the supervision, approval, and defense of theses and dissertations are described in the current SDSM&T Academic Catalog. Both student and advisor are responsible for following these procedures.
- The student is responsible for preparing a thesis or dissertation following formatting guidelines described below.
- The Office of Graduate Education has responsibility for monitoring the physical format of theses and dissertations to make certain that the format conforms to university guidelines and that the quality of the master copy of the manuscript will allow satisfactory reproduction. All thesis and dissertation documents should be submitted to the Graduate Office prior to submission to the library for reproduction. PhD Dissertations should be submitted to UMI. The student pays the fees for UMI archival. Detailed instructions are posted at: <http://www.umi.com>.

#### **1.1 Checklist of Approval, Reproduction, and Binding Procedures for Theses and Dissertations**

1. Do the research and write the paper.
2. Defend. The scheduling form is available on the SDSM&T Graduate Education website Forms page and in the Graduate Education Office. Your thesis/dissertation must be defended and approved by your committee. Please refer to the Graduate Education Deadlines document, which also can be found on the website and in the Graduate Office. Pay particular attention to the last day possible to submit your thesis or dissertation to the Graduate Office. Submitting

on or before this date will allow you enough time to have the format and grammar check completed, make any grammatical corrections necessary, and then submit for final printing and binding.

3. Make whatever corrections/revisions your committee requires. Check that your margins and page numbers are correct and that you have included your Vita page, which must be referenced in the table of contents.
4. Print thesis/dissertation on plain paper, but then be sure to print the title page on required acid free, 100% cotton, at least 24 pound, archive paper, which may be purchased in the campus bookstore.
5. Obtain all signatures on the title page (printed on archival paper) except the Graduate Education Dean's signature.
6. Complete the Thesis/Dissertation Order Sheet that was provided by your committee at the time of your defense. If you want an estimate of your duplication costs, contact the library to set up an appointment. Be prepared to provide details as number of pages, number that are color, if map or CD pockets required, etc.
7. Deliver the title page (with all signatures except the Dean's) and your thesis to the Graduate Office to be reviewed for format and grammatical corrections by a faculty member approved by the Graduate Office. This is due no later than 2 weeks before graduation.
8. You will be contacted by the Graduate Office when your thesis/dissertation has been proofread. You will be asked to pick it up and then make any necessary corrections.
9. Return the marked copy (if there were corrections) and the final copy (including the title page) all on archive paper to the Graduate Office for final review, approval, and the Dean's signature.
  - Note: --Maps must be on acid-free archival paper.
  - Printing must be done using laser jet. Ink jet is not acceptable.
10. You will be notified via email to come to the Graduate Office to pick up your document once the Dean has reviewed it and signed the signature page.
11. Deliver the final, master copy (with title page), the required number of CDs, (the CDs you submit must contain a PDF copy of all elements, including pictures, of the thesis or dissertation in addition to the original files), and the Library check-out sheet (provided to you by your committee) to the Library. Pay for the printing and binding and make sure that you have obtained the required library staff signature on the check-out sheet.
12. Return the check-out sheet to the Graduate Office.

13. The library ships theses and dissertations to the bindery at the end of the month. When yours has been printed and bound, which can take approximately six weeks, the Library will take care of distributing all copies.

## **2. CONSTRAINTS ON THESIS/DISSERTATION CONTENT**

### **2.1 Use of Works Previously Published by Others**

The author of the thesis or dissertation must sign the title page certifying that the document is the author's original work. The use of material copyrighted by others must be properly acknowledged and, unless it falls within the doctrine of fair use, may be used only with written permission of the copyright owner. A copy of the owner's written permission must accompany the document in its final form.

### **2.2 Use of Works Previously Published by the Author**

The thesis/dissertation author's prior published works may not appear in their published form in the main text of the thesis/dissertation. They may be summarized and referenced like any other source materials. They may be presented in reprint form as pocket materials at the end. If the author's published work represents a substantial part of the research effort reported in the thesis/dissertation, it should be so acknowledged in the text where first mentioned.

