Minutes of the Graduate Faculty Council Meeting

Tuesday, October 6, 2009

1) Meeting called to order at 4:06 pm.

Members (13): Bill Yarroch (ASE), Ruth Archer (SBE), Shiyue Fang (Chem), Louise Nelson Dyble James Pickens (SFRES), Simon Carn (Geo & Min Eng), Jianping Dong (Math), Craig Friedrich (ME-EM), Judith Perlinger (Non-Dept Envir), Blair Orr (Peace Corp), Kim Fook Lee (Physics), Beth Flynn (HU), Brian Davis (Sch of Tech)

Guests (6): Heather Suokas (Grad Sch– recording secretary), Debra Charlesworth (Grad Sch), Jackie Huntoon (Grad Sch), Nancy Byers Sprague (Grad Sch), Randy Harrison (GSC), Alex Mayer (Geo)

2) Review and approval of 9/15/09 meeting minutes.

3) Old Business
   a. Procedures to Prepare and Submit a Thesis or Dissertation to Michigan Technological University’s Graduate School (D. Charlesworth): A revised document including revisions received from the Graduate Faculty Council and the Graduate Student Council was posted on the GFC website. Members were asked to review the changes and bring their comments. Dr. Orr would like a revision made to the text in paragraph one, sentence three on page twenty-one, section 3.8 (Research involving human and vertebrate animal subjects). This sentence needs to clarify that all research involving human subjects requires approval not just research that causes distress or harm. Several typographical errors were forwarded to Dr. Charlesworth. These changes will be incorporated before this is brought to the Senate. Motion to approve the procedures with above changes passed.
   b. Proposal to Instate a Graduate Dean’s Teaching Award (J. Dong): Jianping Dong is working on a draft proposal.
   c. Parental/Maternal Accommodation for Graduate Students (J. Huntoon): A revised proposal was posted on the GFC website. Members were asked to review the changes and bring their comments. Dean Huntoon revised the draft proposal to clarify that this policy also includes adoption. She also clarified that the maternal period can start before the birth or adoption but is still limited to six weeks. Questions/Comments: a question was raised about the six week limit and how this was agreed upon. Dean Huntoon responded that Graduate Student Council (in a prior year) helped to determine an appropriate length of time based on student needs and the available funding. In the case of a medical emergency during the maternity accommodation period the university offers medical withdrawal and can be used in addition to the maternity accommodation. Another comment raised was the University’s lack or lactation facilities and accommodations. This would be an entirely separate proposal. Should the text specifically state that the student is not responsible for finding a replacement for their absence? Yes, the Dean will add this text to the proposal. How much will this cost the university per year? The Dean researched this three or four years ago and estimated the total cost to be $15,000 per year. With the above mentioned change, motion to approve the policy passed.
   d. Graduate Program Review (J. Huntoon): The committee has met twice. The first meeting was to brainstorm and discuss goals and during the second meeting a rough draft of the policy was outlined.
e. Dismissal/Appeal/Grievance Policy: (J. Huntoon): The committee has met twice where they discussed the University’s current policy as well as the policy that CU Boulder has in place.

5) New Business

a. Forms Update (D. Charlesworth): The Graduate School has combined, eliminated and streamlined forms in order to reduce the amount of paperwork that graduate students need to turn in. The new forms protect against errors. When online filling out a form, students are to click the “Highlight” field in the top right hand corner of the form. All the fields that require text in order for the form to be printed appear outlined in red. All the fields that are text boxes appear in grey. The form will detect errors in the student’s M numbers (Michigan Tech I.D. numbers) if the number is not long enough or does not include the letter “M.” After the student uses the drop down menu to select their degree program, only the fields pertinent to that program will appear. The form then automatically displays the signature requirements of that particular department (director or chair). If the form is not complete when the student hits the “print” button an error message will appear and will inform them of what they need to do to complete the form. Adobe Acrobat Professional 8, 9 or Acrobat Reader 8, 9 accommodate these forms. These forms require signatures and therefore need to be printed and submitted. These forms cannot be submitted electronically. If any units are interested in modifying these forms for their unit they can contact Dr. Charlesworth in the Graduate School for additional information.

b. Proposal for Graduate Certificate in Sustainable Water Resources Systems (A. Mayer): The proposal was posted on the GFC website. Members were asked to review and bring their comments. This proposal is already being reviewed by the Senate Curriculum Committee and is near approval. The purpose of this certificate proposal is for students to understand water resource systems including the aspects of environmental policy and geology. This certificate has a fifteen credit requirement. On page three there was a question regarding computing access fees. This proposal states that there are no computing access fees. This is correct because students in certificate programs only (that is, who are not also enrolled as degree-seeking students) are considered “non-degree seeking” and do not have a home department and do not have access to computers on campus. Dean Huntoon is to look into the computer access fees/non-degree seeking issue further. Motion to approve the proposal passed with the expectation of further investigation of the computer access fee.

c. Proposal for International Profile (W. Rose): The proposal was posted on the GFC website. Members were asked to review and bring their comments. The goal of this certificate is to raise awareness of the international components of working with people and environments of different cultures. This is a non-departmental certificate and would be available to degree-seeking as well as non-degree seeking students. Peace Corps International students will qualify for this certificate but the intention is that this will not be specifically for Peace Corps students. The design is flexible with emphasis on components that are already used. The proposed certificate has a 12 credit requirement. The justification of the 12 credits is “total MS is 30 credits and 20 credits of course work is normal. We cannot justify a higher number and many grad certificates at other institutions? exist at 12 credits.” Our University Senate has a proposal in place that states all graduate certificates are to have a 15 credit minimum requirement. (Proposal 20-04: http://www.sas.it.mtu.edu/usenate/propose/04/20-04.htm) After discussion with suggestions about offering credit for the language requirement it was decided that a proposal will be submitted to modify the University’s proposal on credit requirements. Dean Huntoon will lead this. Motion to table the Proposal for International Profile until next GFC meeting was passed.
6) Motion to adjourn at 5:10 pm.
Proposal for an Interdisciplinary Graduate Certificate: 
The International Profile Certificate

William I Rose  
Geological Engineering & Sciences  
Blair Orr  
Forestry and Environmental Sciences  
Alex Mayer  
Civil and Environmental Engineering  
John Gierke  
Geological Engineering & Sciences  
Andrew Storer  
Forestry and Environmental Sciences

1. General Description
This proposal recommends the establishment of a Graduate Certificate called the International Profile. This non-departmental certificate would be available to all degree-seeking as well as nondegree-seeking students enrolled in the Graduate School at Michigan Technological University.

Title of Certificate: International Profile Certificate

Catalog Description
The International Profile Certificate recognizes advanced study of any field, but with a substantial international perspective that demonstrates an ability to bridge cultural and language barriers and collaborate effectively.

2. Rationale
Professional work in most fields demands work with diverse groups of people in a wide variety of physical and cultural environments. Educational programs could be expected to include exposure and demonstrated success in working all over the world, and in dealing with all aspects of work on a global basis, because it has a direct link to productivity in workplaces. The degree offerings of a university should reflect accurately the training of students in international contexts.

Michigan Tech has strong and growing international programs. Important examples of these are the Peace Corps associated Masters International Programs in six different academic departments (http://peacecorps.mtu.edu/). In these programs there is two years of volunteer duty in a foreign country and substantial language and cultural training. These programs have changed the focus of their home departments substantially, so that international work is developing even more rapidly than before. International exchange programs for graduate students, such as

EHaz: (http://www.geo.mtu.edu/EHaz/index.htm),

SustR: (http://www.geo.mtu.edu/%7Easmayer/sustr.htm)
and TIES (http://www.doe.mtu.edu/news/TIES_program_05.html)

have triggered significant international exchanges and multi-university course and degree programs. Both Forest Resources and Environmental Science and Geology have just proposed new joint graduate degree programs through EUAtlantis which will involve substantial mobility of MS students to Europe. The development of the Michigan Tech Chapter of Engineers Without Borders, the Aqua Terra Tech Enterprise and other international Senior Design efforts and the D80 Center are grass roots developments that have affected many different graduate programs. We believe that the International Profile is a necessary and appropriate educational opportunity for postgraduate students that will offer them an attractive supplement to their graduate degrees in this era of rapid paced technological change and with a strong need for international bridging. In addition to language and cultural coursework, students will spend one or more semesters abroad doing research, internships and/or coursework.

The International Profile Certificate is designed to:

1. encourage students to pursue international research, internship and course opportunities;
2. deepen students' understanding of world cultures and global issues;
3. develop a world wide perspective on science, engineering and social issues, such as global change and natural hazards;
4. encourage a basic proficiency in another language; and
5. enhance intercultural communication skills

3. Related Programs

Undergraduate minors such as “Study Abroad Minors” or “International Minors” exist at many universities (see University of Minnesota, Auburn). A 12 credit Ph D Minor exists in Global studies at the University of Indiana, and we expect that many such examples are now developing on other campuses. At Michigan Tech graduate minors do not exist, so a certificate seems the best current option.

4. Projected Enrollment

Based on likely faculty participants and current graduate enrollments, we estimate that approximately 20 students may be enrolled at any time. In time we anticipate that this program would become available to students via Distance Learning.

5. Scheduling Plans

This graduate certificate program is primarily a regular (daytime) program.
6. Curriculum Design

A total of 12 credits are required for an International Profile. Students must earn a grade of B or higher in each course to be applied toward the certificate. As an interdisciplinary certificate, a maximum of 6 credits is allowed in courses at the 3000- and 4000- levels.

(A) Foreign Language Requirement
A knowledge equivalent to two years of college coursework in a foreign language is a prerequisite. The student can demonstrate this either by taking such courses at Michigan Tech or another university, by scoring at the third year level or higher on the modern language test administered by the Humanities Department for Spanish, French or German, or by similar scores on modern language tests in other languages.

(B) International and Intercultural Awareness (3 credits minimum)
BA4710
BA4780
CE5993
CE5990, 5991, 5992
EC3100
FW5770
FW5720
GE5001
HU3253
HU3261
HU3262
HU3263
HU3264
HU3502
HU3545
HU3850
HU5050
PSY3070
SS3100
SS3410
SS3610
SS3620
SS3940
SS4210
UN4000
UN5990

(C) Required International Experience (6 credits) Students must have a minimum of six credits of coursework taken in a foreign country while concurrently enrolled as an Michigan Tech graduate student.

(D) Integrated International Studies
UN 5555 Integrated International Studies Seminar (1 credit)
UN 5555 will be proposed as a new course.

**UN5555 Integrated International Studies Seminar** (1 credit, fall, spring). Prerequisite: graduate standing, instructor approval, and a minimum of one semester of graduate study in a foreign country. Seminar discusses the cultural differences of implementing research in a foreign country. Case studies and history of universities in other countries are included.

For convenience, relevant course descriptions are given below:

**BA 4710 - International Management**
Study of managing work in a global context. Assesses impact of culture and the international environment (economic, social, legal, technological) on management, personnel, marketing, accounting, and finance strategies. Examines international business structures from licensing to joint ventures. Develops attitudes and skills leading to increased international effectiveness.

- **Credits**: 3.0
- **Lec-Rec-Lab**: (0-3-0)
- **Semesters Offered**: On Demand
- **Restrictions**: May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior
- **Pre-Requisite(s)**: BA 3700 and EC 3100(C)

**BA 4780 - International Business Communications**
Studies the importance of intercultural communication competence for effective business relationships. Provides a theoretical and practical foundation for successful business communication by examining the communication processes and contextual units.

- **Credits**: 3.0
- **Lec-Rec-Lab**: (0-3-0)
- **Semesters Offered**: On Demand
- **Restrictions**: May not be enrolled in one of the following Class(es): Freshman, Sophomore
- **Pre-Requisite(s)**: UN 1001 and (UN 1002 or UN 1003) and UN 2001 and UN 2002

**CE 5990 - Civil Engineering Graduate Seminar**
Detailed study and group discussions of current literature and graduate research projects related to the broad field of civil engineering. Topics will be combined to address the student's area of interest, including construction, environmental, geotechnical, structures, transportation, and water resources. External speakers discuss current related issues.

- **Credits**: 1.0
- **Lec-Rec-Lab**: (0-1-0)
- **Semesters Offered**: Fall, Spring
- **Restrictions**: Must be enrolled in one of the following Level(s): Graduate

**CE 5991 - Environmental Engineering Graduate Seminar I**
Presentations and discussion of current literature and research related to the broad field of environmental engineering.

- **Credits**: 1.0
- **Lec-Rec-Lab**: (0-1-0)
- **Semesters Offered**: Fall

**CE 5992 - Environmental Engineering Graduate Seminar II**
Presentations and discussion of current literature and research related to the broad field of environmental engineering.

- **Credits**: 1.0
- **Lec-Rec-Lab**: (0-1-0)
- **Semesters Offered**: Spring
CE 5993 - Field Engineering in the Developing World
Study of applying appropriate and sustainable engineering solutions and technology in the developing world. Concepts of sustainable development are covered. Topics are drawn from several areas of engineering, including water supply/treatment, wastewater treatment, materials, solid waste, construction, and watersheds.
Credits: 2.0
Lec-Rec-Lab: (0-1-2)
Semesters Offered: Spring
Restrictions: Must be enrolled in one of the following Level(s): Graduate

EC 3100 - International Economics
Introduction to international economics, including balance of payments, accounting, foreign exchange markets, international trade theory, barriers to trade, trade and development, regional economic integration, and current U.S. international economic issues.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Fall, Spring, Summer
Pre-Requisite(s): EC 3001 or (EC 2002 and EC 2003) and UN 2002

FW 5720 - International Forestry Seminar
Seminar for students who have completed FW5730. Synthesizes field work in a theoretical framework. Covers macro aspects of development theory.
Credits: 1.0
Lec-Rec-Lab: (0-1-0)
Semesters Offered: Fall, Spring, Summer
Restrictions: Must be enrolled in one of the following Level(s): Graduate
Pre-Requisite(s): FW 5730

FW 5770 - Rural Community Development Planning and Analysis
Context, analysis, and monitoring of development processes of rural communities in tropical countries.
Credits: 2.0
Lec-Rec-Lab: (2-0-0)
Semesters Offered: Spring
Restrictions: May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior

GE 5001 - Intercultural Natural Hazards Communication in Latin America
Credits: 2.0
Lec-Rec-Lab: (0-2-0)
Semesters Offered: Fall
Restrictions: May not be enrolled in one of the following Class(es): Freshman, Sophomore

HU 3261 - Communicating Across Cultures
Comparative study of interpersonal communication across cultures by both foreign and American students, with emphasis on cultural patterns, attitudes, values, and nonverbal behaviors. Instructor selects cultures for study from Third World, Western, or non-Western regions.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: On Demand
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 1002 or UN 1003
HU 3262 - Topics in Francophone Cultures
An introduction to Francophone cultures (in English) in a comparative perspective. Includes a survey of French history and its influence on modern-day French and Francophone societies through movies, media, and recent technologies, and a critical examination of cross-cultural differences between French and American cultures.
Credits: 3.0
Lec-Rec-Lab: (0-0-0)
Semesters Offered: On Demand
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 1002 or UN 1003

HU 3263 - Topics in German-Speaking Cultures
An introduction to German-speaking culture (in English) in a comparative perspective. Includes a survey of Central-European history and its influence on modern-day German-speaking societies through movies, media, and recent technologies, and a critical examination of cross-cultural differences between German and North-American cultures.
Credits: 3.0
Lec-Rec-Lab: (0-0-0)
Semesters Offered: On Demand
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 1002 or UN 1003

HU 3264 - Topics in Spanish-Speaking Cultures
An introduction to Spanish-speaking culture (in English) in a comparative historical perspective. Includes a survey and a critical cross-cultural examination of Latin-American culture and Spanish-speaking societies (European, Caribbean, and North, Central and South American) through literature, music, film, art and other media. Spanish-speaking cultures and North American society.
Credits: 3.0
Lec-Rec-Lab: (0-0-0)
Semesters Offered: Spring
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 1002 or UN 1003

HU 3502 - World Mythologies
Survey of the major mythological systems of the world with particular attention to those areas of commonality between the various civilizations. Films may provide contextual background.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: Spring - Offered alternate years beginning with the 2001-2002 academic year
Pre-Requisite(s): UN 1002 or UN 1003

HU 3545 - Literature Across Borders
Study of literary genres, themes, and movements, with emphasis on comparing and contrasting perspectives reflected in literatures from Western and non-Western cultures. Topics may focus on historical, social, aesthetic, and cultural factors as they influence these literatures. Films may be used.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: Fall - Offered alternate years beginning with the 2004-2005 academic year
Pre-Requisite(s): UN 1002 or UN 1003

HU 3850 - Cultural Studies
Examines the way that culture communicates values, feelings, beliefs; structures differential relations of power and possibility; creates difference and hierarchy. Considers the struggles over meaning that open up possibilities for diversity and change.
Credits: 3.0
Lec-Rec-Lab: (0-0-0)
Semesters Offered: Spring
Pre-Requisite(s): UN 1002 or UN 1003

HU 5050 - Intercultural Communication
A critical examination of cross-language and cross-cultural equivalences and differences through the study of acculturation, values, traditions, role expectations, perceptions, stereotypes, and gender issues as well as other verbal and nonverbal problems and issues of communication. Emphasizes the dimensions of communication within a comparative cultural context.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: On Demand
Restrictions: Must be enrolled in one of the following Level(s): Graduate

