

Graduate Student Information Package

Engineering and Technology Education

Utah State University



2007 - 2008

Department of Engineering and Technology Education

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Welcome

This information package is provided to help you apply for, gain admission to, and complete the Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) degree programs in the Department of Engineering and Technology Education (ETE) at Utah State University (USU). We welcome your participation in the graduate degree program and sincerely hope you will be rewarded for your efforts. You are encouraged to visit our web site at www.ete.usu.edu.

You are encouraged to check out Utah State University's Web site at: www.usu.edu. This web site provides valuable information about Utah State University. You are also encouraged to visit the School of Graduate Studies www.usu.edu/graduateschool where you can find out more about admission requirements and retrieve downloadable forms.

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Introduction

The Doctor of Philosophy degree is a multidisciplinary program designed for students wishing to become faculty in engineering and technology education. This research-based program prepares students to perform research in engineering education or technology education. Typical applicants have degrees in engineering or in technology education, though this is not required. The degree is offered through the College of Education's Interdepartmental Degree Program. The coursework has two components, a core component (offered by the College of Education) and specialization component (primarily offered through the College of Engineering).

The Master of Science degree program is primarily designed for teachers in the areas of engineering and technology education, and career and technical education. Its purpose is to increase a teacher's background regarding current educational theory and practice in engineering and technology education, and career and technical education. In this program, students are required to complete a professional core of courses related to engineering and technology education, and career and technical education. Students also are required to complete "selected electives" that help them achieve their educational goals.

Also, current USU undergraduates may take Master Degree courses provided that they have received prior permission. A student who has received permission to take graduate courses must file a **Split Form** (www.usu.edu/graduateschool/apply/forms.cfm) in order to register for graduate courses. The student must be within 30 semester credits of completing bachelor's requirements, have filed an Application for Graduation in the Graduation Office, have a 3.0 or higher GPA, and have applied for admission to the School of Graduate Studies.

Admission Information

You are encouraged to obtain the current *Utah State University General Catalog* (available from the USU Bookstore) or online at: www.usu.edu/ats/generalcatalog. This catalog can assist you in your pursuit of a graduate degree. Required admission application forms are available at: www.usu.edu/graduateschool/prospective. A completed application includes: an Application for Admission Form, a \$55 fee, and three letters of recommendation. Also, required with the application materials are all of your official transcripts. Other School of Graduate Studies admission criteria include:

Graduate Application Review

1. Graduate students entering the program are evaluated on the following competencies:
 - Applicant grades and course work.
 - Graduate Record Examination/Millers Analogy test score
 - Appropriate description of career objectives (matches the Department)
 - If the students do not meet one or more of these requirements, they may be granted provisional admission into the program if, in the collective opinion of the department graduate faculty, the students show potential to achieve these requirements in a reasonable amount of time.
2. Applications will not be reviewed by the Graduate Admissions Committee until they are complete.

Applications and Funding

The Engineering and Technology Education Department admits and funds selected students on a rolling basis. However, many funding decisions are made based on entrance in the fall semester. The fall semester has the following deadlines:

- February 1—Application deadline for admission guaranteed consideration for funding
- Around February 15—Recommendations made by committee on funding; also, funding decisions made for students moving from provisional to full admission
- March 1—Notification of students receiving initial round of funding
- June 15—Final application deadline
- Around June 15—Final funding decisions made
- July 1—Applicants notified of final funding decisions

Candidate Evaluation Procedures for Master's and Doctoral Students

Upon receipt of a full set of application materials, the application is evaluated by the Department's Graduate Admissions Committee. Based on the admission criteria described above, the committee will vote to recommend that an applicant be:

- Accepted
- Accepted with Course Requirements
- Accepted Provisionally
- Rejected

Accepted with Course Requirements – This category of admissions is for students who meet the entrance requirements but may not have the background for success in engineering and technology education (e.g. engineers without a teaching background or teachers without an engineering/technology background). It is recognized that ETE is an interdisciplinary field. The courses may include any of the following semester course equivalents that the student does not have:

- 2 Courses in engineering or technology
- 2 Courses in education or teaching theory
- Mathematics equivalent to one course beyond college algebra or calculus I

Students admitted under this category are eligible for assistantships/fellowships.

Accepted provisionally – This category is for exceptional students who do not meet one or more of our entrance requirements. Students in this category are subject to one or more of the following requirements:

- Minimum GPA requirements for a specified period
- Retake the GRE
- Remedial undergraduate coursework not counting towards the student's degree
- Required graduate coursework (counts towards the graduate degree)

These students are subject to review each semester and may be dropped from the program if the requirements are not met. Upon completion of the requirements, students will be admitted to the program. Students in this category *are not* eligible for assistantships/fellowships.