### **2.3 Works Previously Published When Thesis/Dissertation Author is Co-Author**

A statement must be made (in footnote or in text) indicating the portions of previous work done by the author.

## **3. COPYRIGHTING THESES OR DISSERTATIONS**

### **3.1 Ownership**

The ownership rights to theses and dissertations created by students shall be governed by the following policy.

*Copyright ownership of theses and dissertations resulting from research which is performed in whole or in part by the student with financial support in the form of wages, salaries, stipend or grant by SDSM&T shall be determined in accordance with the terms of the support agreement, or in the absence of such terms, shall become the property of the University. Requests for permission to publish such theses and dissertations should be addressed to the Dean of Graduate Education.*

*The student must, as a condition of a degree award, grant royalty-free permission*

*to the School to reproduce, use, and publicly distribute copies of the thesis or dissertation.*

### **3.2 Registration and Deposit**

Copyright registration of theses and dissertations is optional.

The United States Copyright Act of 1976 adopts the principle of automatic copyright. Works created after 1 January 1978 are copyrighted under federal statute upon creation. While registration with the United States Copyright Office and use of a copyright notice are not conditions for securing initial copyright for these works, registration and notice are still important to ensure full protection of rights under the law. If copyright registration is desired by the copyright owner, all copies should carry a copyright notice (i.e. the word “Copyright” or a symbol—e.g., © 2003 Jane Smith) and the words “All Rights Reserved” beneath the notice. If a thesis or dissertation bears a copyright notice, it becomes subject to mandatory deposit with the Library of Congress (two copies).

### **3.3 Further Information on Copyright Law**

Inquiries regarding federal copyright law, institutional copyright policy, and copyright matters in general may be directed to the Vice President for Research.

## **4. SPECIFIC REQUIREMENTS**

### **4.1 Master Copy Preparation**

Theses and dissertations must be electronically printed and error-free, since the master copy is kept as a permanent record of research and academic achievement by the student, and is used for reproduction.

Further details and specifications concerning submission of a thesis or dissertation to UMI may be found at: <http://www.umi.com>. In general, theses/dissertations that meet SDSM&T standards also will be acceptable to UMI.

### **4.2 Paper**

The paper used in the master copy must be archival quality, 8 ½ x 11, 24 pound, acid free, 100 percent cotton paper. This paper can be purchased directly from the SDSM&T bookstore.

### **4.3 Illustrations**

All copies deposited in the Devereaux Library must be fully illustrated. Illustrations may be oriented lengthwise on the page, but must be placed in such a manner that when the thesis is held in reading position, the bottom of such an illustration and its caption will

be at the right side of the page. All page size (8½ x 11) illustrations must conform to margin limitations as indicated under Item 4.7 (Style and Margins). Large tables, charts, maps, etc., must be folded no larger than 7 x 10 inches with plate number and/or title in bottom right corner, to allow trimming of the bound volume without damaging the material. The library will make the necessary reproductions of all illustrations that are no larger than 11 x 17 inches. For larger illustrations, the appropriate number of copies must be supplied. Under no circumstances are any continuous-tone photographs to be used.

Images and charts reproduced using digital printers should be printed directly on the proper paper using archival-quality inks/dyes/toner.

#### **4.4 Captions for Illustrations, 8½ x 11 inches**

Captions for all illustrations must be within margin and font limitations as set forth under Item 4.7 (Style and Margins). All captions must be placed at the bottom or on the right-hand side of an illustration. Captions should be in a different font to distinguish from the body of text.

#### **4.5 Preparing Maps, Graphs, Tables**

Maps, graphs, and tables are, in most cases, produced electronically. If not, the following instructions apply.