PSY 3070 - Cross-Cultural Psychology
Introduces the student to cross cultural psychology and sociocultural theory as it is applied to psychology. Examines research on cultural specific and universal behaviors. Emphasizes the benefits and challenges of diversity in organizations and diversity skills that promote interpersonal and organizational success.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: On Demand
Pre-Requisite(s): PSY 2000 and (UN 1002 or UN 1003)

SS 3100 - Developing Societies
An overview of the developing world. Asks "What is development?" in ecological, human, and economic terms. Explores variation among developing societies and elements of internal differentiation, including cultures, regions, classes, and genders. Emphasizes active student exploration of strategies for change, including technology, business, and political transformations.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Spring - Offered alternate years beginning with the 2000-2001 academic year
Pre-Requisite(s): UN 1002 or UN 1003

SS 3410 - World Resources & Development
Examination of the human geography and resources of various world regions. Emphasizes factors affecting prospects for development, including population dynamics, natural resource endowment, social and cultural systems, and spatial structure of society. Case studies of individual countries supplement general concepts and theories.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Fall, Summer - Offered alternate years beginning with the 2001-2002 academic year
Pre-Requisite(s): UN 2002

SS 3610 - International Law
Explores the principles, content, and logic of public international law, the law of nations. Students brief cases, prepare longer briefs to defend a side in a moot case, and engage in a moot court.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Fall, Spring - Offered alternate years beginning with the 2000-2001 academic year
Pre-Requisite(s): UN 2002

SS 3620 - International Environmental Technology Policy
Explores the relationship between markets and government policies in moving national economies and corporations toward "greener" technology choices. Topics may include industrial ecology, regulation, innovation, and pollution prevention. Course employs examples from U.S., Canada, EU, and Japan. When possible, students work on a real-life project for a client.
SS 3940 - World Affairs
The study of current issues and themes in world affairs and of significant world tension areas. Detailed examination of central issues in selected recent regional or international conflicts or high profile internal problems in selected countries.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Fall, Spring - Offered alternate years beginning with the 2001-2002 academic year
Pre-Requisite(s): UN 2002

SS 4210 - Global Change in Culture and Society Since 1400
Explores the increasing interconnectedness of world cultures since 1400. The course examines the social, economic, and political changes that accompanied the rise of world capitalism from multiple theoretical perspectives. Themes include colonialism, agency, resistance, world-systems theory, and globalization.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Spring - Offered alternate years beginning with the 2007-2008 academic year
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 2002

UN 4000 - Remote Sensing Seminar
A seminal series that covers topical issues in remote sensing, ecosystem research, and global change. Required for all students with a minor in remote sensing.
Credits: 1.0; Repeatable to a Max of 2
Lec-Rec-Lab: (0-1-0)
Semesters Offered: Fall, Spring
Restrictions: May not be enrolled in one of the following Class(es): Freshman, Sophomore

Library and other Learning Resources.
No additional library or learning resources are required.

6. Computing Access Fees
No computing access fees are required beyond those normally incurred by enrolled graduate students.

7. Faculty Resumes
Key faculty for this graduate certificate program include the three proposers, whose short vitae are attached at the end of this proposal: Numerous additional faculty and staff that are important to this program are those associated with the language programs in Humanities department and those who teach classes listed under section 6B (above), especially in HU and SS. This initiative recognizes a strong commitment to international perspectives in all study areas and receives broad support across the Michigan Tech campus. As such the main impact of this certificate may make these international classes more visible to graduate students.
8. Program Costs
There are no additional direct costs associated with establishing this graduate certificate program at this time. Foreign language courses are already in high demand and overbooked. The sustainability of offering UN5555 in the longer term may depend upon additional resources.

9. Space
No additional space is required.

10. Policies Regulations and Rules
All policies, regulations and rules are described in Section 6 and follow University Senate policy for Graduate Certificates. The committee of Peace Corps Masters International programs (including all of the proposers) will assist the Graduate School in the administration of this certificate. The committee may designate appropriate classes to qualify for the certificate in addition to those listed in this proposal. Recommendations for modification of the curricular requirements of this certificate shall be made through the to the Dean of the Graduate School.

11. Accreditation (Not applicable)

12. Internal Status of the Proposal

13. Planned Implementation
This program could begin starting in fall semester, 2009.

Vitae of organizers follows
WILLIAM I ROSE
Professor, Department of Geological Engineering and Sciences
Michigan Technological University
HOUGHTON, MI 49931 USA
906 487 2367; raman@mtu.edu
www.geo.mtu.edu/~raman

PROFESSIONAL PREPARATION:
Ph.D. in Geology, Dartmouth College, 1970;
A.B. in Geography, Geology, Dartmouth College, 1966.

APPOINTMENTS:
9/79-present: Professor of Petrology, Michigan Technological University, Houghton.
6/90- 6/ 98 Department Chair, (planned new building; hired 8 new faculty); 9/74-9/79: Associate Professor of Petrology, 9/70-9/74; Assistant Professor of Petrology.
1/99-12/99: Visiting Leverhulme Fellow, Dept of Earth Sciences, University Of Bristol, UK.
8/85-6/86: Visiting Scientist, Los Alamos National Laboratory.
1/81-present: Geochemist (W.A.E. basis), USGS, Cascade Volcano Observatory , Vancouver, WA; Alaska Volcano Observatory, Anchorage; VDAP.
8/77-8/78: Senior Visiting Scientist, Upper Atmosphere Group, National Center for Atmospheric Research, Boulder, CO.
8/77-8/78: Visiting Scientist, Branch of Isotope Geology, USGS , Denver, CO.

RELATED PUBLICATIONS


SYNERGISTIC ACTIVITIES


2. Since 1980: **Educational efforts shared with many other campuses**: Video based educational efforts in Optical Mineralogy, 1982; Volcanic Rock Textures, 1985; and video field trips: 1987-1993; Volcanic Rocks and their vent areas, Industry Short Courses (field trips and lectures); 1976-1985; Graduate Student field trip efforts, 1997 (Western Mexico and IAVCEI meeting); NSF funded International Travel Grant to IAVCEI Bali meeting, and associated Hawaii and Pinatubo field trips, July 2000; NSF Int Travel Grant for students to attend IAVCEI meeting in Chile, 2004. Special session exploring graduate volcanology educational efforts, AGU 2002. 2005-2009: **FIPSE-NAFTA 6 University Consortium in Earth Hazards (EHaz)**, funded by Dept of Education.


4. Since 1992: Development of Michigan Tech Remote Sensing Institute. Co-organizer and Interim Director of an institute with 35 faculty members from nine different MTU departments, Development of shared lab facilities, success with equipment funding as a NASA center of excellence, development of an interdisciplinary minor program in remote sensing; many interdisciplinary seminar series and several new interdisciplinary classes.


**RECENT COLLABORATORS EXTERNAL TO MICHIGAN TECH** (2000-2005)
Stephen Self (Open University); Andrew Harris (University of Hawaii); Luke Flynn (University of Hawaii); Hans Graf (Cambridge Univ); Fred Prata (CSIRO, Australia); Arlin Krueger (UMBC); Vincent Realmuto (NASA/JPL); Frank Marzano (University “La Sapienza” of Rome); Costanza Bonadonna (Univ So Florida); Christiane Textor (Max Planck Inst Meteorology); Alain Bernard (University of Bruxelles);

**THESIS ADVISEES AND POSTDOCTORAL SCHOLARS SPONSORED, LAST 5 YEARS**
Tianxu Yu, STC/NOAA Washington, DC
Song Guo, Canadian Centre for Remote Sensing, Montreal
Sebastien Darveille, Los Alamos National Lab
Demetrio Escobar, Volcanologist, SNET, El Salvador
Yingxin Gu, SAIC/USGS EROS Data Center, Sioux Falls, SD
Matthew Watson, Bristol University UK
Matthew Patrick (current Post Doc) Owen P Mills, Adam Durant, Janelle Byman, Kelly Durst, John Lyons, Ellen Engberg, Hans Lechner, Adam Blankenbicker, Jemile Erdem, Karinne Knutsen, Ingrid Fedde (current graduate students)

**Graduate Students Supervised:** 39 M.S. and 14 Ph.D.

**Graduate Advisor:** Richard E Stoiber, Dartmouth College, deceased.
BLAIR ORR
School of Forest Resources and Environmental Science
Michigan Technological University

Professional Preparation


Appointments

2008 – present: Director of Peace Corps Programs. Michigan Technological University
2006 – present: Professor of Forestry, Michigan Technological University
1998 – 2006: Associate Professor of Forestry. Michigan Technological University
1992 – 2006: Assistant Professor of Forestry. Michigan Technological University
1988 – 1992: Assistant Professor of Forestry, The University of the South

Five Relevant Publications


Five Other Publications


Blair Orr 2


Synergistic Activities

Peace Corps Master’s International Program
EU-US Atlantis Program
TIES – FIPSE and SustR programs in Mexico; Veracruz Study Abroad Program
World Forestry Committee of the Society of American Foresters
International Society of Tropical Foresters

Courses and Workshops:

Trees in Agricultural Systems; Overseas Research; Graduate Tropical Forestry; International Forestry Practicum; International Forestry Seminar; Community Planning and Analysis, Master’s Graduate Seminar; Doctoral Graduate Seminar

Collaborators and Affiliations

Dr. James B. Pickens, Michigan Technological University
Dr. Alex S. Mayer, Michigan Technological University
Dr. Willem Beets, retired
Dr. Karlyn Eckman, University of Minnesota
Dr. James Mihelcic, U. of South Florida
Dr. Kathleen Halvorsen, Michigan Technological University
Dr. Miquel Armando Ramirez, Universidad Veracruzana
Dr. Martin Yemefack, Institute of Agricultural Research for Development, Cameroon
J. Cardenas Castillo, Oruru Technical School, Bolivia
Dr. Thomas Van Dam, Michigan Technological University

Graduate Advisor: Dr. J. Buongiorno, U. of Wisconsin – Madison

Graduate Students (M.S.)

Biographical Sketch
Alex S. Mayer
Department of Civil & Environmental Engineering
Michigan Technological University

Professional Preparation
Brown University, Sc.B. Civil/Environmental Engineering, 1981
University of North Carolina at Chapel Hill, M.S. Environmental Engineering, 1987
University of North Carolina at Chapel Hill, Ph.D. Environmental Engineering, 1992

Appointments
September 2005-present: Director, Michigan Technological University Center for Water & Society
September 2002-present: Professor
September 1998-August 2002: Associate Professor
March 1992-August 1998: Assistant Professor
Department of Geological Engineering and Sciences
Michigan Technological University, Houghton, MI
September 2000-May 2001: Visiting Professor
Department of Civil Engineering and Geosciences
Technological University of Delft, Netherlands
August 1995-November 1995: Visiting Professor
Department of Chemical Engineering
University of Sonora
1981-1985: Civil Engineer
Water Resources Projects Section, Planning Division
East Bay Municipal Utility District, Oakland, CA

Five Relevant Publications

Five Other Publications
Synergistic Activities
AQUA3, ExCIT, SustR, and TIES Programs in Water Resources Management: managed projects, recruited and advised graduate and undergraduate students from Mexico, U.S. and Canada, developed curriculum, developed and led field trips dealing with Mexican water resources issues, working with engineers, economists, sociologists, etc., has led to several collaborative research and education initiatives.

Textbook on groundwater contamination: co-edited and co-authored with engineers, geologists, and soil scientists, book accessible to university professors and students and practitioners, funded by Fulbright Scholarship.

Rio Yaqui basin modeling project: principal investigator for effort to develop integrated hydrologic-economic-institutional model, involves working with economists, policy-makers, government agencies.

Michigan Tech Center for Water and Society: Director and co-founder of university-wide effort to integrate research, education and outreach efforts at Michigan Tech, involves engineering, forestry and environmental sciences, biology, chemistry, humanities and social science departments; state and federal agencies, non-governmental organizations, etc.

Watershed management plan for Huron Creek: lead investigator on multi-disciplinary group of faculty and students and community advisory group developing watershed management plan for Huron Creek, a small, highly-impacted creek that empties into Lake Superior. Development of plan has included local K-12 teacher and student involvement in gathering data, producing a community watershed interpretive program, and participation in a watershed advisory committee.

Michigan Environmental Education Curriculum Support (MEECS) program: Developed and authored several modules for middle school environmental curricula made available to all middle school science teachers in Michigan.

Courses, Workshops or Special Courses Taught During the Past Three Years
Undergraduate Courses: Geohydrology, Water & Society, Environmental Engineering Senior Design Project, Geological Engineering Senior Design Project
Graduate Courses: Mathematical Modeling of Earth Systems, Field Engineering for the Developing World
Workshops: Watershed Management Certificate Program (Sonora, Mexico)

Collaborators & Other Affiliations
Asbornsen, H., co-investigator, University of Iowa
Chadde, J., co-investigator, Center for Science, Mathematics and Environmental Outreach; Houghton, MI
Garcia Ruiz, J.L., co-investigator, U. Sonora, Hermosillo, Mexico
Gorman, H., co-investigator, Michigan Technological University, Houghton, Michigan
Hand, D., co-author, Michigan Technological University, Houghton, Michigan
Halvorsen, K., co-investigator, Michigan Technological University, Houghton, Michigan
Hassanizadeh, S.M., co-author, U. Utrecht, Utrecht, The Netherlands
Mihelcic, J., co-investigator, University of South Florida, Houghton, Michigan
Perez Lugo, co-investigator, University of Puerto Rico Mayagüez
Sivapalan, M., co-investigator, University of Illinois
Solomon, B., co-author, Michigan Technological University, Houghton, Michigan
Watkins, D., co-investigator, Michigan Technological University, Houghton, Michigan
Zhang, Q., co-investigator, Michigan Technological University, Houghton, Michigan
Zimmerman, J., co-investigator, Yale University

Graduate Advisor: Miller, C.T., U. North Carolina, Chapel Hill, NC

Recent STEM Graduate Dissertation/Thesis/Project Advisees
Bau, D., Ph.D. Environmental Engineering, 2006
Ballard, M., Ph.D. Environmental Engineering, in progress
Betz, K., M.S. Geological Engineering, 2006
Endres, K., Ph.D. Environmental Engineering, 2004
Fitzgerald, K., M.S. Geological Engineering, in progress
Kersten, L. M.S. Environmental Education, 2008
Munoz Hernandez, A., Ph.D. Environmental Engineering, 2009
Ollila Ojeda, M., M.S. Environmental Engineering, 2006
Robles Morua, A., Ph.D. Environmental Engineering, in progress
Rodriguez Ibarra, W., M.S. Environmental Engineering, 2005
Van Grinsen, M., M.S. Geology, in progress
Biographical Sketch for John S. Gierke, Ph.D., P.E.,

a. Professional Preparation
Michigan Technological University Civil Engineering BSCE 1984
Michigan Technological University Civil Engineering MSCE 1986
Michigan Technological University Environmental Engineering Ph.D. 1990

b. Appointments
Associate Professor - September 1996 to Present;
   Michigan Technological University, Houghton, Michigan 49931-1295
Visiting Associate Professor - January 1999 through December 1999
   University of Delaware, Newark, Delaware
Assistant Professor - July 1990 through August 1996
   Michigan Technological University, Houghton, Michigan 49931-1295
Summer Research Faculty Visitor - June 1991 to August 1991
   Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831.

c. Publications

(i) Five Relevant Publications
Using Remotely Sensed Imagery to Identify Geological Lineaments in Hard-Rock Terrains: An
Application for Groundwater Exploration in Nicaragua,” to be submitted to Photogrammetric
Engineering & Remote Sensing, a full length paper appeared in the proceedings of: American Society
of Photogrammetry and Remote Sensing, 2009 Annual Conference, March 9-13, 2009 Baltimore,
Maryland, USA. ASPRS is the publisher of PE&RS.
Gierke, J.S., “Manually Constructed and Operated Water Wells,” Chapter 16 in Field Guide in
Environmental Engineering for Development Workers: Water, Sanitation, Indoor Air, Mihelcic, J.R.,
E.A. Myre, L.M. Fry, B.D. Barkdoll (eds), American Society of Civil Engineers (ASCE) Press, Reston,
VA, in press (scheduled publication May 2009).
Huntzinger, D. N., M. J. Hutchins, J. S. Gierke, J. W. Sutherland, “Enabling Sustainable Thinking in
Undergraduate Engineering Education,” International Journal of Engineering Education, 23(2), 218-
6592.2007.00142.x

(ii) Five Other Significant Publications
of Irrigation and Drainage Engineering, in review.
Fuchs, V.J., J.S. Gierke, J.R. Mihelcic, “Hydraulic Model Comparison of Vertical Flow Regimes During
Soil Clogging,” Water Practice (Special Issue on Watershed Management and Ecology), in review.
Heron, G., J.S. Gierke, B. Faulkner, S. Mravik, A.L. Wood, and C.G. Enfield, “Pulsed Air Sparging in
Aquifers Contaminated with Dense Non-Aqueous Phase Liquids,” Ground Water Monitoring and
d. Synergistic Activities

(1) Principal investigator for the Michigan Tech Remote Sensing for Hazard Mitigation and Resource Protection in Pacific Latin America Project, National Science Foundation Partnerships for International Research and Education, where research is conducted on developing, applying, and testing remote sensing in geologic hazards and water resources in Costa Rica, Ecuador, El Salvador, Guatemala, Nicaragua, and Panama; (2) Graduate advisor for M.S. students in Michigan Tech’s Masters International/Peace Corps programs in geohazards and in civil and environmental engineering where students conduct their masters research whilst serving in the U.S. Peace Corps; (3) Collaborating with faculty at the University of Puerto Rico—Mayaguez to involve their undergraduate geology students in remote sensing research in Pacific Latin America; (4) Organized a 1-day workshop on applications of remote sensing for characterizing groundwater aquifers in conjunction with the 9th Congress on Latin American Hydrogeology in Quito, Ecuador, July 7, 2008; (5) Research on hydrology of glacier melting in Alaska and invited for participating in a workshop (proposal pending) on the future impacts of climate change on glaciers and the ecology of the Andes.

e. Collaborators and Other Affiliations

(i) Collaborators and Co-Editors: Falta, Ronald W. (Clemson University), Imhoff, Paul (University of Delaware), McCray, John M. (Colorado School of Mines), Stewart, Bo (Praxis Environmental).