To prepare a good original by hand:

1. Draw on high quality reproducible paper or film.
2. Draw with black, waterproof (non-transferring) India ink. Do not use felt tip pens.
3. All lines should be dark, crisp and clear.
4. Drawing should be clean of any film.
5. When shading, use dark, clear patterns.
6. Do not use blue line. Not all blue lines can be reproduced.
7. Follow guidelines for margins as instructed in sections 4.4 under “Captions for Illustrations” and 4.7 “Style and Margins.” When doing thesis drawings larger than 8 1/2” x 11” (i.e. geographic maps) keep in mind that they are to be folded down to a 7” x 10” format. Therefore, you need to put the identifying information (plate, title, preparer’s name) in the bottom or bottom right corner so it can be easily displayed when folded.

## 4.6 Including Material on Digital Media

Follow UMI instructions for submission of such material in digital format.

See <http://www.umi.com>.

## 4.7 Style and Margins

Fonts used should be clean and easily readable. The recommended font style is Times New Roman. Minimum font size is 12 pts. Minimum font size for captions is 10 pts. The same font should be used for the principle text throughout the work, although other fonts and styles may be employed for smaller segments.

All pages in the document should be numbered, with the exception of the title page. Use the roman numeral I (one) for the first page after the title page. Use the numerical number 1 (one) for the first page of the body. Upper case letters should be used to number appendixes. Page numbers must be in the same font and size as the body of the text and placed on all pages, including the Abstract and the Table of Contents. Page numbers must be in the upper right-hand corner,  $\frac{3}{4}$  inch down from the top, and  $\frac{3}{4}$  inch from the right-hand side.

Margins are to be  $1\frac{1}{2}$  inches on the left side and 1 inch on the other three sides. (use this document as an example.) The same margins apply to both landscape and portrait page orientation. Margins are to be blank—without punched holes, writing, or other marks. The margins set in many word processing packages may not measure the same on the printed page. Measure the margins on printed test pages and adjust the software settings accordingly to meet the above requirements.

Pages which have printed text only must be oriented in the same manner as the pages of this instruction manual, often called “portrait.” When necessary, graphs, photographs, tables, and figures may be oriented facing to the right. The manuscript is to be double-spaced with paragraph indentation and tables typed in accordance with format of journals in the candidate’s particular discipline and printed on one side of the paper only.

## 4.8. Style References

The bibliographic style used in the thesis or dissertation is determined by the candidate’s department or professional society and by consultation with the candidate’s major professor. The Office of Graduate Education encourages preparation of theses/dissertations in a format suitable for submission for publication in leading journals in the candidate’s field.

The following section provides examples for citing a wide variety of sources in the American Psychological Association (APA) style, a commonly used style similar to the bibliographic styles used in many disciplines. In some fields, styles may differ considerably. The candidate should follow a format required by the publication to which he/she plans to submit the work. However, if there is no specific format in a

given field, and the candidate's department has no specific guidelines, use of this APA style is encouraged.

The American Psychological Association (APA) recommends an author/date style of in-text citations. These citations refer readers to a list of references at the end of the paper. APA in-text citations provide at least the author's last name and the date of publication. For direct quotations, a page number is given as well. In APA style, the alphabetical list of works cited is entitled **References**. The general principles are as follows:

1. Invert *all* author names and use initials instead of first names. With two or more authors, use the word *and*. Separate the names with commas.
2. Use all authors' names; do not use "et"
3. Place the date of publication in parentheses immediately after the last author's name. **Examples:** (Levy, 1997). (National Institute of Mental Health [NIMH], 1999) and in later citations (NIMH, 1999)
4. Underline titles and subtitles of books; capitalize only the first word of the title and subtitle (as well as all proper nouns).
5. Do not place titles of articles in quotation marks, and capitalize only the first word of the title and subtitle (and all proper nouns). Capitalize names of periodicals as you would capitalize them ordinarily. Underline the volume number of periodicals.
6. Use the abbreviation *p.* (or *pp.* for plural) before page numbers of newspaper articles and works in anthologies, but do not use it before page numbers of articles appearing in magazines and scholarly journals.
7. You may use a short form of the publisher's name as long as it is easily identifiable.
8. Alphabetize your list by the last name of the author (or editor); if there is no author or editor, alphabetize by the first word of the title other than *a*, *an* or *the*.
9. In many applications using APA, the first line is indented, subsequent ones full width—like a paragraph. This is the style that appears in the APA manual. However, some APA applications employ the hanging indent (first line full width, subsequent lines indented).

BOOKS (check capitalization for this book section)

[**Note:** When the author is an organization, the publisher is often the same organization. In



such a case, give the publisher's name as "Author."]

[**Note:** Use author's name for first and subsequent entries. Arrange entries by date, *earliest* first.]

(BASIC FORMAT FOR A BOOK)

Schaller, G. B. (1993). *The last panda*. Chicago: University of Chicago Press.

(TWO OR MORE AUTHORS)

Eggan, P. D. and Kauchall, D. (1992). *Educational psychology: Classroom Connections*. New York: Merrill.

Caplow, T., Bahr, H. M., Chadwick, B. A., Hill, R., and Williamson, M. H. (1982). *Middletown families: Fifty years of Change and Continuity*. Minneapolis: University of Minnesota Press.

(CORPORATE AUTHOR)

Fidelity Investments. (1993). *Fidelity Brokerage Services handbook*. Boston: Author.

(UNKNOWN AUTHOR)

*The Times atlas of the world* (9<sup>th</sup> ed.). (1992). New York: Times Books.

(EDITORS)

Fox, R. W., and Lears, T. J. F. (Eds.). (1993). *The power of Culture: Critical essays in American history*. Chicago: University of Chicago Press.

(TRANSLATION)

Miller, A. (1990). *The untouched key: Tracing childhood trauma in creativity and destructiveness* (H. & H. Hannum, Trans.). New York: Doubleday. (Original work published 1988)

(EDITION OTHER THAN FIRST)

Cavanaugh, J. C. (1993). *Adult development and aging* (2nd ed.). Pacific Grove, CA: Brooks/Cole.

(WORK IN AN ANTHOLOGY)

Ochs, F., and Schieffelin, B. (1984). Language acquisition and socialization: Three developmental stories. In R. Schweder & R. Levine (Eds.), *Culture theory: Essays in mind, self, and emotion* (pp. 276–320). New York: Cambridge University Press.

(TWO OR MORE WORKS BY THE SAME AUTHOR)

Davis, F. (1973). *Inside intuition: What about nonverbal communication*. New York: McGraw-Hill.

Davis, F. (1978). *Eloquent animals: A study in animal communication*. New York: Coward, Geoghegan.

## ARTICLES IN PERIODICALS

[**Note:** Cite works according to the usual style, and arrange them alphabetically by title. Add lower-case letters beginning with “a,” “b,” and so on within parentheses immediately following the year.

## (ARTICLE IN A JOURNAL PAGINATED BY VOLUME)

Block, N. (1992). Begging the question: Against phenomenal consciousness. *Behavioral and Brain Sciences*, 15, 205–206.

## (ARTICLE IN A JOURNAL PAGINATED BY ISSUE)

Searle, J. (1990). Is the brain a digital computer? *Proceedings of the American Philosophical Association*, 64(3), 21–37.

## (ARTICLE IN A MAGAZINE)

Caputo, R. (1993, August). Tragedy stalks the Horn of Africa. *National Geographic*, 184, 88–121.

## (ARTICLE IN A DAILY NEWSPAPER)

Goleman, D. (1993, July 13). New treatments for autism arouse hope, skepticism. *The New York Times*, pp. C1, C11.

## (LETTER TO THE EDITOR)

Fuller, K. S. (1993). The issue of ivory [Letter to the editor]. *Audubon*, 95(4), 12.

## (REVIEW)

Blaut, J. M. (1993). [Review of the book *Global capitalism: Theories of societal development*]. *Science and Society*, 57(1), 106–107.

## (TWO OR MORE WORKS BY THE SAME AUTHOR IN THE SAME YEAR)

Eckholm, Erik. (1985a, June 25). Kanzi the chimp: A life in science. *The New York Times*, pp. C1, C3.