(ii) Graduate Advisor: Neil J. Hutzler, Michigan Technological University

(iii) Thesis Advisor for (last five years denoted in bold): Anderson, Cecilia P. (ERM-West), *Bachmann, Nancy-Jeanne (Emmons & Olivier Resources, Inc), Bruning, Jill N. (searching for employment), Carpenter, Michael D. (consulting), Castor, Meaghan G. (consulting), Ebsch, Jeffery (Coleman Engineering), El-Beshry, Manar, Fish, Randy E. (Peace Corps, serving in Tanzania), Fader, Caleb (Peace Corps, serving in Uganda), Fuchs, Valerie J. (Michigan Technological University), Gross, Essa L. (Michigan Technological University), Gu, Yingxin (McGill University), Harrison, Elizabeth (Los Alamos National Laboratory), Hegemann, Robert (Peace Corps, serving in Honduras), Hein, Gretchen L. (Michigan Technological University), Huntzinger, Deborah N. (Post-doc, University of Michigan), Hutchins, Margot J. (Michigan Technological University), Jenson, Jeremy (Peace Corps, serving in Benin), Keating, Gordon (Los Alamos National Laboratory), Kremer, Theodore J. (Malcolm Pirnie, Inc.), Kucharski, Matthew J. (Peace Corps, serving in Philippines), Mackenzie, Heidi L. (Grenkowitz) (Ford Motor Company), Muraski, Jennifer L. (Montgomery Watson), Myre, Elizabeth A. (Engineering development work in Haiti), Quinnman, Joseph (ARCADIS), Ritchie, Beatrice, Rios Sanchez, Miriam (Michigan Technological University), Sanders, Deborah L. (ERM-West), Sawall, R. Hardy (Geotrans), Schmunk, Steven W. (Marquette Intermediate School District), Sherman, Heidi M. (Consulting), Shonsey, Cara W. (Michigan Technological University), Smith, Gwynneth (Peace Corps, serving in Suriname), Stright, Lisa E. (Stanford University), Taeege, Deborah A. (AMEC), VanAntwerp, Darby J. (RMT), Vincent, Ashlee K. (Michigan Technological University), Wang, Congli (Consulting), Wojick, Christopher L. (Michigan Technological University).

**Served as co-advisor, student at different university.

Advisor for 20 M.S. and 2 Ph.D. graduates, co-advisor for 3 M.S. and 2 Ph.D. graduates; currently advising 2 Ph.D. students and 10 M.S. students and co-advising 1 Ph.D. student.
Biographical Sketch: Andrew J. Storer

School of Forest Resources and Environmental Science
Michigan Technological University,
1400 Townsend Drive, Houghton, Michigan, 49931, USA

Telephone: (906) 487-3470, Email: storer@mtu.edu, Fax: (906) 487-2915

Professional Preparation
St. Anne's College, University of Oxford. Pure and Applied Biology. B.A. (Hons) 1986
St. Anne's College, University of Oxford. M.A. 1993
Department of Zoology, University of Oxford. Forest Entomology. D.Phil. 1993

Appointments
2005 – Present Associate Professor, Forest Insect Ecology, School of Forest Resources and Environmental Science, Michigan Technological University
2007 – Present Director, The Honors Institute, Michigan Technological University
2001 –2005 Assistant Professor, Forest Insect Ecology, School of Forest Resources and Environmental Science, Michigan Technological University
1998 - 2001 Assistant Research Entomologist, Division of Insect Biology, University of California, Berkeley.
1999 - 2001 Instructor, Department of Landscape Horticulture, Merritt College, Oakland.
1992 - 1997 Postdoctoral Researcher, Division of Insect Biology, University of California, Berkeley.

Publications (5 most closely related – from work in Africa or other locations outside the US)

Publications (5 other)


**Synergistic Activities**

1) Active research in forest health and educational programs in global technological leadership in Ghana.

2) Director of the Honors Institute at Michigan Technological University. This institute encourages undergraduates to develop research and other professional experience during their undergraduate career.


4) Member of the editorial board of the Journal of Pest Science (Springer). Subject editor for Forest Entomology


**Collaborators and other affiliations**

a) Collaborators and coeditors

Abeney, EA (Forest Research Institute of Ghana), Bonello, Pierluigi (The Ohio State University), Cobinnah J.R. (Forest Research Institute of Ghana), Delisle, J. (Natural Resources Canada), Erbilgin, N. (University of Edmonton), Gordon, Thomas R. (University of California, Davis), Hyslop, MD (Michigan Technological University), Jurgensen MF (Michigan Technological University), Karnosky, David (Michigan Technological University), Marshall, J.M. (Michigan Technological University), McNee, William R. (Wisconsin Department of Natural Resources), McPheron, Brice A. (University of California, Berkeley), McCullough, Deborah (Michigan State University), Nagel, Linda M. (Michigan Technological University), Opuni-Frimpong, E. (Forest Research Institute of Ghana), Risch, AC (Swiss Federal Institute for Forest, Snow and Landscape Research), Ritokova, G. (UC Davis), Standiford, Richard B. (University of California, Berkeley), Schutz M (Swiss Federal Institute for Forest, Snow and Landscape Research), Shields JM (Michigan Technological University), Webster, CR (Michigan Technological University), Witter John A. (University of Michigan), Wood, David L. (University of California, Berkeley).

b) Graduate and Postdoctoral Advisors

Graduate: Martin R. Speight, University of Oxford; David Wainhouse, Forest Research, England

Postdoctoral: David L. Wood, UC Berkeley; Thomas R. Gordon, UC Davis

c) Thesis Advisor and Postgraduate Scholar Sponsor

Thesis Advisor to: Tara Bal (Michigan Technological University), Brian L. Beachy (deceased), Jessica A. Beachy (Michigan Technological University), Sarah Brodeur-Campbell (Michigan Technological University), Ryan DeSantis (University of Oklahoma), Michelle Freeman (Michigan Technological University), Elizabeth E. Graham (University of Illinois), Brian P. Henry (Washington DC), Jordan M. Marshall (Michigan Technological University), Emmanuel Opuni-Frimpong (Forest Research Institute of Ghana), Melissa Porter (Michigan Technological University), Bryan K. Roosien (Michigan Technological University), Justin M. Rosemier (Kentucky Wesleyan University).

Total advised: Graduate students: 13, Postdoctoral Scholars: 1
Proposal to Establish

GRADUATE CERTIFICATE IN SUSTAINABLE WATER RESOURCES SYSTEMS

1. General description and characteristics of program.

We propose to establish a 15-credit graduate Certificate entitled “Certificate in Water Resources.” The Certificate program will be administered by the Michigan Technological University Center for Water and Society. Courses contributing to this Certificate are currently offered by the Departments of Geological and Mining Engineering and Sciences, Civil and Environmental Engineering, Biological Sciences, Social Sciences, the School of Forest Resources and Environmental Science and the School of Business and Economics. The program will be open to all students who have completed a Bachelor’s Degree.

Students who complete this Certificate will have a set of core competencies in understanding current water resource issues and develop an advanced understanding of the problems and new technology development in their field of expertise. This Certificate will be useful to students in such fields as natural resource management, business and policy, environmental and civil engineering, geology and geological engineering, and environmental policy.

2. Rationale.

Students who complete this Certificate will be able to demonstrate that they understand water resource management from an interdisciplinary perspective that includes policy, natural sciences, and applied sciences. Increasingly, water managers have to work effectively on problem solving that crosses disciplines. For instance, a community water resource management issue may involve the failure of multiple homeowner onsite wastewater systems causing lake eutrophication with negative impacts on fisheries. Solving this problem effectively necessitates an understanding of how to work effectively with the homeowners, communicate fisheries impacts, work within existing state law governing onsite wastewater management, and the technical dimensions of the wastewater systems in use. While no one individual is likely to have deep knowledge in every area, our Certificate will give students literacy in multiple areas allowing them to absorb information outside of their core discipline.

3. Discussion of related programs within the institution and at other institutions.

No program like this proposed Certificate program is offered at Michigan Technological University. According to a brief online search conducted 12/1/08, graduate Certificates in similar fields are offered at the following institutions in the U.S.

Texas State University: Certificate in Water Resources Policy
http://www.geo.txstate.edu/degrees-programs/certificates/Certificate-in-Water-Resources-
4. Projected enrollment.

We expect 10 individuals will enroll in this Certificate program each year. At least initially, we expect that the individuals working toward the Certificate will be students on the MTU campus and enrolled in post-baccalaureate degree programs. In the future, we will explore extending the Certificate program to non-degree seeking students and course delivery via distance education, online, or at remote sites.

5. Scheduling plans (Extension, Evening, Regular).

All courses to be taken as a part of this Certificate are regularly scheduled courses.

6. Curriculum design.

This Certificate requires a total of 15 credits. Specific requirements for the Certificate program include

a) All students must take Water and Society Colloquium (UN5XXX, 1 credit).

b) All students must take a hydrology course equivalent to the 3000 level or higher and worth at least three credits. Examples of suitable MTU courses include FW 4370 Forest and Landscape Hydrology, CE3650 Hydraulics and Hydrology, and CE 5620 Stochastic Hydrology. Courses from other institutions, e.g. the undergraduate institution attended by the Certificate participant, may fulfill this requirement.

c) All students must take a minimum of one class from each of the three categories listed in the Table 1. All classes taken to fulfill the requirements of the Certificate, with the exception of the Water and Society Colloquium and the exceptions described in item b) above, must come from the list in Table 1.

d) A grade of B or higher in must be obtained in each of the courses taken to fulfill the Certificate requirements.
e) At least 9 of the total Certificate credits (course and research credits) must be at the 5000-level or higher.

### Table 1

<table>
<thead>
<tr>
<th>Category</th>
<th>Courses</th>
<th>Credits</th>
<th>Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Systems</td>
<td>BL 4450 Limnology (4 credits)</td>
<td>4</td>
<td>Fall</td>
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<tr>
<td></td>
<td>BL 5451 Aquatic Ecology</td>
<td>4</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>BL 4460 Biodiversity and Human Influences on Freshwater Resources</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>BL 5460 Advanced Ecology: Ecosystems</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>FW 4220 Wetlands</td>
<td>4</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>FW 4370 Forest and Landscape Hydrology</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>FW 5115 Restoration Ecology</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Policy and Societal Systems &amp; Economics</td>
<td>CE 4506 Application of Environmental Regulations and Pollution Prevention to Engineering Practice prerequisite(s): CE 3501 or CE 3503</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>EC 5640 Natural Resource Economics prerequisite(s): EC 3001 or EC 3002 or EC 2001</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>EC 5650 Environmental Economics prerequisite(s): EC 3001 or EC 3002 or EC 2001</td>
<td>3</td>
<td>Spring</td>
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<tr>
<td></td>
<td>SS 5100 Global Environmental Systems</td>
<td>3</td>
<td>Fall</td>
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<td></td>
<td>SS 5200 Environ. Decision-Making</td>
<td>3</td>
<td>Spring</td>
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<tr>
<td></td>
<td>SS 5300 Environ. Policy and Politics</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td></td>
<td>SS 5350 Environ. Policy Analysis prerequisite(s): SS 5200</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>SS 5400 Sociology of the Environment</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Physical Hydrology and Engineered Water Resources Systems</td>
<td>CE3650 Hydraulics and Hydrology</td>
<td>3</td>
<td>Fall, Spring</td>
</tr>
<tr>
<td></td>
<td>CE 4505 Surface Water Quality Engineering prerequisite(s): CE 3501 or CE 3503</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>CE 4507 Water Distribution and Wastewater Collection Design prerequisite(s): CE 3501 or CE 3503</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>CE 4508 Water and Wastewater Treatment prerequisite(s): (ENG 3507 or ENG 3200) and (CE 3501 or CE 3503)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>CE 4620 River and Floodplain Hydraulics prerequisite(s): CE 3620</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td></td>
<td>CE 4640 Stormwater Management and Low Impact Development</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Category</td>
<td>Courses</td>
<td>Credits</td>
<td>Offering</td>
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<tr>
<td></td>
<td>CE 3620</td>
<td>3</td>
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<td></td>
<td>CE 5502 Biological Treatment Processes</td>
<td>3</td>
<td>Fall, Spring</td>
</tr>
<tr>
<td></td>
<td>CE 5503 Physical/Chemical Treatment Processes</td>
<td>3</td>
<td>Spring</td>
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<tr>
<td></td>
<td>CE 5504 Surface Water Quality Modeling</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>CE 5508 Biogeochemical Processes prerequisite(s): CE 4501</td>
<td>3</td>
<td>Fall, Spring</td>
</tr>
<tr>
<td></td>
<td>CE-CH 5509 Transport and Transformation of Organic Pollutants prerequisite(s): CE 4501 or CH 3510</td>
<td>3</td>
<td>Fall^d</td>
</tr>
<tr>
<td></td>
<td>CE 5620 Stochastic Hydrology pre-requisite(s): MA 3710 and CE 3620</td>
<td>3</td>
<td>On demand</td>
</tr>
<tr>
<td></td>
<td>CE 5661 - GIS Applications pre-requisite(s): CE 3620</td>
<td>3</td>
<td>On demand</td>
</tr>
<tr>
<td></td>
<td>CE 5664 Water Resources Modeling pre-requisite(s): CE 3620</td>
<td>3</td>
<td>On demand</td>
</tr>
<tr>
<td></td>
<td>CE 5665 Stream Restoration pre-requisite(s): CE 3620</td>
<td>3</td>
<td>On demand</td>
</tr>
<tr>
<td></td>
<td>CE 5666 Water Resources Planning &amp; Management pre-requisite(s): CE 3620 and (EC 3402 or ENT 3402 or EC 3400)</td>
<td>3</td>
<td>On demand</td>
</tr>
<tr>
<td></td>
<td>GE 3850 Geohydrology</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>FW 4370 Forest and Landscape Hydrology</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>GE 4800 Groundwater Engineering prerequisite(s) GE 3850</td>
<td>3</td>
<td>On demand</td>
</tr>
<tr>
<td></td>
<td>GE 5850 Advanced Groundwater Engineering and Remediation</td>
<td>3</td>
<td>Spring</td>
</tr>
</tbody>
</table>

^a Offered alternate years beginning with the 2000-2001 academic year  
^b Offered alternate years beginning with the 2007-2008 academic year  
^c Offered alternate years beginning with the 2004-2005 academic year  
^d Offered alternate years beginning with the 2005-2006 academic year  
^e FW 4370 can satisfy the course requirements from either the “Natural Systems” or the “Physical Hydrology and Engineered Water Resources Systems” categories, but not both.

7. New course descriptions. (New Course Add Forms are needed for each course and will be processed upon final approval of program.)

UN 5XXX. Center for Water and Society Colloquium: 1 credit, spring. Seminar based class covers relevant, current topics in water resources. Objectives: (1) build towards a common literacy on water resources issues; (2) identify areas of common interest among students and...
faculty with an eye towards potential areas of collaboration on research projects or other initiatives, in the area of water resources. Open to all graduate students and undergraduate students with permission of course instructor(s).

Course Add Form is attached.

8. **Library and other learning resources.**

No new library or other learning resources are required.

9. **Computing Access Fee.**

No computing access fee is required for students on campus and enrolled in post-baccalaureate degree programs at Michigan Technological University. In the future, as we explore extending the Certificate program to non-degree seeking students and course delivery via distance education, online, or at remote sites, we will develop appropriate mechanisms for charging computer access fees.

10. **Faculty resumes.**

Resumes for the following faculty can be found at the Center for Water and Society web site: [http://www.mtcws.mtu.edu/participants3.html](http://www.mtcws.mtu.edu/participants3.html). These faculty include the Director and members of the Advisory Committee for the Center for Water and Society, and have endorsed this proposal.

Nancy Auer
William Breffle
John Gierke
Kathleen Halvorsen
Alex Mayer
Tom Pypker
Noel Urban

11. **Description of available/needed equipment.**

No equipment is needed.

12. **Program costs, years 1, 2, and 3.**

No costs are anticipated. Faculty will teach the Center for Water and Society Colloquium as a no-cost overload. This course will be team taught and rotated among the faculty participants in the Center for Water
13. Space.

No space is required.


The Certificate will be administered by the Center for Water and Society Advisory Committee and the Graduate School. Changes to the Certificate program must be approved by the Center for Water and Society Advisory Committee and the Dean of the Graduate School, except for substitutions for course requirements. Course requirement substitutions may be approved by the Director of the Center for Water and Society.

This Certificate program will follow current (as of 12/1/08) Michigan Technological University regulations for graduate Certificates.

All coursework counted towards the Certificate must be completed with a grade of “B” or better.

15. Accreditation requirements.

No accreditation is required.

16. Internal status of the proposal.

Proposal has been reviewed by Center for Water and Society Advisory Committee and the Dean of the Graduate School.