Eckholm, Erik. (1985b, June 24). Pygmy chimp learns language skill. *The New York Times*, pp. A1, B7.

## OTHER SOURCES

[**Note:** No end punctuation is used at the end of the URL.]

## (DISSERTATION ABSTRACT)

Pellman, J. L. (1988). Community integration: Its influence on the stress of widowhood. (Doctoral dissertation, University of Missouri, 1988). *Dissertation Abstracts International*, 49, 2367.

## (GOVERNMENT DOCUMENT)

U.S. Bureau of the Census. (1989). *Statistical abstract of the United States* (109th ed.). Washington, DC: U.S. Government Printing Office.

## (PROCEEDINGS OF A CONFERENCE)

Waterhouse, L. U (1982). Maternal speech patterns and differential development. In C. E. Johnson & C. L. Thew (Eds.), *Proceedings of the Second Annual International Study of Child Language* (pp. 442–454). Washington, DC: University Press of America.

## (RADIO OR TV PROGRAM)

MacNeil, R. (Interviewer). (1991, August 22). [Interview with G. F. Kennan]. *The MacNeil/Lehrer NewsHour* (Program 4144). New York and Washington, DC: PBS.

## (VIDEOTAPE)

National Geographic Society (Producer). (1987). *In the shadow of Vesuvius* [Videotape]. Washington, DC: National Geographic Society.

## (ONLINE: ARTICLE FROM A NEWSPAPER ON THE WEB)

Lewis, R. (1995, December 24). Chronobiology researchers say their field's time has come. *The Scientist*, 9, p. 14 [On-line newspaper]. Retrieved December 30, 1997, from the World Wide Web: [http://web.the-scientist.library.upenn.edu/jr1995/chrono\\_951211.html](http://web.the-scientist.library.upenn.edu/jr1995/chrono_951211.html)

## (ONLINE: ARTICLE FROM A JOURNAL OR MAGAZINE ON THE WEB)

Broydo, L. (1998, January 13–18). The clean cleaner cover-up. *Mother Jones*, January/February 1998. *Mother Jones the Mojo Wire*. [Magazine, selected stories on-line]. Retrieved January 15, 1998, from the World Wide Web: [http://www.mojojones.com/mother\\_jones/JF98/homeplanet.html](http://www.mojojones.com/mother_jones/JF98/homeplanet.html)

## (ONLINE: ANNOUNCEMENT POSTED ON THE WEB)

National Institute of Mental Health. (1997, May 15). *Mammalian clock gene closed*. [Press release posted on the World Wide Web]. Bethesda, MD: Author. Retrieved December 30, 1997, from the World Wide Web: <http://www.nimh.gov/events/prnorth.htm>

## (ONLINE: MATERIAL FROM AN FTP SITE)

Beck, A. (1994, July 2). Glass, a fractal gif. [On-line graphic]. Swedish University Network SUNET. Retrieved January 17, 2000: <ftp://ftp.sunet.se/pub/pictures/fractals/>

## (ONLINE DOCUMENT WITHOUT A PRINT VERSION)

Wallach, D. S. (1993, September 22). FAQ: Typing injuries (2/5): General info. [On-line]. Available FTP: <rtfm.mit.edu>

**(COMPUTER SOFTWARE)**

Transparent Language Presentation Program (Version 6 for Windows) [Computer software]. (1999). Hollis, HH: Transparent Language.

**(ABSTRACT ON CD-ROM)**

Marcus, H. F., & Kitayamo, S. (1991). Culture and the self: Implications for group dynamics [CD-ROM]. *Psychological Review*, 88(2), 224, 253. Abstract from: SilverPlatter File: PsycLIT Item: 78-23878.

**(INFORMATION SERVICES: ERIC)**

Chiang, L. H. (1993). Beyond the Language: Native Americans' nonverbal communication. (ERIC Document Reproduction Service No. ED 368 540).

**(INFORMATION SERVICES: NEWSBANK)**

Wenzell, R. (1990). Businesses prepare for a more diverse work force. (Newsbank Document Reproduction Service No. EMP 27:D12).