17. Planned implementation date

As soon as approved.
TO: Graduate Faculty Council and Graduate Student Council

FROM: Debra Charlesworth (on behalf of the committee)

DATE: September 23, 2009

RE: Thesis and Dissertation Procedures

On behalf of the Thesis and Dissertation Committee, I am pleased to present the revised “Procedures to prepare and submit a thesis or dissertation to Michigan Technological University’s Graduate School.” The committee is comprised of a broad cross-section of faculty and students who together represent each college or school at the University with a graduate program. The committee was formed in October 2007, and met regularly through the academic year to develop the procedures. In December 2008, the first version of the procedures was sent to GFC and GSC for feedback. The attached version incorporates feedback from the review of the first version collected in the spring of 2009. The committee met again to discuss and approve the revisions presented in this document.

This pdf file is bookmarked and hyperlinked to aid in navigation and contains:

- This memo
- A summary of the changes in the document
- A proposed plan for implementation
- A policy statement
- A Pre-defense Form including changes described in the procedures
- A revised draft of the procedures

We look forward to feedback from the graduate faculty and students.

Committee Members:
Debra Charlesworth (chair), Assistant to the Dean of the Graduate School
Elizabeth Flynn, Professor, Humanities
Craig Friedrich, Professor, Mechanical Engineering – Engineering Mechanics
Robert Keen, Associate Professor, Biological Sciences
Emily McCarthy, Graduate Student, Geology
Thomas Vosecky, Graduate Student, Rhetoric and Technical Communication
Christopher Webster, Associate Professor, School of Forest Resources and Environmental Science
Summary of changes made to the procedures

- Clarifications and typographical issues were corrected.

- The section “Issues to consider before writing” was changed to “Issues to consider early.” (see Section 1, page 5). The section was reordered and rewritten a bit to reflect changes throughout the document.

- The document follows the formatting requirements in terms of margins, line spacing, etc. The header at the top of the page will be deleted once the document is accepted and it is no longer in the draft stage.

- Instructions for double sided printing were added. See Section 3.14, page 30.

- The section “Research involving human subjects and vertebrate animals” was rewritten per comments received and pulled out of the “Contents” section. See Section 3.8, page 21.

- The section “Copyright permissions” was pulled out of the “Contents” section and rewritten to reflect that the Graduate School provides advice regarding permissions. See Section 3.7, page 19.

- The “Contents” section now contains just general instructions about the contents of a thesis or dissertation. See Section 3.6.12, page 15.

- Random review of documents by turnitin.com was removed based on student feedback. The originality statement will still be part of the Publishing Agreement. See Section 5.2.3, page 42. A draft of the pre-defense form that includes the originality statement is included in this packet.

- The opportunity to review journal articles by the committee was removed as a requirement. It is included as “encouraged,” (top of page 18) since early interaction with the advisory committee is advocated by the Graduate School.

- Faculty will now be e-mailed a notification that the review of the document is available through Image Now, the campus document imaging system. This is more efficient than e-mailing potentially large files, and can be automated to minimize staff time in composing e-mails, and clerical errors. See Section 4.3.2 on page 35.

- When students include a multi-authored paper in the thesis or dissertation, we have required a preface that describes the individual contribution of the student to the article. This was viewed as cumbersome. This section has been rewritten a bit to emphasize that just a short description by the author is required and eliminated some of the descriptive language that made this sound more overwhelming than was intended. See the “Authorship” section on page 18, and the new Section 3.6.7 on page 13.
Proposed Implementation of Thesis and Dissertation Procedures

- The procedures and policy require approval by the Graduate Faculty Council, University Senate, and University administration prior to adoption by the Graduate School.

- When the procedures receive final approval, no required changes in the submission or formatting of a thesis or dissertation will occur until two semesters after their approval.

- Students submitting a draft in a given semester will follow the review generated by the Graduate School at that time to submit their final document. Formatting changes implemented between the draft and final submission will not affect any students. Students must adhere to the deadlines in a given semester to submit their final documents to graduate in a given semester.

- Sample timeline:
  - Semester approved (ex: Spring 2010): Procedures receive final approval from the University Senate and University administration. No changes occur to submission or formatting of a thesis or dissertation during this semester.
  - 1st semester after approval (ex: Summer 2010): New procedures will be available online as soon as possible, including all associated formatting files as described in the procedures. Students will continue to format their documents using the previous procedures. The Graduate School will recommend, but not require, formatting changes based on the new procedures. Deadlines for submission will remain unchanged.
  - 2nd semester after approval (ex: Fall 2010): All students will submit and format their draft documents using the new procedures. Final documents will follow the review generated by the Graduate School at the time of submission. The revised deadlines will apply beginning in this semester for all students who submit any draft or final documents.
Thesis and Dissertation Requirement

Graduate students enrolled in a master’s program (Plan A) or doctoral program will submit a thesis or dissertation in partial fulfillment of their degree requirements. The thesis or dissertation will be formatted and submitted following the current procedures, as published by the Graduate School. The thesis (for a master’s student) or dissertation (for a doctoral student) will be a written description of the original research carried out by the student during their graduate program. Michigan Tech theses and dissertations will be archived in the J.R. Van Pelt and Opie Library. The Graduate School procedures will be reviewed by Graduate School staff as needed at the request of the Graduate Faculty Council, Graduate Student Council or Graduate School and changes will be forwarded to the Graduate Faculty Council for approval before adoption.
Pre-defense Form - Please type; handwritten forms are not acceptable

This form is required for the following degrees: PhD, MS (plan A, B, C) and Master of Forestry

Off campus students should e-mail a completed form to their graduate program; they will print and submit.

Return this form to the Graduate School two weeks prior to the oral defense.

Provide information about you and your program.

Last Name, First Name, MI: Last, First M

M Number (ex: M12345678): M12345678

Select Degree Type: ☐ PhD ☐ MS ☐ MFor

Select Graduate Program: Applied Cognitive Science and Human Factors

A draft of your dissertation or thesis is due in the Graduate School two weeks prior to your defense. This does not need to match the copy given to your committee.

Title of thesis, report, or dissertation:

I hereby certify that the work presented in this document is original. To ensure originality, I:

☐ have analyzed the document using plagiarism detection software or other methods and have corrected the document accordingly.

☐ am requesting that the Graduate School analyze the document using plagiarism detection software and I will correct the document accordingly. I understand that the degree will not be awarded until these corrections are made.

For style questions not described in the Graduate School procedures, my document:

☐ follows the Chicago Manual of Style (recommended unless field specifies a different standard)

☐ follows the MLA Handbook

☐ follows the Publication Manual of the American Psychological Association

☐ follows the CSE Manual for Authors, Editors, and Publishers

☐ follows another style manual specific to my field (please specify)

The references in my document:

☐ follow the formatting found in the Graduate School procedures.

☐ follow a style from a peer-reviewed journal in my field. I will submit the "Instructions to Authors" from the journal with the draft I submit to the Graduate School.

Select your defense date, time, and place.

Students make their own arrangements to reserve a room on campus and set a date and time for the defense. All information in this section must be provided when the form is submitted to the Graduate School.

Defense Date (MM/DD/YYYY): 10/07/2009

Start Time of Defense: 2pm

Place - building and room number: Admin 407A
Provide your committee members.
The advisor and co-advisor (if applicable) serve as chairs of the committee. At least four members of the graduate faculty are required for doctoral candidates. At least one member will be from outside the student's administrative home department or school.

Advisor Name, Chair

1

2

3

Sign the form. A graduate program director may sign for any advisor. Advisors should verify the ETD and embargo options selected on the next page.

Advisor Name Date

Graduate Program Director, Applied Cognitive Science and Human Factors Date

Assistant to the Dean of the Graduate School Date
Modified 9/16/2009 ddc Last, First M
I hereby certify that the work presented in this document is original. To ensure originality, I have requested that the Graduate School analyze the document using plagiarism detection software and I will correct the document accordingly. I understand that the degree will not be awarded until these corrections are made.

My advisory committee and I agree that the above-mentioned document be placed in the Library archives with the embargo and ETD options noted.

Students who are off campus may sign this portion of the form when they are on campus for their defense.

First M Last Date

When the form is initially submitted, the student will need to obtain advisor and program approval to schedule the defense. If a revised version of this form is submitted, advisor approval will be needed to ensure that the publication options selected by the student are appropriate.

Only one of the yellow items on page 3 and 4 will appear on the form. It will depend on the option selected on page 1.
PROCEDURES TO PREPARE AND SUBMIT A
THESIS OR DISSERTATION TO
MICHIGAN TECHNOLOGICAL UNIVERSITY’S GRADUATE SCHOOL

By:
The Graduate School

Michigan Technological University

2009
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1. **Issues to consider early**

Students are expected to be familiar with all of the procedures required to submit a thesis or dissertation. There are, however, several issues that students should be aware of well before beginning the writing process. A brief summary of these issues is presented here for easier reference for the student:

- A traditional thesis or dissertation presents the graduate research as a single book, often with a sequential order to the materials presented. Refer to Section 3.6.12.1 on page 15 for more details. Optionally, a thesis or dissertation may be presented as a collection of student-authored journal articles that have been submitted, accepted, or published in a journal. For this latter format, see Section 3.6.12.2 on page 17 for formatting suggestions, and section 3.7 on page 19 for important requirements for reprinting articles that have been published.

- If a student wishes to include copyrighted material in their thesis or dissertation, permission may be needed to reprint the material. This includes work published on the Internet, in a journal article, in a book, and *work that the student or advisor has authored*. Please see Section 3.7 on page 19 for more information on copyright permissions.

- Formatting of the thesis or dissertation is covered in Section 3, beginning on page 8.

- Submission of the thesis or dissertation is covered in Section 4, beginning on page 32.

- Remember that a draft of the thesis or dissertation must be submitted to the Graduate School at least two weeks before the oral defense. Failure to do so will result in a delay of the oral defense. The Pre-defense form, which includes the Publishing Agreement, must also be submitted at this time.

- When submitting a final thesis or dissertation, please allow one week for processing the document. This time is necessary for review of the thesis or dissertation and payment of any publication fees.

- If a project involves human subjects, vertebrate animal subjects, or recombinant DNA, the principal investigator must have the protocol reviewed by the Office of Research Integrity and Compliance prior to conducting the research. Research with human subjects is not limited to projects that could cause physical harm to
people, but also includes studies that could cause psychological distress, including surveys. See Section 3.8 on page 21 for more details.

1.1. Forms related to theses and dissertations

There are several forms related to theses and dissertations found on the Graduate School’s web page. They are summarized here.

- Publishing Agreement (part of the Pre-defense form): Due two weeks before the oral defense, this form informs the Graduate School of the publishing options the student desires, contains a statement of originality, and gives the J.R. Van Pelt and Opie Library permission to photocopy the work for interlibrary loan requests. See Section 4.2 on page 33.

- TD-Review: This form is generated by the Graduate School after review of a thesis or dissertation. It communicates to the student all of the changes that are required prior to acceptance of the thesis or dissertation and may also include suggestions for formatting. See Section 4.3.2 on page 35 for more details.

- TD-Bindery: This form allows the student to order bound copies of the thesis or dissertation and pay any fees related to submission to ProQuest/UMI. See Section 4.4.2 on page 37 for more details.
2. Introduction

Writing a thesis or dissertation is a large task, representing the culmination of a research project, and a professional representation of not only the student’s work, but the advisor, graduate program, and Michigan Tech. This document will form the primary basis of communication of the research to an examination committee. The term “document” is commonly used in these procedures to refer to either a thesis or dissertation. Presentation of the document in a professional and consistent manner will reflect well on the student and aid in the defense of the research project. These procedures outline the requirements for formatting and submitting a thesis or dissertation in Sections 3 and 4, respectively. Following these procedures will ensure that a document is ready for publication by ProQuest/UMI Dissertation Publishing (ProQuest/UMI) and the J.R. Van Pelt and Opie Library. A summary of the policies surrounding academic integrity and responsible conduct for research pertaining to a thesis or dissertation are presented in Section 5.
3. Formatting requirements

These procedures present the basic style requirements for all theses and dissertations submitted to the Graduate School. Compliance with these procedures will also ensure acceptance for publication with ProQuest/UMI. For style questions not covered in these procedures, students must refer to the current edition of the *Chicago Manual of Style*, which is available in the Library. For some items of formatting, the style of a journal or appropriate style manual may be substituted for these procedures or those specified by the *Chicago Manual of Style*. These substitutions should only be made when the student’s field customarily uses a different style, and must be indicated on the Publishing Agreement when a student submits a thesis or dissertation. When appropriate, these allowed substitutions will be outlined. Examples include the MLA style for Rhetoric and Technical Communication, APA style for social sciences or CSE style (formerly CBE) for the sciences. A list of these style manuals, as well as the call numbers in the Library is listed in Section 8.1 on page 53.

3.1. Typefaces

A typeface is a collection of fonts with a similar style. For example, Times New Roman is a typeface, while the font refers to the specific style of the typeface, such as bold or italics. The typefaces used in a thesis or dissertation convey important information about the style of the document and enhance (or detract from) the readability of it. In order to ensure readability and compliance with ProQuest/UMI guidelines, the typefaces and sizes listed in Table 3.1 are allowed for the body text of a thesis or dissertation. Some of these typefaces are recognized as web fonts, indicating that they are easily read on a computer screen and may be preferable for preparing documents for electronic access.

The typefaces that can be used for headings in a thesis are listed in Table 3.1. The size and style of these typefaces will be adjusted for each heading level to visually indicate the importance of each section. For example, a heading used for a chapter title will be larger and more prominent than the sub-headings of the chapter. One way to improve the distinction of heading is to select a typeface with serifs for the body text (such as Century or Times New Roman) and a typeface without serifs for the headings (such as Arial or Verdana). Macintosh users may also use Helvetica, Times, or Geneva. All typefaces must use true type or open type versions of the font.

Exceptions to these requirements will be granted by the Graduate School when the student can demonstrate that a journal in their field has different typeface requirements. Student must submit the “Instructions to Authors” from the journal with their thesis or dissertation.
Table 3.1
Typefaces allowed for use in theses and dissertations.

<table>
<thead>
<tr>
<th>Typeface</th>
<th>Minimum Size for Body Text</th>
<th>Web Font</th>
<th>Minimum Size for Headings</th>
<th>Maximum Size for Headings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arial</td>
<td>10 pt</td>
<td>Yes</td>
<td>12 pt</td>
<td>24 pt</td>
</tr>
<tr>
<td>Century</td>
<td>11 pt</td>
<td>No</td>
<td>13 pt</td>
<td>25 pt</td>
</tr>
<tr>
<td>Courier New</td>
<td>10 pt</td>
<td>Yes</td>
<td>12 pt</td>
<td>24 pt</td>
</tr>
<tr>
<td>Garamond</td>
<td>12 pt</td>
<td>No</td>
<td>14 pt</td>
<td>26 pt</td>
</tr>
<tr>
<td>Georgia</td>
<td>11 pt</td>
<td>Yes</td>
<td>13 pt</td>
<td>25 pt</td>
</tr>
<tr>
<td>Lucida Bright</td>
<td>10 pt</td>
<td>No</td>
<td>12 pt</td>
<td>24 pt</td>
</tr>
<tr>
<td>Microsoft Sans Serif</td>
<td>10 pt</td>
<td>No</td>
<td>12 pt</td>
<td>24 pt</td>
</tr>
<tr>
<td>Tahoma</td>
<td>10 pt</td>
<td>No</td>
<td>12 pt</td>
<td>24 pt</td>
</tr>
<tr>
<td>Times New Roman</td>
<td>12 pt</td>
<td>Yes</td>
<td>14 pt</td>
<td>26 pt</td>
</tr>
<tr>
<td>Trebuchet MS</td>
<td>10 pt</td>
<td>Yes</td>
<td>12 pt</td>
<td>24 pt</td>
</tr>
<tr>
<td>Verdana</td>
<td>10 pt</td>
<td>Yes</td>
<td>12 pt</td>
<td>24 pt</td>
</tr>
</tbody>
</table>

3.2. Margins
The binding edge margin of all pages will be at least 1.5 in. but no more than 1.6 in. For a page with a portrait orientation (for example, this page in these procedures), the left hand margin is the binding edge. For a page with a landscape orientation, the binding edge margin will be at the top of the page. The margins of the remaining sides will be at least 1 in. but no more than 1.1 in. These margins apply to all material in the document including page numbers and appendices.

3.3. Paper size
Theses and dissertations must be formatted to print on 8.5 × 11 in. paper with the exception of oversized maps or tables as detailed in Section 3.12 on page 29.

3.4. Page numbers
Students may choose to number their pages according to the traditional scheme, or Arabic numbering. In the traditional scheme, page numbers for the preliminary pages are formatted as lower case roman numerals (i, ii, iii, etc.). The title page and signature page are included in the numbering; however, a page number is not placed on these pages.
With the exception of the title and signature pages, all pages must be numbered. In the traditional scheme, the body of the document uses Arabic numbers (1, 2, 3, etc.). Table 3.2 on page 10 has a summary of all of the sections included in a thesis or dissertation, their order, and the type of page number necessary for each.

Students may also choose to use Arabic numbering throughout the document. With this choice, every page is numbered from the start to the end with Arabic numbers (1, 2, 3, etc.). Note that the title page and signature page are pages 1 and 2, respectively, but no numbers appear on these pages. With this numbering scheme, the page numbers in a PDF file will automatically match the page numbers printed on the document which can make it easier to find the desired material in the document.

Regardless of the numbering scheme chosen, page numbers must appear in the same place throughout the document. Page numbers may either be placed at the center of the bottom edge of the paper or in the upper right corner. Page numbers must be at least 1 in. from the edge of the page. For example, if page numbers are placed at the bottom of the page, the bottom edge of the number must be at least 1 in. from the edge of the page. Note that the default for most word processors is to place page numbers approximately ½ in. from the edge of the page, so students must adjust the placement of the page numbers accordingly. If the orientation of a page is landscape, the page number will be in the same location as the rest of the pages. This means that the page numbers on landscape pages must be rotated.

3.5. Line spacing

Line spacing refers to the amount of height given for each line of text. The body of the text may use either double-spacing, one-and-a-half line spacing, or single spacing. For the final draft, students are encouraged to use single or one-and-a-half line spacing. This includes the appendices and preliminary pages. The exceptions to this spacing are figure captions and table captions, which must be single spaced. The table of contents, list of figures, list of tables, and references may be double or single spaced. If the references are single spaced, a blank line will be inserted between each, and a hanging indent will be used. Single spaced table of contents, list of figures, and list of tables, will have blank lines inserted as appropriate to enhance legibility. For example, a blank line between chapters would be appropriate. If the student is following the MLA style, the table of contents, list of figures, and list of tables are double-spaced.

3.6. Sections included and order

A thesis or dissertation contains many sections that are typical for a book but not usually used in other reports. The order of these sections is important, particularly since not all sections are found in all documents. Table 3.2 lists the sections that may occur in a thesis
3.6.1. Title page

Page numbering begins with the title page; however, no page number is placed on this page. The format for a title page is shown in Section 7 (see page 48). Please pay careful attention to the formatting shown for the title page. The typeface, style and size of text is the same as that used for the body text of the document. Accepted typefaces are listed in Table 3.1 on page 9. A title page contains:

1. A title. The title will be in all capital letters.

2. The author’s full name.
3. A statement indicating:

4. The type of document in all capital letters (A THESIS or A DISSERTATION).

5. The text, “Submitted in partial fulfillment of the requirements for the degree of”

6. The degree type (Master of Science or Doctor of Philosophy)

7. The degree program – note that this does not always match the name of the department or school with which the student is associated. A complete list of degree programs can be found in Section 6, page 44.

8. MICHIGAN TECHNOLOGICAL UNIVERSITY

9. The year of the degree. Note that this may not be the same year a thesis or dissertation is defended.

10. A copyright notice in the form “©Year Owner’s Name”. US Copyright Law does not require this notice to provide copyright protection, but it is recommended. “Copyright” or “Copr.” may be used instead of “©.” Dissertation or thesis copyrights may be registered, for a fee, when students submit their document to ProQuest/UMI.

3.6.2. Signature page

Page numbering continues with the signature page, but no number is placed on this page. The format for a signature page is shown in Section 7 (page 48). Please pay careful attention to the formatting of the signature page. The typeface, style, and size of font is the same as that used for the body text of the document. Accepted typefaces are listed in Table 3.1 on page 9. Ensure that the correct degree program, administrative home department or school of student, and degree type are specified. A complete list of degree programs and more information can be found in Section 6, page 44.

Students will place an unsigned page in the electronic document submitted to the Graduate School. One original signature page, with original signatures for each person listed on this page, must be delivered to the Graduate School.
3.6.3. Dedication
Students may choose to dedicate their thesis or dissertation to an individual, several people, or a group. The word “dedication” is usually not needed on this page. The formatting of this page is up to the student’s discretion, as long as the text uses an approved typeface. Customarily, the dedication is short, such as, “To my mother.”

3.6.4. Table of contents
A table of contents is required. This is the first page with a page number on it. Each chapter or section heading, with the exception of the table of contents, must be listed in the table of contents. Additionally, at least the first- and second-level subheadings in each chapter will be listed. Additional subheadings may be included at the author’s discretion. The table of contents must be formatted so that the distinction of each level of heading is clear and page numbers are easily found. Page numbers must align flush right and must be preceded by a leader of periods. One way to clearly identify section headings is to indent each subheading more than the previous subheading. These formatting requirements are illustrated in the table of contents for these procedures.

3.6.5. List of figures
If figures are present in the document, a table listing the figure number, figure caption, and page number of each must be included. The formatting of the list of figures is similar to that of a table of contents, except that there are no subheadings, simply a list of the figures with their captions and page numbers. Captions should be shortened to eliminate extensive description. Multi-line entries must be formatted so that each line after the first line is indented (also known as a hanging indent).

3.6.6. List of tables
If tables are present in the document, a table listing the table number, table caption, and page number of each must be included. The formatting of the list of tables is similar to that of a list of figures. Captions should be shortened to eliminate extensive description. Multi-line entries must be formatted so that each line after the first line is indented. See the List of Tables in this document on page 4 for an example.

3.6.7. Preface
A single preface at the beginning of the thesis or dissertation is required if published material, such as a journal article, is reprinted in its entirety as a chapter in the document. If the reprinted material was solely authored by the student, the preface is not required. Section 3.6.12.2 on page 17 describes formatting for this type of document in more detail. See the “Authorship” section on page 18 for more information about specific items to include in the preface. If reprinted material is not used as chapters in the document, a preface is optional. A preface is sometimes used to describe the motivation for the work.
3.6.8. Acknowledgements
An acknowledgements section is optional. Many students wish to use this page to thank individuals, groups, or organizations for support of their research. The thanks could be for financial support, such as a fellowship or research grant, or for the emotional support of friends and family. The formatting of this section must match the body of the work, but the content is the responsibility of the author.

3.6.9. Definitions
A definitions section is optional. Definitions will be alphabetized. The term to be defined will be typed in bold, lowercase letters and followed with a period. Terms will only be capitalized if they appear in capital letters in the body of the document. The definition will be typed in sentence case using punctuation. If the definition is longer than one line, the text will be indented after the first line with a hanging indent. See the example below.

definition. A definition follows the word. When the definition is longer than one line, text on the subsequent lines is indented to make it easier to find the words being defined.

3.6.10. Lists of abbreviations
A list of abbreviations is optional, and it may be formatted in one of two ways. The first option is for abbreviations to be typed in a two-column format with the first column showing the abbreviation and the second column describing the abbreviation. The abbreviations in the second column will be flush left with each other. The first column will be wide enough so that the longest abbreviation fits on one line.

A list of abbreviations may also be presented in the same way as a list of definitions. Each abbreviation will be in bold text and followed by a period. Capitalize the abbreviation if it is capitalized within the text. If the description of the abbreviation is longer than one line, utilize a hanging indent for subsequent lines.

For both methods, list abbreviations in alphabetical order, placing those with Greek letters first.

3.6.11. Abstract
An abstract is a concise summary of the research. The abstract is found in the document and is used for the ProQuest/UMI index. Publication with ProQuest/UMI is required for both theses and dissertations. Writing an abstract that clearly identifies the topic areas of the research will aid others in finding the document. When an abstract is placed in a search engine, many databases will truncate an abstract at 350 words for a dissertation
and 150 words for a master’s thesis. Students are strongly encouraged to adhere to these word limits in order to maximize the distribution of their entire abstract. Under no circumstances will an abstract be longer than two pages.

3.6.12. Contents

The organization of a thesis or dissertation is a matter for an advisor and student to consider carefully. If the student’s program has requirements for the content of a thesis or dissertation, those requirements should be used in place of the recommendations in this section. A traditional document presents the graduate research as a single book. A second format which is gaining popularity presents the graduate work as a collection of journal articles. Both formats offer a variety of disadvantages and advantages, and one may be more appropriate for a particular project. This section is meant to guide the student in selecting a method of presentation that is appropriate and meets the needs of the student, advisor, and project. It is not meant to be an all-inclusive guide to writing these documents, nor a statement of which method is preferred. Writing a thesis or dissertation as a collection of journal articles does require some special considerations and the procedures in this section must be followed carefully. The reference books listed in Section 8.2 on page 53 are also good resources to help guide the student in the selection of an appropriate format and guidance during the writing process. The Craft of Research is particularly useful for students in the rhetoric and technical communication program.

3.6.12.1. Traditional

A traditional thesis or dissertation includes content in an order similar to a lab report or term paper. Particularly in the sciences or engineering, the document is sequential in nature, meaning that all of the methods are described, followed by all of the results, discussion, and conclusions. The format of a dissertation in the rhetoric and technical communication program varies greatly depending on the nature of the research, and cannot be as easily summarized. An advantage of a traditional thesis or dissertation is that it is easy to include all experimental details in the body of the document. For experimental work, the thesis or dissertation may serve as a summary of the research to date for the next student continuing the research. A disadvantage of this type of thesis or dissertation is that the text must be shortened and rearranged, sometimes substantially, in order to submit an article to a journal. If the material has been published in a journal prior to submission as part of a thesis or dissertation, it must be cited. If the student wishes to reproduce any section of an article that is larger than allowed for by “fair use” policies, appropriate copyright permission must be obtained, as described on page 19. Some common sections in a traditional document are briefly described below.
Introduction
The introduction lays the foundation for the current research and places the work in context within the field. It should be an analysis of the existing body of research that has a bearing on the project. It is important to not only review the literature, but also to critique it. This section should outline some of the limitations of current research and areas that need further exploration so that the goals of the work to be discussed can be easily seen.

Goals and hypotheses
Following the introduction is usually a section outlining the goals of the current work and the hypotheses to be tested. A goal is an overall aim of the work, for example, to develop a new method. A hypothesis is an idea about what the result will be when something is changed. For example, a hypothesis could test whether or not the new method improves something. A good hypothesis is testable, meaning that some experimental method can be applied to determine if it is true or false.

Methods
The methods section describes all of the experimental methods used in the study. Each of these methods should be testing one or more hypotheses. Methods include computer programs, surveys, experiments, and characterization techniques. If the methods are lengthy, such as computer code used to analyze data, it is appropriate to include an overview of the methods in the body of the document and include the details in an appendix.

Results
The results section presents all of the data obtained from the methods described. A common mistake is to include methods in the results section. This is usually done when a student wants to describe a test that was done to verify or continue an experiment. This should be avoided in nearly all circumstances. Summaries of data may be included in the body with extensive tables located in an appendix. Alternate ways of expressing the data may also be in an appendix.

Discussion
In the discussion section, the results are interpreted and are put in context with current research in the field. The author should explain what the results mean and if the hypotheses were proven or disproven. It is common to refer to the literature to compare and contrast the results found in the current work to that done by others. Sources of discrepancies, limitations, or errors in the current work should also be presented here.
Future work
This section highlights additional work that should be done at a later date to continue or clarify the current research. Future work, for example, could illustrate how to address limitations of the current study. The purpose of this section is to show that the student understands the implications of the research and what could come next.

Conclusions
Conclusions summarize the main findings of the current research. It reiterates the main points and limitations of the current research and may highlight some of the areas for future work.

3.6.12.2. Collection of journal articles
The thesis or dissertation as a collection of journal articles has been gaining popularity as an accepted format. In this type of document, the individual chapters consist of individual journal articles. These articles may be published, under review, or planned for submission. Although this section refers to journal articles, the same procedures apply if the material is planned to be or has been published in a book, conference proceedings, or any other form, and will be presented in the thesis or dissertation in an identical format.

Suggested formats for compiling information
When the body of the thesis or dissertation is a collection of journal articles, it is extremely important that the document have an introduction and conclusion section that connects the individual articles in a comprehensive manner. A thesis or dissertation is not simply a collection of articles; it is the presentation, synthesis, and analysis of an entire research project which has occurred over several years. It is suggested that an introduction is followed by or includes a general statement of goals and hypotheses for the overall project.

The text of each chapter must match the formatting procedures as presented in this document, particularly with respect to typeface selection, line spacing, and margins. Photocopies or PDF versions of published papers will not be acceptable. A footnote must be placed on the first page of the chapter and must include the following information if the paper has been published or submitted for publication:

- “The material contained in this chapter (was previously published in OR has been submitted to) the journal Title of Journal.”

This statement can be modified as appropriate if the material was published in a book or conference proceeding in the same form as that presented in the thesis or dissertation. If the article has already been published, see Section 3.7 on page 19 for more information.
on how to obtain and document the permission in the footnote. Students are encouraged, but not required, to give their advisory committee an opportunity to review journal articles prior to submission.

Authorship
It is rare that a graduate student would be the sole author of a journal article. Research is frequently a multi-disciplinary activity that typically requires the use of resources from many laboratories or sources and involves the expertise of several experts. A thesis or dissertation, however, is attributed to one student author. To address the issue of co-authorship of work(s) contained within a document with a sole author, a single preface must be included at the beginning of the thesis or dissertation that addresses the contribution made by the thesis or dissertation author for each paper presented. Note that this is only required if the full-text of a multi-author journal article has been included in the thesis or dissertation. As shown in Table 3.2 on page 10, this preface is placed after the List of Tables and before the Acknowledgements.

In this preface, students will describe in a few sentences their individual contribution to the paper contained in each chapter, referencing each chapter by its unique number or name. It is not necessary for the student to explain the role of each author in the paper. The advisor’s signature on the signature page will serve to verify that the student has accurately represented his or her contribution to each article.

3.6.12.3. Hybrid thesis
Some theses or dissertations may combine elements of the traditional and collection format. For example, a student could use the traditional approach of including all experimental details in the body of the document but organize the chapters to represent sections of the research that would be submitted to a journal after editing.

3.6.13. Reference list
A reference list presents all of the sources consulted to prepare the document. More information on the formatting of this section is found in Section 3.7.

3.6.14. Appendices
Appendices are used to place lengthy experimental methods, derivations, data, or other supporting material that is not necessary to understand the main body of work but is needed to support it. For example, data can often be presented in a graphical or tabular form. Only one form should generally appear in the body of the document, but the second might be useful to another student continuing the research or to serve as an archive for the data. A subset of data might be included in the body of the document, while the entire table might be included in the appendix.
Appendices will be formatted in the same way as the body of the thesis or dissertation. Students should pay particular attention to the margins, since it is common to place large or lengthy materials in an appendix. When a document is prepared so that the body is a collection of papers, the appendices may be lengthy and care must be taken so that the material can be easily found within an appendix.

3.7. Copyright permissions

Students may wish to include material in a thesis or dissertation that has been created by someone else, or that they have published previously. Permission is generally needed to reprint these materials. The Graduate School will provide recommendations when the draft is submitted for review, and is available for consultation at any time by appointment or via e-mail. The following sections provide recommendations on how to determine if permission is needed, how to obtain permission, and how to document the ability to reprint copyrighted materials.

3.7.1. Determine if permission is needed

Reprinting the full-text of an article, book chapter, or similar, previously published by the student requires permission unless the student has retained the right to reprint the material. The right to reprint the article can be documented by the copyright transfer agreement with the publisher. In either case, the Graduate School recommends documenting the ability to reprint following the procedure in Section 3.7.3. Recommendations on how to obtain permission, if required, can be found in Section 3.7.2. If the text and figures have been substantially altered from the original material, permission is not required.

Permission is needed to reprint any material that the student has not created, with the following exceptions:

- Material in the public domain. This includes material created by employees of the federal government.

- Material where the copyright has expired.

- Material that is “fair use” of copyrighted materials. The fair use clause of copyright law allows for the reuse of some materials without asking permission.

The Graduate School recommends that these exceptions are documented, as described in Section 3.7.3. A full discussion of copyright, fair use, and public domain is beyond the
scope of these procedures. The Graduate School maintains a web site that contains links to helpful websites and resources to assist students in obtaining their permissions:

http://www.gradschool.mtu.edu/td/copyright

In particular, ProQuest maintains a site entitled “Copyright Law & Graduate Research” that provides information about copyrights in general, what items require permission, and how to obtain permission. This site can be found here:


Stanford University also maintains a site that describes copyright and fair use in academia. In addition to addressing concerns of students writing a thesis or dissertation, it also addresses the use of copyrighted materials in the classroom. Their site can be found here:

http://fairuse.stanford.edu/Copyright_and_Fair_Use_Overview/

3.7.2. Obtain permission for copyrighted materials

If the student determines that permission is required to reprint materials, the student must obtain written permission from the publisher. Sample permission letters can be found in the ProQuest guide:


If the student is not able to obtain permission, the work must be rewritten in such a way that it presents the information using new language and/or images. Students are advised to allow sufficient time to allow the permission to be obtained. A degree cannot be awarded to a student until the dissertation or thesis is complete, and students must continuously enroll until their degree is awarded. Exceptions to the continuous enrollment policy will not be granted while students are waiting for permission from a publisher.

3.7.3. Document the ability to reprint copyrighted materials

All reference materials, including those in the public domain or not requiring permission to use, must be properly cited with a full and complete reference in the reference list.

Students may determine that reprinting copyrighted materials is fair use of these materials. In this case, students should describe this claim in a separate document or in
the “comments” section when submitting their thesis or dissertation to the Graduate School using Blackboard. This will expedite the review process, and avoid a request for clarification from the Graduate School.

In all other cases, it is recommended that students:

- Include a credit line that follows the requirements of the publisher or follows the Chicago Manual of Style (see items 12.42 – 12.47). See 12.49 for credit line examples for work in the public domain. A credit line identifies the source of the material and the copyright holder.

- Include a reference to permission letters from the publisher or documentation that gives the student the ability to reprint the material (examples: “See Appendix A for permission letters to reprint this material,” or “See Appendix A for a copy of the copyright transfer agreement.”, or “See Appendix A for documentation that this material is in the public domain.”).

- Place all permission letters, or documentation that the material can be reprinted, in an appendix. This material will be organized so that it is easy for the reader to find.

Any letters granting permission to the student to include copyrighted material in the document will be prepared so that the signatures are redacted in the document. Redaction obscures the signature and will minimize the potential for identify theft. Adobe® Acrobat® 8.0 (or newer) offers powerful redaction features, or a photocopy of the letter may have the signature redacted before scanning.