#### **4.9 Bibliographic Style**

The author may use either footnotes or references to a bibliography at the end of the thesis or dissertation. As stated above, bibliographic style (footnotes, references, citations, etc.) and type (mathematical notation, symbols, etc.) should be those consistent with the guidelines established by the candidate's department or professional society. The style of the principal abstracting journal of the candidate's discipline is otherwise a good guide. Whenever possible, periodical titles should be abbreviated according to the standards outlined by the American National Standards Institute.

Some specific journals and bibliographies in various disciplines are:

American National Standards Institute, Inc., American National Standard for the Abbreviation of Titles of Periodicals. 1970. (Z39.5-1969—which is a revision of Z39.5-1963).

Atmospheric Sciences: J. of the Atmospheric Sciences; Meteorological and Geostrophysical Abstracts

Chemical Engineering: Chemical Abstracts; Engineering Index.

Chemistry: Chemical Abstracts; Analytical Abstracts.

Civil Engineering: ASCE Publications Abstracts; Engineering Index.

Electrical Engineering: Electrical and Electronic Abstracts; Engineering Index.

Electronics and Communications Abstracts Journal.

Geology and Geological Engineering: Annotated Bibliography of Economic Geology; Bibliography and Index of Geology; Bibliography of North American Geology; Geological Society of America, Bulletin; Geophysical Abstracts.

Mathematics: American Mathematical Monthly; American Mathematical Society Proceedings; Mathematical Reviews.

Mechanical Engineering: American Society of Mechanical Engineers, Transactions. Series A to J; Engineering Index; Mechanical Engineering.

Metallurgical Engineering: American Institute of Mining, Metallurgical and Petroleum Engineers, Transactions. American Society of Metals, Transactions; Engineering Index; Metals Abstracts; Chemical Abstracts.

Mining Engineering: Geological Society of America, Bulletin; Mining

Engineering: Engineering Index, IMM Abstracts, Energy Research Abstracts.

Paleontology: Camp, Charles Lewis, Bibliography of Fossil Vertebrates, 1954-1958, Geological Society of America (New York), 1964. (Z6033/.P2/C342); Bibliography and Index of Geology.

Physics: Nuclear Science Abstracts; Solid State Abstracts Journal; Physics Abstracts; Physical Review A-D.

#### **4.10 Title Page**

The title page must show the title, author, whether the document is a master's thesis or a doctoral dissertation, its purpose, name of the college, date, author's signature, and signature approvals of the Graduate Advisory Committee, the head of the major department, and the Dean of the Graduate Education. Names should be printed below signatures. An example follows.

Sample title page:

## **The Metaphysics and Mythology of Coffee**

By

Joseph Highly Caffeinated

A thesis submitted to the Graduate Division  
in partial fulfillment of the requirements for the degree of

Master of Science in Chemical Engineering

South Dakota School of Mines and Technology  
Rapid City, South Dakota

November 30, 2012

Prepared by:

---

Degree Candidate

Approved by:

---

Major Professor – Kofi R. Bean, Ph.D.

---

Head of the Chemical and Biological Engineering Department – Dee Caff, Ph.D.

---

Graduate Division Representative – Kaldi T. Goatherd, Ph.D., Humanities Department

---

Committee Member – Skin E. Latte, Ph.D., Biomedical Engineering Department

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Dean of Graduate Education - Doug Wells, Ph.D.

#### 4.11 Thesis and Dissertation Titles

Theses and dissertations can be valuable reference works when they can be easily located. Titles must be informative, meaningful, and descriptive—rather than just indicative of the content of the material. For example, it would be well to avoid such phrases as:

“Factors affecting...”

“Some causes and effects of...”

“An experiment on...”

NOTE: The method, process, instrument, device, etc., developed or used should be identified in the title if it’s a significant part of the research.