3.8.  Research involving human and vertebrate animal subjects

Research projects that involve human subjects, animal subjects, or recombinant DNA must be reviewed by the Office of Research Integrity and Compliance. The faculty member identified as the principal investigator is responsible for submitting the research protocol for approval prior to conducting the research. Please note that research with human subjects is not limited to research that could cause physical harm to people but also includes research that could cause psychological distress, including surveys. Every reviewed project, including those exempted, receives an approval number from the Office of Research Integrity and Compliance for the research protocol. This approval number must be included in the thesis or dissertation in an appropriate place. For a traditional document, the appropriate place could be the methods or an appendix. If a thesis or
dissertation is a collection of papers, this information could be included as a footnote to a chapter, or in an appendix.

If the approval number is not present during review of the draft document, the Graduate School will request clarification from the student and contact the Office of Research Integrity and Compliance. In the event that a research protocol was not submitted prior to conducting the research project, the principal investigator of the project will be held accountable, and the student will not be penalized for that infraction.

Please contact the Office of Research Integrity and Compliance (906-487-2902) with any questions about the submission or review of a research protocol.

3.9. Formatting of in-text references and the reference list

Students may choose to follow the Graduate School formatting of in-text references and reference list, as found in this section, or may choose to follow the formatting guidelines of a journal that is important in their field. The Graduate School style for the reference list follows *Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers* (see Section 8.1, page 53 for a full citation, also referred to as *The CSE Manual* or CSE style) more closely than the *Chicago Manual of Style*, since the CSE style is more appropriate for most engineering and science fields. It also allows for three different formats of in-text references, one of which is likely to match a style common in the student’s field. Students who choose to follow a journal format will select one that includes the full name of the journal. This will make it easier for the reader to find the cited article. Note that the default for the CSE style is to use abbreviated journal names, so if commercial templates are used, they must be altered to match the styles shown in Section 3.9.2. Students who choose to use a journal format from their field must provide the “Instructions to Authors” from the journal with the submission of their draft to the Graduate School. If the MLA style is used, students may just state this with their submission.

In either case, students are encouraged to utilize software such as EndNote or Reference Manager to aid in formatting their bibliographies and citations. The use of software will greatly decrease the amount of time required to prepare this portion of the document. A site license is available for EndNote for Michigan Tech faculty, staff, and students. Links to download the software and EndNote styles and filters appropriate for a Michigan Tech thesis or dissertation are available at:

[http://www.gradschool.mtu.edu/td/endnote](http://www.gradschool.mtu.edu/td/endnote)
References within the text must be provided for ideas or facts that have been paraphrased in the thesis or dissertation, material that has been reprinted from another source, or figures that have been generated from source data the author did not collect. This includes material that is copyrighted and requires permission to reprint or material in the public domain.

3.9.1. Formatting of references within the text

References within the text (or in-text references) may be citation-sequence, citation-name, or name-year. Citation-sequence and citation-name in-text references may be either numbers in-line with the text and enclosed in parenthesis (Smith (1) proved the following theorem.) or super-scripted (Smith¹ proved the following theorem.). Non-adjacent numbers will be separated by a comma with no spaces (for example, (1,3,5) or ¹,³,⁵). Adjacent numbers will be separated by a dash. For example, the in-text references (1-3,5) or ¹-³,⁵ refer to references 1, 2, 3 and 5. The difference between citation-sequence and citation-name is in the ordering of the reference list. This will be discussed further in Section 3.9.2 on page 24.

Name-year citations will include the surname of the author and the year of publication. There are numerous variations to this simple rule depending upon, for example, if the same author has published multiple papers in the same year or if different authors with the same surname have published papers in the same year. The most common variations are described below. For additional details and more variations, students are referred to the The CSE Manual.

- **Single author paper**
  The in-text reference (Smith 2006) refers to a paper solely authored by Smith in 2006.

- **Same author, multiple papers in one year**
  Add a lowercase letter to the year to distinguish which paper is being referenced. For example, the in-text references (Smith 2007a) and (Smith 2007b) refer to two different papers written solely by Smith in 2007. The letter is also included in the reference list.

- **Different authors with the same surname publish papers in the same year**
  Include the initials of their first and middle names. For example, the in-text references (Smith J 2008) and (Smith K 2008) refer to two different papers written by two different authors with the same surname in 2008.
• **Paper with two co-authors**
  Use both surnames in the in-text reference and separate the surnames with an “and.” For example: (Smith and Jones 2007).

• **Paper with three or more co-authors**
  Refer only to the first author which is then followed by “et al.”. For example, the in-text citation (Smith et al. 2007) refers to a paper written by Smith with more than one co-author. Note that “et” is not an abbreviation, so it does not have a period after it. A period is required after “al.”.

As discussed in *The CSE Manual*, each choice has benefits and disadvantages. Citation-sequence and citation-name in-text references are brief in the running text which can make a document easier to read. There are also no additional rules to apply or interpret when adding in-text references. One disadvantage to these in-text references is that they lack bibliographic information within the text, which can hinder the reader who is familiar with the work of a particular author. Without using computer software to organize and maintain the reference list, in-text references and the reference list can be difficult to generate.

Name-year citations, on the other hand, provide rich detail about the in-text reference in the body of the document, and the reference list and in-text references are relatively straightforward to maintain without the use of computer software. Applying the multiple rules necessary to construct in-text references, however, can become cumbersome. Long lists of in-text references, particularly common in the introduction to a thesis or dissertation, are also awkward to read.

The decision of which in-text reference style to use should be considered carefully by the student and advisor. They should consider which method is most prevalent in the field of study and all of the disadvantages and advantages of each style.

### 3.9.2. Formatting of reference list

There are three ways to organize a reference list, based on the in-text references chosen. The types of in-text references were discussed in Section 3.9.1.

If the student has chosen…

1. **citation-sequence** in-text references, then the reference list is organized in order of appearance. The first in-text reference is “1,” the second is “2” and so on.
2. **citation-name** in-text references, then the reference list is alphabetized, and each reference in numbered in alphabetical order.

3. **name-year** in-text references, then the reference list is alphabetized.

For both citation-name and name-year reference lists, there are additional rules for alphabetizing the reference list. The most common rules are below:

- Alphabetize the reference list:

- By the surname of the first author. Papers authored by a single author precede those written by the same first author with additional co-authors.

- For multiple authors with the same surname, alphabetize by the initials of the first author to group the same authors together.

- For multiple papers by the same first author, use the title of the reference to alphabetize within the author grouping for the citation-name system. If using the name-year in-text reference style, order the references beginning with the earliest and ending with the most recent.

- Ignore all instances of “a,” “an,” and “the” that may be present at the beginning of a title or organization when alphabetizing either authors or titles. An organization could be the author of a publication, such as the American Society for Testing Materials, which authors a series of testing standards for materials.

- If an organization is the author of a publication, use the full-name rather than its acronym to alphabetize the item.

- If an acronym is used in the title of an article, use the acronym to alphabetize items.

The general format for a few common reference types is shown in Section 3.9.2.1 (for citation-sequence and citation-name in-text references) or Section 3.9.2.2 (for name-year in-text references). Students should consult *The CSE Manual* (see Section 8.1, page 53 for a full citation) for details on other types of references. The Graduate School maintains style files that can be used to format citations and reference lists at
http://www.gradschool.mtu.edu/td/endnote

Note that the Graduate School requires the full name of a journal, while *The CSE Manual* requires an approved abbreviated name.

### 3.9.2.1. Reference list formats for citation-sequence and citation-name in-text references

- **Journal Article**
  
  *Generic:*
  
  Author(s). Article Title. Journal title. Date;volume(issue):location.
  
  *Example:*
  

- **Book**
  
  *Generic:*
  
  Authors(s). Title. Edition. Place of publication: publisher; date. Extent (optional; total number of pages). Notes (optional).
  
  *Example:*
  

- **Book Chapter**
  
  *Generic:*
  
  
  *Example:*
  

- **Web page on the internet**
  
  *Generic (as many items as can be found should be included):*
  
  Title of Homepage [medium designator]. Edition. Place of publication: publisher. Title of specific page (not needed if page is the homepage for the domain); Date of publication [date updated; date cited]; [extent if necessary]. Notes.
  
  *Example:*
  
3.9.2.2. Reference list formats for name-year in-text references

- **Journal Article**
  
  *Generic:*
  
  
  *Example:*
  

- **Book**
  
  *Generic:*
  
  Authors(s). Date. Title. Edition. Place of publication: publisher. Extent (optional; total number of pages). Notes (optional).
  
  *Example:*
  

- **Book Chapter**
  
  *Generic:*
  
  
  *Example:*
  

- **Web page on the internet**
  
  *Generic (as many items as can be found should be included):*
  
  Title of Homepage [medium designator]. Date of publication. Edition. Place of publication: publisher. Title of specific page (not needed if page is the homepage for the domain); [date updated; date cited]; [extent if necessary]. Notes.
  
  *Example:*
  

3.10. Table formats

The use of one table format throughout the document is strongly encouraged. The style of text in a table will generally be the same style of text as in the body of the document. Bold text may be used to denote the headings in a table. A style of borders should be chosen that can be uniformly applied to create consistent tables. The tables in this
document, for example, are all formatted with the same borders and text styles. Tables should be centered on the page and be located at the top or bottom of a page of text.

Each table will have a caption that identifies the chapter and table number. The chapter and table number are separated by a period. Tables are numbered sequentially within a chapter using Arabic numbers (Table 1.1, Table 1.2, etc.). Table captions are centered above each table, with the table number on a single line and the caption on a new line centered below the table number. Captions should be brief, and should not comment on the significance of the data presented. Discussion is reserved for the body of the document. The caption will use sentence-style capitalization. This style capitalizes the first word of the sentence and proper names. All other words in the caption are in lower case letters.

3.11. Figures

The use of one format for similar types of figures throughout the document is strongly encouraged. Students should choose one font for items on graphs and use the same font and font size throughout the document for similar purposes. For example, a student might choose the Arial font and use a size of 10 pt for tick labels, 12 pt for legends, and 14 pt for axes titles. Note that the size of all elements does not need to be identical, but the size and font should be consistent throughout the entire document. The typefaces listed in Table 3.1 on page 9 are those allowed for figures. It is customary, but not required, to select a sans serif font such as Arial or Tahoma for figures.

Some students will utilize graphs that are created by a piece of equipment or software, such as a scanning electron microscope image or a finite element model result. In this case, it may not be possible to have the size and typeface conform to these guidelines and use the same font as the other figures. In all cases, however, the text must be readable. Pay close attention to the size and clarity of text when the image is exported.

All images must be clear, readable, and reproducible. Images that look good on a computer screen may not be of sufficient resolution to print well. Images must have a minimum resolution of 300 ppi and should be in focus. Line art must be produced with software that allows for high quality exports and does not create “halos” around the lines or jagged text. Screenshots have a maximum resolution of 72 dpi, and these are allowed when absolutely necessary.

Each figure will have a caption that identifies the chapter and figure number. The chapter and figure number are separated by a period. Figures are numbered sequentially within a chapter using Arabic numbers (Figure 1.1, Figure 1.2, etc.). Figure captions are located below each figure, with full justified text. The first sentence of a caption should be an
overview of the figure. Subsequent sentences will include, as necessary, detailed information about the figure. Captions should be descriptive enough that the figure and caption could be easily understood by someone in the field who has not read the body text. If a figure contains multiple parts, each part is generally identified with a letter within the figure. Within the caption, the letter is usually italicized, and then followed by a comma and description of the part of the figure. The caption should be in sentence case with the first word capitalized and all other words in lower case letters.

3.12. Including oversize pages or media

Oversize pages can be incorporated into the document in several ways. Pages of up to 11 × 17 in. can be included within the body of the document so that the pages fold out from the binding edge. To prepare the document for printing, students will:

- Prepare two electronic copies of the thesis or dissertation. One copy will contain the oversized page in the appropriate location. The second copy will have a blank 8.5 × 11 in. page. If there are multiple oversized pages in the document, the blank page will have text on it referring the bindery to the appropriate file.

- Each oversized page will be submitted as a separate pdf file. The bindery will print and bind these pages as directed.

Larger materials can be folded and placed in a pocket constructed by the bindery. Materials can be printed by the student or the bindery. If printed by the student, an appropriate number of copies need to be provided at the time of submission to the Graduate School. The bindery will use these to construct an appropriately-sized pocket. Media, such as CDs, can also be included in a pocket if a student wants to make electronic files available to the reader. An appropriate number of copies of the media will also be provided at the time of submission. There is an extra charge for inserting oversize materials or pockets. Students interested in these options may contact the Graduate School for current pricing.

3.13. Use of color

Color should be used only when necessary. For example, graphs should be formatted using different styles of lines and/or symbols instead of differently colored lines. Although unnecessary use of color will not cause the rejection of a submitted document, students should keep in mind that color pages are more expensive to produce in the bound copy of the thesis or dissertation. Even when a student is willing to accept the extra cost, students should remember that when a document is photocopied, not all colors reproduce equally well. The use of red and green in the same figure is discouraged.
because readers with color blindness will find it difficult to interpret the material presented. The use of color should also be consistent between graphs. A single color should represent the same type of data throughout the document. For example, if a student were plotting the strength and modulus of a material as a function of different variables in a set of multiple graphs, each graph should have the strength data represented with the same color.

Examples where color is necessary or desirable include:

- Maps
- Pictures of cells with a colored staining
- Finite element analysis with colored areas representing different stress levels
- Web pages
- Visual arguments
- Complex figures with multiple lines
- Response surface (3D graph)

### 3.14. Double sided printing

If students wish to print their documents double-sided, the format of the document will need to be altered as described below.

- **Margins:** The binding edge margin must be 1.5 in. as described in Section 3.2. For a double sided document, the binding edge will be on the left hand side for odd pages, and on the right hand side for even pages.

- **Page numbers:** If students choose to place numbers on the bottom center of the page as described in Section 3.4, no changes are necessary. If numbers are placed in the upper right corner of the page, page numbers must appear on the outer corner of each page. Therefore, page numbers will appear in the upper right corner for odd pages, and upper left corner for even pages.

- **Blank pages:** Place a blank page after the title page, signature page, and dedication page (if present). A blank page may be placed after major sections, such as the Table of Contents or at the end of a chapter to force the next major section to begin on an odd page. Blank pages do not have page numbers appear on them, but are included in the page count.
• Oversized pages: As described in Section 3.12, a blank page is used as a placeholder in the electronic file prepared for the bindery, and multiple electronic files are submitted to the Graduate School. For a double sided document, place two 8.5 × 11 in. pages as placeholders for each oversized page up to 11 × 17 in. that is to be bound in the thesis or dissertation. Oversized pages are not printed double sided.

• Table of contents: Begin page numbering with the table of contents. If a dedication page is present, this will be page vii, otherwise, it will be page v. Continuing numbering pages as described in Table 3.2.

• Landscape pages: Figures or tables presented in landscape format will be shown so that when the book is rotated clockwise 90°, the text is readable. Note that for even pages, the binding edge margin will be on the bottom of the page, while for odd pages, the binding edge margin will be at the top of the page.
4. Document submission

4.1. Electronic Document preparation

Theses and dissertations will be available electronically in the Library and via the ProQuest Theses and Dissertation @ Michigan Tech database. A paper copy of the document will also be archived in the Library. Electronic documents offer a rich variety of content and navigation options not available in traditional paper copies. Although a paper copy will still serve as an archival version in the Library to protect the student’s intellectual property, it is anticipated that online access to these documents will be more common. Therefore, care should be taken to prepare these documents so that they are easy to navigate and contain content whose file format will become obsolete in the future.

Theses and dissertations will be prepared as a single PDF file with all fonts embedded into the document. Compression, password protection, or digital signatures are not allowed. Supplemental files that do not lend themselves to inclusion in a written document such as music or video may also be included but must be linked to text within the PDF document. Supplemental files must match the format types acceptable by ProQuest/UMI in their publishing agreement. A list of these is found in Table 4.1.

Care should be taken to ensure that no signatures are placed in the electronic document. The signature page in the electronic document will not contain signatures. The original signature page provided with the final documentation will be photocopied by the bindery and placed in each paper copy. The original signature page will be bound in the Library’s archival copy. Students may provide more than one original signature page if they would like original signatures in any other paper copies.

The single PDF file must be bookmarked and hyperlinked to aid in navigation. At a minimum, the table of contents must contain hyperlinks to each section, and each item in the table of contents and the table of contents itself must be listed as a bookmark. It is optional, but recommended, to include a link to figures and tables from the table of contents and from the text within the document. When choosing software to prepare the thesis or dissertation and create the PDF file, students should be aware of the features and limitations of the software they choose. Bookmarks are easily added when the features of a word processing program are used to create headers for each section in a document and when the professional version of Adobe Acrobat is used to prepare the PDF file. See the Graduate School website for tutorials on how to include these features using Microsoft® Word and Adobe® Acrobat®. The University has a site license for Adobe® Acrobat® Pro, so any University owned computer can have the software installed at no cost to the student.
Table 4.1
List of acceptable multimedia file types that can be included as supplemental files with a thesis or dissertation submission.

<table>
<thead>
<tr>
<th>Type of multimedia</th>
<th>Acceptable file types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Images</td>
<td>GIF (.gif)</td>
</tr>
<tr>
<td></td>
<td>JPEG (.jpeg)</td>
</tr>
<tr>
<td></td>
<td>TIFF (.tif)</td>
</tr>
<tr>
<td>Video</td>
<td>Apple Quick Time (.mov)</td>
</tr>
<tr>
<td></td>
<td>Microsoft Audio Video Interleaved (.avi)</td>
</tr>
<tr>
<td></td>
<td>MPEG (.mpg)</td>
</tr>
<tr>
<td>Audio</td>
<td>AIF (.aif)</td>
</tr>
<tr>
<td></td>
<td>CD-DA</td>
</tr>
<tr>
<td></td>
<td>CD-ROM/XA</td>
</tr>
<tr>
<td></td>
<td>MIDI (.midi)</td>
</tr>
<tr>
<td></td>
<td>MPEG-2</td>
</tr>
<tr>
<td></td>
<td>SND (.snd)</td>
</tr>
<tr>
<td></td>
<td>WAV (.wav)</td>
</tr>
<tr>
<td></td>
<td>MP3 (.mp3)</td>
</tr>
</tbody>
</table>

To avoid possible cross-platform problems and difficulties in future archival processes, the file names of all files must follow the DO+3 naming convention: abcdefgh.xyz. Use English letters and Arabic numbers only; no extra punctuation or diacritical marks or spaces are allowed. For example, JJSthes.pdf, not John Smith Thesis.pdf; Fig04.jpg, not Figure 4.jpg.

When including supplemental files, it is recommended to name files so that a computer will sort them in some logical manner. For example, each file name can begin with a 1- or 2-digit number, depending on how many files you have, to ensure they will sort logically: 01Smith.pdf, 02Music.wav, 03Movie.mov, etc.

4.2. Embargos and restricted publication

The default for all theses and dissertations is for these documents to be immediately published and available. This option may not be suitable for students who wish to publish their document as a book after graduation or if the thesis or dissertation contains proprietary material. Some publishers consider a thesis or dissertation a prior publication
and will therefore not publish or republish material included in these documents. Most journals do not consider a thesis or dissertation a prior publication, but book publishers tend to be more restrictive on considering a thesis or dissertation a prior publication. For some book publishers, the download statistics for an open access thesis or dissertation can also prove that there is an audience for the book, and encourage them to contact the author with an invitation to publish. Most books represent substantial revisions from a thesis or dissertation to appeal to a different audience, and therefore, open access to a thesis or dissertation does not necessarily diminish the document’s worth to a publisher. Students are advised to check with any future publisher of their work prior to publication of their thesis or dissertation.

Students may place an embargo on their document to prevent it from being published for a certain period of time, restrict access of their electronic document to just the Michigan Tech community or both. Two weeks prior to the oral defense, all students must complete the Pre-defense form, which includes the Publishing Agreement. This form allows students to request an embargo or restriction and gives the Library permission to make limited photocopies of the work as necessary for interlibrary loan patrons or to replace a lost copy of the document. If the Publishing Agreement is first submitted after the oral defense, an embargo or restriction will not be allowed. Changes to the original Publishing Agreement, if necessary, must be requested by submitting a new Publishing Agreement. Embargos and restrictions must include a justification for the request and must be approved by the advisor or graduate program director. Graduate School staff will review requests for one year or less. The dean of the Graduate School will review requests for longer than one year. Approval is not automatic and requests for embargos longer than one year are rarely granted.

All embargo requests will incur a 10% surcharge on the binding costs. Binding of an embargoed document does not occur until the embargo has expired. Binding charges increase each year making the 10% surcharge necessary.

4.3. Submission of draft prior to defense

At least two weeks before the proposed defense date, students must submit a draft of their thesis or dissertation and the Pre-defense form to the Graduate School. If these two items are not in the Graduate School two weeks prior to the defense, the defense will be cancelled, and the student will need to begin the scheduling process again.

The Pre-defense form may be submitted well in advance of the defense to the Graduate School. For example, some students may need to schedule their defense a month in advance in order to accommodate the travel schedules of their committee but might not
have a complete draft of the thesis or dissertation ready at that point. Alternatively, the student may wish to submit their draft earlier, to facilitate review.

The intent of this policy is to ensure that a draft of the thesis or dissertation will be delivered to the committee members and Graduate School with sufficient time for review of the document prior to the defense. The draft submitted to the Graduate School does not need to be the final copy of the thesis or dissertation provided to the committee. The Graduate School recommends scheduling the oral defense two weeks after the draft has been submitted to the Graduate School and submitting a final thesis or dissertation within a month after the oral defense. If students anticipate needing longer than a month after the oral defense to complete corrections to the thesis or dissertation, the Graduate School recommends delaying the defense. It is in the student’s best interests to defend a document that is the best representation of the scholarship.

4.3.1. How to submit
A Blackboard course has been established for all master’s and doctoral students. Active students will automatically be enrolled each semester; if students become inactive, please contact the Graduate School for assistance in gaining access to the course. Doctoral students who are submitting a thesis for a master’s degree should also contact the Graduate School to gain access to the master’s level course. Students can find Blackboard at:

https://courses.mtu.edu

Blackboard provides a secure area where materials can be uploaded and reviewed by appropriate staff in the Graduate School and Library. Advisors do not have access to Blackboard. Students will select the appropriate assignment to upload their document. Follow the instructions available online to upload the document and any supplemental files.

4.3.2. Review of submission
Each thesis or dissertation will be reviewed using a standardized form (TD-Review) to ensure that each review is uniform and complete. Documents will be reviewed to ensure that they meet the University’s formatting requirements. Required changes will be noted, and these must be addressed in the final version or the document will not be accepted for publication and the degree will not be awarded. Suggestions regarding the layout of the document, appearance of the figures or use of proper language may also be included. Suggestions to improve the document that are not required should be discussed by the student with their advisor to determine if they are necessary. Comments will be returned to the student via Blackboard and the advisor will be e-mailed when the review is
available. Advisors may access the review using the University’s document imaging software, ImageNow.

Theses and dissertations are reviewed in the order they are received by the Graduate School. Every effort is made to review documents in a timely manner; however, students should keep in mind that the end of the semester is a busy time for reviewers, and reviews may take longer than during the middle of a semester.

4.4. Final document submission

4.4.1. Timeline

To complete a graduate degree, students must submit tracking forms (such as the M6, D8, etc.) to report on the results of the examination and their plans for after graduation. They must also submit a final copy of their thesis or dissertation, and the form “TD-Bindery” to order paper copies and pay publication fees. These procedures only outline how to submit the thesis or dissertation and TD-Bindery. Students should refer to the Graduate School web page for current information on the other forms required and the date they should be received in the Graduate School.

To finish in a given semester (for instance, fall), all final paperwork is due in the Graduate School no later than 4:00 p.m. on the Friday before the next semester begins. The thesis or dissertation must be accepted in its final form no later than this deadline if the student is to avoid registering for the next semester. Since a draft of the final thesis or dissertation must be reviewed to ensure that all required changes have been made, a final copy of the thesis or dissertation must be received by the Graduate School at least one week before the final deadline. If this date falls on a holiday, the thesis or dissertation will be due by 4 p.m. on the next business day. Regardless of when the thesis or dissertation is submitted, students should allot enough time to submit their final draft, receive the review of it and make any final changes before the deadline to finish in a given semester. Please allow up to one week for document review and processing. See Table 4.2 for deadlines for upcoming semesters.

Theses and dissertations are reviewed in the order they are received by the Graduate School. Every effort is made to review documents in a timely manner; however, students should keep in mind that the end of the semester is a busy time for reviewers, and reviews may take longer than in the middle of a semester.
Table 4.2

Table 4.2

Deadlines for receipt of final forms and thesis or dissertation. Materials must be submitted no later than 4:00 p.m. on the day indicated.

<table>
<thead>
<tr>
<th>To finish...</th>
<th>Submit final thesis or dissertation no later than...</th>
<th>Submit final forms no later than...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2009</td>
<td>January 4, 2010</td>
<td>January 8, 2010</td>
</tr>
<tr>
<td>Spring 2010</td>
<td>April 30, 2010</td>
<td>May 7, 2010</td>
</tr>
<tr>
<td>Summer 2010</td>
<td>August 20, 2010</td>
<td>August 27, 2010</td>
</tr>
<tr>
<td>Spring 2011</td>
<td>April 29, 2011</td>
<td>May 6, 2011</td>
</tr>
<tr>
<td>Summer 2011</td>
<td>August 19, 2011</td>
<td>August 26, 2011</td>
</tr>
</tbody>
</table>

4.4.2. How to submit

To complete the submission process, students will:

1. Complete TD-Bindery. This form orders the necessary paper copies of the thesis or dissertation and contains the invoice for payment of the publication fees. Students will check with their graduate program assistant, advisor and committee to ensure that the appropriate number of paper copies are ordered.

2. Submit the following at the same time to the Graduate School using the instructions available online:

   a. TD-Bindery (to Blackboard - http://courses.mtu.edu). If the final copy of the thesis or dissertation is accepted for publication by the Graduate School, the thesis editor will check and return an electronically signed copy of TD-Bindery.

   b. A final thesis or dissertation (to Blackboard - http://courses.mtu.edu). If the final copy of the thesis or dissertation is not accepted for publication by the Graduate School, the student must re-submit their document with the required changes along with an updated TD-Bindery form if required. The document must be accepted in its final form no later than the final form deadline to graduate in the desired semester.

   c. An identical final thesis or dissertation to ProQuest/UMI (http://dissertations.umi.com/michigantech/) Traditional Publishing is the minimum requirement. Open Access publishing, registration of the copyright, and printed copies from ProQuest/UMI are options that students may select if
desired. Students will pay for printed copies from ProQuest/UMI using their online payment system. Fees for Traditional Publishing, Open Access Publishing, or copyright registration are paid through TD-Bindery.

3. Obtain any signatures required from the graduate program on the Graduate School approved TD-Bindery. Signatures are required from the graduate program assistant or advisor and from each account holder if the student is using University accounts to pay for any portion of the publishing costs.

4. Obtain original signatures for the signature page of the thesis or dissertation. The signatures of the student’s advisor, co-advisor (if applicable) and chair of the program’s department are required. If the program resides in a school, the signature of the dean of the school is required instead of a department chair. Interdisciplinary programs that do not reside in an academic department or school, such as atmospheric sciences, require the signature from the chair or dean of the administrative home department or school. Signatures of the committee members are optional.

5. Pay the fees indicated on TD-Bindery at the Cashier’s office and obtain a receipt. Take the signed invoice, receipt for payment, printed copy of the title page, and the original, signed signature page to the Graduate School.

Students who are no longer in the Houghton area should complete step 1 above. On Blackboard, the student should indicate that he or she is off campus in the comments section of the final submission. The Graduate School will coordinate obtaining the necessary signatures for TD-Bindery (step 3 above) and provide instructions on how to pay the fees (step 5 above). The student must coordinate having a signature page (step 4 above) delivered to the Graduate School.

Once all publication fees have been paid and it has been verified that the student has completed all other requirements for graduation, the electronic copies of the document will be released to the Library. Documents are submitted to ProQuest/UMI after degrees are granted for the semester.
5. **Academic integrity and responsible conduct for research**

All work done by students, faculty and staff is expected to be completed with the highest level of integrity and to follow the code of conduct for the University and each individual’s field. Michigan Tech addresses academic integrity and misconduct in research, scholarly, and creative endeavors (hereafter, “misconduct”) in separate policies and procedures. The integrity of academic assignments is addressed by the Academic Integrity Policy (Senate Proposal 8-06, [http://www.sas.it.mtu.edu/usenate/propose/06/8-06.htm](http://www.sas.it.mtu.edu/usenate/propose/06/8-06.htm)), while the integrity of research is addressed by the Misconduct in Research, Scholarly, and Creative Endeavors Policy (Senate Proposal 4-08, [http://www.sas.it.mtu.edu/usenate/propose/08/04-08.htm](http://www.sas.it.mtu.edu/usenate/propose/08/04-08.htm)). A thesis or dissertation is considered research, and allegations of misconduct are handled according to the misconduct procedures.

5.1. **Definitions**

All student work will be completed with the highest level of integrity and follow the code of conduct for the University and the student’s field. Misconduct includes, but is not limited to, fabrication, falsification, or plagiarism. The misconduct procedure found at: [http://www.admin.mtu.edu/research/vpr/documents/Misconduct_Procedures.pdf](http://www.admin.mtu.edu/research/vpr/documents/Misconduct_Procedures.pdf) provides definitions of these terms as well as what misconduct does not include. These are copied below for easier reference:

1. **Fabrication** is making up data or results and recording or reporting them.

2. **Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

3. **Plagiarism** is the appropriation of another person’s ideas, processes, results, or words as if they were one’s own without giving appropriate credit to the originator as is commonly practiced in the community of one’s discipline. Plagiarism also includes self-plagiarism, for example publishing the same work in multiple refereed scholarly journals without receiving permission to do so.

4. Misconduct does not include honest error or differences in opinion. For example, if former collaborators on a research project or proposal make independent use of
jointly-developed concepts, ideas, methods, descriptive language or the product of the joint work, or if one of the collaborators subsequently fails to credit the other(s), this is an example of an authorship or credit dispute.

Although not an exhaustive list of what constitutes misconduct, this can serve as an initial guide for the student.

5.2. Responsibilities
Students, faculty and the Graduate School have distinct responsibilities in ensuring that the thesis or dissertation submitted has been completed following the appropriate codes of conduct. This section details these responsibilities.

5.2.1. Students
Students must:

- Understand what constitutes misconduct. This includes reading the academic integrity and misconduct policies and any codes of conduct for their fields. Not understanding what constitutes misconduct does not excuse any student from infringements of the policies.

- Prepare their documents with adequate time for faculty to provide useful comments and assist them with their writing.

- Seek assistance from University staff such as an advisor, a Graduate School staff member, or a Writing Center coach if what constitutes misconduct is unclear.

- Review their work for possible plagiarism. This can be done manually by carefully examining the sources cited and the student’s work or by using the turnitin.com software available on the Graduate School Blackboard course. Students may submit their own documents to turnitin.com, and view their own originality reports, at any time on the Blackboard course. See the online instructions for how to use this service and how to interpret the results. Graduate School staff are also available to assist.
5.2.2. Faculty

Faculty must:

• Ensure that students have access to appropriate codes of conduct for their field and assist them in identifying these resources.

• Encourage students to seek out professional development opportunities that will aid them in their careers as researchers. These opportunities may include seminars or on-campus workshops.

• Read drafts of student work and provide useful comments that will assist students with their writing. Students who need additional help with writing should be directed to the Writing Center for weekly appointments with writing coaches or to an editor.

• Sign the signature page of the thesis or dissertation to approve the final document. This signature is the faculty assurance that the document has been prepared in a manner consistent with Michigan Tech policies and codes of conduct for their field. It is also their assurance that, to the best of their knowledge, the work included in the thesis or dissertation was carried out by the student.

5.2.3. Graduate School

The Graduate School is responsible for awarding graduate degrees and ensuring that these degrees are completed with integrity. The Publishing Agreement (contained within the Pre-defense form) includes an originality statement that will be signed by the student and advisor. Students will certify that they have submitted an original document that has been verified by them using any procedures they choose. Students may also request that the Graduate School submit their document to a plagiarism detection service, such as turnitin.com. Regardless of the choice, the Graduate School strongly recommends the use of plagiarism detection software to quickly and accurately search for common instances of plagiarism. Students may submit their own documents, and view their own originality reports, at any time on the Blackboard course. Log into http://courses.mtu.edu, navigate to the Graduate School course and access turnitin.com from the “Writing Tools” page.

If students choose to ask the Graduate School to submit their document to a plagiarism detection service, several important facts must be kept in mind.
Plagiarism detection software is a tool to determine if text in the thesis or dissertation matches sources from internet and archived materials, such as books or journal articles. It does not assign blame or make students plagiarists. **At the draft stage, there are no penalties if a submitted document contains plagiarized material.** A draft is any thesis or dissertation submitted to the Graduate School before the oral defense. Graduate School staff will work with the student to identify appropriate resources to assist the student in revising their document.

- Students will be able to view their originality reports on Blackboard. Graduate School staff are available to assist in the interpretation of these results.

- Documents will be submitted in such a way that they will not be stored on the turnitin.com server in order to protect the intellectual property of the student.

- Documents will have the preliminary pages (title page, signature page, dedication page, preface, etc.) and reference list removed from the document prior to submission. This minimizes false matches and reduces the amount of identifying information present in the document. If students have additional material that identifies them in the document that they wish to have removed, please notify the Graduate School at the time of the request for review.

- Students may re-submit their own intermediate drafts to plagiarism detection software at any time via the Blackboard course. Students are encouraged to ask their advisor, the Graduate School, or the Writing Center for assistance in interpreting the originality reports.

- A final version will be submitted to the same plagiarism detection software by the Graduate School to ensure that all changes were made.

If plagiarism is found in a final document submitted in partial fulfillment of degree requirements, this will be considered misconduct, and the actions described below will be taken.

### 5.3. Misconduct procedures

When misconduct is suspected in a final thesis or dissertation submitted in partial fulfillment of degree requirements, it will be forwarded to the director of research integrity and compliance in accordance with University misconduct procedures. These procedures are found at:
An inquiry committee will determine if there is sufficient evidence of misconduct to warrant an investigation. Allegations that are considered research misconduct are sent to an investigation committee who determines, based on a preponderance of the evidence, if misconduct occurred and, if so, what type, to what extent, who was responsible, and its seriousness. A draft of the investigation report is sent to the student and the student is given the opportunity to respond. The student response becomes a part of the investigation report. The investigation report, findings, and the recommended actions regarding the student are submitted to the dean of the Graduate School for the dean’s recommendation before submitting to the deciding official. Possible sanctions include, but are not limited to, expulsion or withdrawal of a previously awarded degree. If federal funds are involved, additional sanctions determined by the deciding official may be applied. Appeals may be made to the provost and vice president for academic affairs in accordance with section XI of the misconduct procedures.