Authors of master’s theses and doctoral dissertations must substitute, in the title, appropriate words for formulas, symbols, superscripts, Greek letters, etc. For example, the term “Fission-Fragment Synthesis of  $K Mn(CN)$ ” is to be written as “Fission-Fragment Synthesis of Potassium Manganicyanide.” This is a requirement of UMI so that dissertations may be microfilmed and/or preserved digitally, and also facilitates readability when the work is included in thesis and dissertation abstracts.

#### 4.12 Abstracts

The format of the abstract at South Dakota School of Mines and Technology is as follows:

- A. Must be on a single, separate page, adhering to margin requirements.
- B. Limit to 250 to 350 words—preferably not to exceed 300 words for a thesis, or 350 words for a dissertation.
- C. Text will be single-spaced.
- D. The Abstract page comes after the Title Page and before the Table of Contents.

An abstract should be informative. It should not state: “this is discussed,” “that was investigated,” or “conclusions are given.” Be as specific on each point as space allows. Avoid stating what the material is about. Concentrate instead on what work has been done. For example, do not write: “the gravity anomalies in the area are discussed.” Rather, state that: “A gravity high of 25 milligals suggests that . . . .”

Report your information impersonally. This is a convention, and the restriction on the use of “I” makes the use of passive voice common in abstracts. Example: “On 30 June a sunspot almost 20 times the size of the planet Earth was observed on the east limb of the sun.”

The abstract summarizes three major elements of the full document:

- Objectives of the research
- Methodology used in the research
- Findings, including results, conclusions, and recommendations.

**Example** (from NASA JPL):

Title: An Object-oriented Software Architecture for Planetary Dexterous Manipulators

Planetary rover software tends to become very complex due to the rover's complex hardware architecture, numerous scientific instruments, and the requirements for real-time determinism and efficiency. The authors of this report developed an extendible object-oriented system decomposition and architecture to manage this complexity and to provide a powerful, robust yet easy set of tools for developers of higher-level applications. A version of this object-oriented architecture has been implemented on the Mars prototype rover, Rocky 7, to assist in employing autonomous manipulation on the rover. This architecture is being adapted for the next generation Mars rover prototype.

Object-oriented design provides a powerful tool for developing a system architecture that can be used on a wide range of planetary rovers with varying hardware components. A flexible five-layer, object-oriented system decomposition has been developed. At the lowest level is the hardware dependent device driver layer, which describes system components such as digital and analog I/O boards, cameras, frame-grabbers, and motors. The second layer is a hardware abstraction layer that provides an object-oriented hardware independent interface to the device driver layer. The third layer implements the basic independent subsystem operations such as arm, mast, vehicle, and other instruments. Such behaviors include vehicle obstacle avoidance for navigation, sensor-based manipulation, and so on. Finally, the highest level is the autonomous operations layer, where complete operations such as long-range path planning and navigation, sample acquisition of a specified target, and instrument placement on a target several meters away can be executed.

Criteria such as code reusability, extendibility, and portability played a key role in the design.

The preparation of a good abstract is an art to be acquired through care, thought, and practice. It should convey a maximum amount of information with a minimum number of words, and this requires more writing and re-writing than does almost any other part of the work.



#### **4.13 Vita**

A vita page, not over one page in length, is to be included as the last page of all theses and dissertations deposited in the Devereaux Library. The vita is to be written in the third person and could contain the following information:

- A. Place and date of birth.
- B. Place and date of high school graduation.
- C. Place and date of college graduation—with degree and major.
- D. Place and date of receipt of master's degree—with major.
- E. Vocational and professional experience (not summer jobs)—including dates, nature of position, and school or organization.
- F. Military experience, with indication of professional relevance—if any.
- G. Scholarly publications, exhibits of creative work, membership in professional organizations and honorary societies.

#### **4.14 Acknowledgements**

If included, place the acknowledgements between the abstract and the table of contents.

#### **4.15 Table of Contents**

Use the table of contents at the beginning of this document as an example of this page.