If it is determined that the allegations have merit, but are considered an academic integrity violation rather than misconduct, the procedures in support of Michigan Tech’s academic integrity policy will be followed:

http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html

An academic integrity hearing may result in sanctions which can be appealed to the dean of the Graduate School.
6. **Degree programs and degree types**

The title page and signature page both require the listing of the degree type (Master of Science, Doctor of Philosophy, etc.) and the degree program. The signature page also lists the administrative home department or school for each student. It is important to identify these correctly on the title and signature page because this information is used to properly catalog the document in the Library. Some programs are housed within departments, such as the PhD in Electrical Engineering. This degree program (Electrical Engineering) is housed within a department (Electrical and Computer Engineering). Note that the program and department do not necessarily share the same name.

Students pursuing degree programs overseen by a school will list the school and obtain the signature of the school’s dean.

Some degree programs, such as atmospheric sciences, are non-departmental, and are overseen by the Graduate School. Students in these programs will list the department or school assigned as their administrative home. This department or school is generally assigned based on the primary appointment of the advisor.

A current listing of degree types, degree programs, and units responsible for program oversight is shown in Table 6.1 for master’s programs, and Table 6.2 for doctoral programs.

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Administrative Home Department or School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Cognitive Science and Human Factors</td>
<td>Department of Cognitive and Learning Sciences</td>
</tr>
<tr>
<td>Applied Ecology</td>
<td>School of Forest Resources and Environmental Science</td>
</tr>
<tr>
<td>Applied Natural Resource Economics</td>
<td>School of Business and Economics</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>Department of Biological Sciences</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>Department of Chemical Engineering</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Department of Chemistry</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>Department of Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Department of Computer Science</td>
</tr>
</tbody>
</table>
Table 6.1 (continued)

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Administrative Home Department or School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Engineering</td>
<td>Department of Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>Department of Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Engineering Mechanics</td>
<td>Department of Mechanical Engineering-Engineering Mechanics</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>Department of Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Environmental Engineering Science</td>
<td>Department of Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Environmental Policy</td>
<td>Department of Social Sciences</td>
</tr>
<tr>
<td>Forest Ecology and Management</td>
<td>School of Forest Resources and Environmental Science</td>
</tr>
<tr>
<td>Forest Molecular Genetics and Biotechnology</td>
<td>School of Forest Resources and Environmental Science</td>
</tr>
<tr>
<td>Forestry</td>
<td>School of Forest Resources and Environmental Science</td>
</tr>
<tr>
<td>Geological Engineering</td>
<td>Department of Geological and Mining Engineering and Sciences</td>
</tr>
<tr>
<td>Geology</td>
<td>Department of Geological and Mining Engineering and Sciences</td>
</tr>
<tr>
<td>Geophysics</td>
<td>Department of Geological and Mining Engineering and Sciences</td>
</tr>
<tr>
<td>Industrial Archaeology</td>
<td>Department of Social Sciences</td>
</tr>
<tr>
<td>Materials Science and Engineering</td>
<td>Department of Materials Science and Engineering</td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td>Department of Mathematical Sciences</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Department of Mechanical Engineering-Engineering Mechanics</td>
</tr>
<tr>
<td>Mining Engineering</td>
<td>Department of Geological and Mining Engineering and Sciences</td>
</tr>
<tr>
<td>Physics</td>
<td>Department of Physics</td>
</tr>
<tr>
<td>Rhetoric and Technical Communications</td>
<td>Department of Humanities</td>
</tr>
</tbody>
</table>
Table 6.2

Listing of doctoral programs. The degree program name is placed on the title and signature page. The administrative home department or school is placed on the signature page. Note that students in non-departmental programs will be assigned an administrative home which is typically the department or school where the advisor has an academic appointment. For all programs listed in this table, the degree type is “Doctor of Philosophy” and the document type is a dissertation.

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Administrative Home Department or School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Cognitive Science and Human Factors</td>
<td>Department of Cognitive and Learning Sciences</td>
</tr>
<tr>
<td>Atmospheric Sciences</td>
<td>Varies for each student</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>Department of Biological Sciences</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>Department of Biomedical Engineering</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>Department of Chemical Engineering</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Department of Chemistry</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>Department of Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Computational Science and Engineering</td>
<td>Varies for each student</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Department of Computer Science</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>Department of Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>Department of Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>Department of Physics</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>Varies for each student</td>
</tr>
<tr>
<td>Forest Molecular Genetics and Biotechnology</td>
<td>School of Forest Resources and Environmental Science</td>
</tr>
<tr>
<td>Forest Science</td>
<td>School of Forest Resources and Environmental Science</td>
</tr>
<tr>
<td>Geological Engineering</td>
<td>Department of Geological and Mining Engineering and Sciences</td>
</tr>
<tr>
<td>Geology</td>
<td>Department of Geological and Mining Engineering and Sciences</td>
</tr>
<tr>
<td>Industrial Heritage and Archaeology</td>
<td>Department of Social Sciences</td>
</tr>
</tbody>
</table>
Table 6.2 (*continued*)

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Administrative Home Department or School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials Science and Engineering</td>
<td>Department of Materials Science and Engineering</td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td>Department of Mathematical Sciences</td>
</tr>
<tr>
<td>Mining Engineering</td>
<td>Department of Geological and Mining Engineering and Sciences</td>
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<td>Physics</td>
<td>Department of Physics</td>
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<tr>
<td>Rhetoric and Technical Communications</td>
<td>Department of Humanities</td>
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</tbody>
</table>
7. Sample pages

The pages that follow show sample layouts for title and signature pages. The description of a title page can be found in Section 3.6.1, page 11 and the description of a signature page can be found in Section 3.6.2, page 12. Note that the degree program, degree type and administrative home department or school can be found in Table 6.1 (page 44) for master’s programs and Table 6.2 (page 46) for doctoral programs.
TITLE OF THESIS

By
Mary A. Doe

A THESIS
Submitted in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE
(Insert your degree program from Table 6.1)

MICHIGAN TECHNOLOGICAL UNIVERSITY
2009

© 2009 Mary A. Doe
TITLE OF DISSERTATION

By
Mary A. Doe

A DISSERTATION
Submitted in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

(Insert your degree program from Table 6.2)

MICHIGAN TECHNOLOGICAL UNIVERSITY

2009

© 2009 Mary A. Doe
This thesis, “Title of Thesis,” is hereby approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE IN DEGREE PROGRAM. (Replace DEGREE PROGRAM with your degree program from Table 6.1)

Enter administrative home department or school from Table 6.1

Signatures:

Thesis Advisor
____________________________________
Type name of advisor

Thesis Co-Advisor
____________________________________
Type name of co-advisor
(if applicable, required)

Committee Member
____________________________________
Type name of committee member
(include all or none)

Department Chair
____________________________________
Type name of department chair or dean
(Replace with Dean for Schools)

Date
____________________________________
Sample Signature Page for Doctoral Program

This dissertation, “Title of Dissertation,” is hereby approved in partial fulfillment of the requirements for the Degree of DOCTOR OF PHILOSOPHY IN DEGREE PROGRAM. (Replace DEGREE PROGRAM with your degree program from Table 6.2)

Enter administrative home department or school from Table 6.2

Signatures:

Dissertation Advisor _________________________________________
Type name of advisor

Dissertation Co-Advisor _________________________________________
(If applicable, required) Type name of co-advisor

Committee Member _________________________________________
(Include all or none) Type name of committee member

Department Chair _________________________________________
(Replace with Dean for Schools) Type name of department chair or dean

Date _________________________________________
8. **Suggested resources for students**

The following books may assist students in preparing their documents. When the most current edition is available in the Library, a call number is provided.

### 8.1. Style guides


### 8.2. Writing guides

Previous editions of some of these books are available in the Library. The call number listed is the most recent edition of the book in the Library.


Proposal for a Graduate Student Parental Accommodation Policy

**Purpose:** This proposal describes a policy for accommodating graduate students who have new child care or related responsibilities due to a recent or upcoming birth or placement of a child under four (4) years of age in the home for the purposes of adoption. The proposal includes a mechanism to provide financial assistance to a Department Chair, Graduate Program Director, Center Director, or principal investigator who must hire a temporary replacement for a student being accommodated.

**Eligibility:** This policy applies only to graduate students enrolled fulltime at Michigan Technological University and who are in good academic standing. To be eligible, a student must have completed at least one full-time semester at Michigan Tech. The student being accommodated must be the primary giver for a child or children.

**Note for International Students:** International graduate students who are attending Michigan Tech full-time with a student visa or exchange visitor visa are encouraged to consult with the International Programs and Services office about their plans during the accommodation period to ensure compliance with immigration regulations.

**Part 1: Maternal/Paternal/Adoption Accommodation**

Students must apply for accommodation at least one (1) month in advance of the proposed accommodation period using the Graduate School’s *Graduate Student Parental Accommodation Request* form. This form must be signed by the student’s advisor, Graduate Program Director, Academic Home Department Chair, Center Director (if applicable), and the Principal Investigator of the research project that would normally be providing the student’s funding during the intended accommodation period.

Exceptions for the one-month advance notice requirement will be allowed only in cases involving a medical emergency. Documentation of a medical emergency must be provided in the form of a letter from a health-care provider to the Dean of the Graduate School.

A student who intends to apply for accommodation must consult in advance with their advisor, Graduate Program Director, Academic Home Department Chair, Center Director (if applicable), and the Principal Investigator of the research project that would normally be providing the student’s funding during the intended accommodation period.

The period of accommodation will extend up to six (6) weeks. Students’ accommodation period may begin prior to either a birth or placement of child of under four (4) years in age in the home for purposes of adoption. In the event of multiple births or placements for adoption the period remains at six (6) weeks total. During this six-week period the graduate student will
continue to be enrolled as a full-time student and continue to pay tuition. If both parents are enrolled as graduate students only one is eligible for accommodation. Graduate students are expected to return full-time to their graduate responsibilities after the six-week period.

**Part II: Extension of Time to Degree Limit and other Deadlines**

An accommodated student will be given an automatic one-semester extension in her/his time-to-degree limit, deadline for completion of a qualifying exam, and deadline for completion of a proposal defense.

Other deadlines and academic expectations may also be modified as part of the accommodation. Modifications of deadlines should be documented in writing on the student’s *Graduate Student Parental Accommodation Request* form.

In the event of multiple births or placements for adoption students are eligible for a maximum of a one (1) calendar year extension of deadlines.

**Part III: Funding during Parental Accommodation Period and Graduate Student Parental Accommodation Fund**

**a) Graduate Teaching or Research Assistants**

The Graduate School will establish a Graduate Student Parental Accommodation Fund. The purpose of this fund will be to provide funding that can be used to hire a temporary for a graduate student who is being accommodated. Department Chairs, Graduate Program Directors, Center Directors, and Principal Investigators can apply for funding from the Graduate School using the *Graduate Student Parental Accommodation Funding Request* form.

Funding for a student normally supported by a sponsored project will only be available when the external funding agency disallows payment to graduate students who reduce their time commitment or are absent under the circumstances covered by Michigan Tech’s Graduate Student Parental Accommodation Policy.

Funding for a student normally supported as a graduate teaching assistant, using funds provided by the Graduate School will only be available when a department or program has no option to cover teaching needs other than to hire an additional part-time graduate student who will serve as a temporary teaching assistant.

Temporary replacements will be paid an hourly wage equivalent to the hourly wage earned by internally-funded graduate teaching assistants.

Tuition costs will not be reimbursed since the accommodation period is limited to 6 weeks.

**b) Graduate Fellowships**
Graduate students supported by Michigan Tech fellowships will not experience any change in funding during the Parental Accommodation period. Those students supported by an externally funded fellowship must adhere to rules of that granting agency with regard to absences from research and academic work.

c) Graduate Instructors or Staff Assistants
Graduate Student Instructors or Assistants are subject to the terms of employment covered by their contract with Michigan Tech and should contact the Human Resources office for more information.

d) Graduate Students without Financial Support
Unsupported graduate students are eligible for Parental Accommodation for a six (6) week time period and are eligible to have deadlines extended. Department Chairs, Graduate Program Directors, Center Directors, and Principal Investigators are not eligible to receive funding from the Graduate School during the accommodation period.

Forms needed¹:
For students:
1) Graduate Student Parental Accommodation Request – Results in an automatic one-semester extension of the time-to-degree limit and documents other extensions (for exams, coursework, assignments, or research, etc.) in writing.

For Department Chairs, Graduate Program Directors, Center Directors, and Principal Investigators:
2) Graduate Student Parental Accommodation Funding Request – Form to request funding from the Graduate School for a temporary replacement hire.

¹ (see UM forms for ideas linked at the bottom of http://rackham.helpserve.com/index.php?_m=knowledgebase&_a=viewarticle&kbarticleid=47)
The University Senate of Michigan Technological University

“Proposed Revisions to the Graduate Certificates Policy”

This proposal is submitted by the Graduate School. The Graduate Certificates Policy is a Senate policy so amendments must be approved by the Senate.

Basis for the Proposal: In the last two years several new certificate programs have been established and others are in the proposal stage. This proposed change to the minimum number of credits is designed to give maximum flexibility to departments/schools wishing to offer certificates while maintaining a university standard. Several other institutions offer certificates at 12 semester credits including: Clarkson University, Georgia Institute of Technology, Lehigh University, Louisiana Tech University, Missouri Technological University (STEM disciplines), New Jersey Institute of Technology (STEM discipline), New Mexico State University, Rensselaer Polytechnic Institute (STEM disciplines), Texas Tech University (STEM disciplines), University of Alaska Fairbanks, and University of Minnesota.

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<td>(Current Policy – Deletions in Blue)</td>
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requirements established by academic or research units at Michigan Technological University. Graduate Certificates will be noted on official transcripts, and a written certificate will be given to the student upon completion of the requirements. The Graduate School will administer the Certificate Programs and develop procedures regarding faculty oversight, program re-evaluation, scholarship support, and other fiscal and management issues.

Graduate Certificates require a minimum of 12 credit hours. Of these 12 credits, no more than 3 credit hours may normally be 3000 or 4000 level courses, however interdisciplinary and multidisciplinary certificates may have a maximum of 6 credit hours at the 3000 or 4000 level. All other credits must be at the 5000 or higher level, and may include no more than 3 credit hours of research. A minimum grade of B is required in all course work. Graduate Faculty must teach all courses required for a Graduate Certificate, except for the 3 credit hours of allowed 3000 or 4000 level courses. Because Certificates are not degree programs, double counting is allowed in all cases.

Applicants to a Graduate Certificate program must have a Bachelors degree or equivalent. Individual Graduate Certificate programs may have additional admission requirements. The time limit during which a student is expected to complete all of the requirements of a Graduate Certificate may vary, but is not to exceed four years.

**Faculty Endorsement and University Approval of a New Graduate Certificate**

Graduate Certificates may be proposed by individual faculty, groups of faculty, departments, or groups of departments in requirements established by academic or research units at Michigan Technological University. Graduate Certificates will be noted on official transcripts, and a written certificate will be given to the student upon completion of the requirements. The Graduate School will administer the Certificate Programs and develop procedures regarding faculty oversight, program re-evaluation, scholarship support, and other fiscal and management issues.

Graduate Certificates require a minimum of 15 credit hours. Of these 15 credits, no more than 3 credit hours may normally be 3000 or 4000 level courses, however interdisciplinary and multidisciplinary certificates may have a maximum of 6 credit hours at the 3000 or 4000 level. All other credits must be at the 5000 or higher level, and may include no more than 3 credit hours of research. A minimum grade of B is required in all course work. Graduate Faculty must teach all courses required for a Graduate Certificate, except for the 3 credit hours of allowed 3000 or 4000 level courses. Because Certificates are not degree programs, double counting is allowed in all cases.

Applicants to a Graduate Certificate program must have a Bachelors degree or equivalent. Individual Graduate Certificate programs may have additional admission requirements. The time limit during which a student is expected to complete all of the requirements of a Graduate Certificate may vary, but is not to exceed four years.

**Faculty Endorsement and University Approval of a New Graduate Certificate**

Graduate Certificates may be proposed by individual faculty, groups of faculty, departments, or groups of departments in
any academic or research unit at Michigan Tech. Graduate Certificates may be proposed in disciplines without a pre-existing graduate degree program. A proposed Graduate Certificate curriculum may contain fieldwork, distance learning, and laboratory courses in addition to traditional classroom offerings. Additional admission requirements for a Graduate Certificate program beyond that stated above must be listed in the proposal. Proposals for Graduate Certificate programs will follow the usual procedures for university programs, and be submitted to the Senate by the Provost.

Adopted by Senate: 25 February 2004
Approved by President: 3 March 2004
GRADUATE SCHOOL | Graduate Faculty Council—Draft Agenda

October 6, 2009

1. Review minutes of 9/15/2009
2. Old Business
   a. Procedures to prepare and submit a thesis or dissertation to Michigan Technological University’s Graduate School (Thesis & Dissertation Committee)
   b. Proposal to instate a Graduate Dean's List (J. Dong)
   c. Graduate Student Parental Accommodation Policy (N. Auer)
   d. Graduate Program Review (Dean Huntoon)
   e. Dismissal/Appeal/Grievance Policy (Dean Huntoon)
3. New Business
   a. Forms update (D. Charlesworth)
   c. Proposal for International Profile (B. Orr, W. Rose)