### **5. GRAMMAR ASSISTANCE AND HELPFUL WEBSITES**

Helpful website addresses for research and writing tips:

- <http://www.wsu.edu/~brians/errors/errors.html>
  - For help on grammar mechanics
- <http://word.tips.net/>
  - Helpful tips on Microsoft Word
- <http://owl.english.purdue.edu/owl/>
  - Website includes an online writing lab and tips for ESL writers

- <http://international.sdsmt.edu/current-students/resources/esl/>
  - Contains a list of ESL web resources on the SDSM&T Ivanhoe International Center's website
  
- <http://registrar.sdsmt.edu/47802/>
  - The Tech Learning Center (TLC) Tutors website. This may be a source of help with writing. (Note that this is not a free service; students must pay for this help.)
  
- <http://library.sdsmt.edu/quicklink.html>
  - As a member of the South Dakota Library Network [SDLN], holdings of the Devereaux Library as well as those of most South Dakota libraries are available online via the network. Search for specific journals in the library collection, or search holdings of more than 55,000 libraries worldwide.
  - EndNote is a commercial reference management software package, used to manage bibliographies and references when writing essays and articles. Normally EndNote costs hundreds of dollars per user; however, EndNote software is available at no charge to our students, faculty and staff through a state contract. Please contact the library if you are interested in this software.
  
- [www.latex-project.org](http://www.latex-project.org)
  - LaTeX is a document preparation system for high-quality typesetting. It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing.

## PROOFREADERS' MARKS

Symbol	Meaning	Example
☞ or ☞ or ☞	delete	take <del>it</del> out
⊂	close up	print as <u>one</u> word
☞	delete and close up	<del>close</del> up
^ or > or ˆ	caret	insert here <i>(something)</i>
#	insert a space	put one <sup>^</sup> here
eg#	space evenly	space evenly ^ where ^ indicated
stet	let stand	let marked <del>text</del> stand as set
tr	transpose	change <u>order</u> the
/	used to separate two or more marks and often as a concluding stroke at the end of an insertion	
[	set farther to the left	<u>too</u> far to the right
]	set farther to the right	too <u>far</u> to the left
~	set as ligature (such as )	encyclo <u>p</u> ædia
=	align horizontally	<u>align</u> ment
	align vertically	align with surrounding text
x	broken character	im <u>per</u> fect
□	indent or insert em quad space	
¶	begin a new paragraph	
Ⓟ	spell out	set <u>5 lbs.</u> as five pounds
cap	set in CAPITALS	set <u>nato</u> as NATO
sm cap or s.c.	set in SMALL CAPITALS	set <u>signal</u> as SIGNAL

<i>lc</i>	set in lowercase	set <del>s</del> outh as south
<i>ital</i>	set in <i>italic</i>	set <u>oeuvre</u> as <i>oeuvre</i>
<i>rom</i>	set in roman	set <u>mensch</u> as mensch
<i>bf</i>	set in <b>boldface</b>	set <u>important</u> as <b>important</b>
= or -/ or $\hat{=}$ or /M/	hyphen	multi-colored
$\frac{1}{N}$ or <i>en</i> or /N/	en dash	1965–72
$\frac{1}{M}$ or <i>em</i> or /M/	em (or long) dash	Now—at last!—we know.
∨	superscript or superior	$\overset{2}{\pi}$ as in $\pi^2$
∧	subscript or inferior	$\underset{2}{H}$ as in $H_2O$
⋈ or ⋊	centered	⋈ for a centered dot in $p \cdot q$
↵	comma	
↵	apostrophe	
⊙	period	
⋮ or ⋮/	semicolon	
⋮ or ⋮	colon	
⋮ or ⋮	quotation marks	
(/)	parentheses	
[/]	brackets	
OK/?	query to author: has this been set as intended?	
↓ or ↓ <sup>1</sup>	push down a work-up	an unintended <del>mark</del>
⊖ <sup>1</sup>	turn over an inverted letter	inve <del>t</del> ed
wf <sup>1</sup>	wrong font	wrong si <del>z</del> e or styl <del>e</del>