Matriculation

Students who have met all the above requirements are admitted as matriculated students. Applicants with deficiencies may be admitted on a provisional basis. A master's degree must be completed within six years of matriculation. Attached with this document is an *ETE Master's Degree Student Responsibilities Check Sheet* to assist you in the pursuit of your graduate studies.

Important Notes:

- A maximum of **12 semester graduate credit hours** may be earned before matriculation.
- Transfer credits are subject to approval by the student's graduate committee and School of Graduate Studies. Only 12 transfer credits earned before matriculation may be transferred.
- Transfer credits with Pass (**P**) grades will be accepted with committee approval.
- For specific graduate information concerning admission requirements, call the School of Graduate Studies Office (435-797-1189).

Financial Information

Fees

Utah State University uses a graduated tuition and fee schedule. To assist you in determining approximate graduate tuition costs, consult the *Registrar's Office Links* "Tuition & Fee Tables" at www.usu.edu/registrar/payment.

- Notes:**
1. Graduate school fees are slightly higher for off-campus (extension) courses.
 2. Non-Resident tuition is waived for Summer Semester.

Financial Assistance

A limited number of graduate teaching and research assistantships, as well as non-resident tuition scholarships are available to full-time graduate students. Please contact the ETE Department Head (Dr. Kurt Becker, (435) 797-2076, kbecker@cc.usu.edu) to find out about the current types of financial assistantships available.

Funding Eligibility

1. Only full time students are eligible for funding.
2. Student must take a minimum of 9 credits.
3. Graduate student funding is of limited duration. The ETE Department will fund students for the following time periods, pending funding and student progress:
 - Master's Degree: Up to 2 years
 - Doctorate with an MS: Up to 3 years
 - Doctorate with a BS: Up to 4 years
4. At the end of this period, the student may petition in writing for an extension of up to one year. This petition must be approved by the Department Chair, Graduate Coordinator, and the student's Advisor. Students should be aware that a second extension is rarely granted.

Funding Evaluation Procedures

The Admissions Committee evaluates the candidate's potential for funding. Provisional students are not normally considered for departmental funding until they have completed the requirements specified in their provision statement.

Scheduling of Job Hours

1. A full time graduate student position is 20 hours per week. These 20 hours are in addition to classes/class work and in addition to thesis/dissertation writing.
2. The Department recognizes that other academic requirements will require some flexibility in the number of working hours per week. However, the expectation is that missed hours will be made up.

3. Typically, students are appointed to either 9, 10, or 12 month assistantships. The starting dates for assistantships are:

- Fall, Spring, Summer – One Week Before the Start of the Semester.

Holidays

4. Graduate students are employees of Utah State University. As such, they are required to be present except for the *university employee holidays* granted to 12-month employees. Please note that these holidays are not the same as the class schedule.

5. The dates of holidays are available on the USU website (www.usu.edu/calendar/holidays.cfm?year=2008). For 2008, they are:

New Year's Day

Tuesday, January 1, 2008

Pioneer Day

Thursday, July 24, 2008

Human Rights Day

Monday, January 21, 2008

Labor Day

Monday, September 1, 2008

Presidents' Day

Monday, February 18, 2008

Thanksgiving

Thursday, November 27, 2008

Friday, November 28, 2008

Memorial Day

Monday, May 26, 2008

Christmas Holidays

Wednesday, December 24, 2008

Thursday, December 25, 2008

Friday, December 26, 2008

Independence Day

Friday, July 4, 2008

6. In addition, graduate students may take up to five days per semester of unscheduled holidays, subject to approval by their advisor. Unused holidays may be accumulated from semester to semester and must be all be used prior to the start of each academic year. In the case of teaching assistants, these days may not coincide with their scheduled classes.

Master's Degrees in Engineering and Technology Education

Master's Degree Programs

Full Time Program: A full-time Master's degree program is available on the main campus of USU during the regular school year.

Summer Time Program: A four-week summer school graduate program is offered on the main campus of USU. The summer program permits graduate students to take a full load of courses in the summer during a short period of time.

Off Campus (Extension) Program: Off-campus programs for the convenience of practicing teachers are also available. These programs have been offered in various locations around the state of Utah. For more information about current offerings, please contact the Department of Engineering and Technology Education.

NOTE: Utah State University is on the semester system. The semester calendar year is made up of three semesters: Fall (August - December), Spring (January - May) and Summer (May - August). Shown in Appendix A are proposed future ETE graduate courses.

Masters Degree Program Requirements

The M.S. degree in ETE offers the student flexibility in designing his or her own program. In addition to completion of the required Professional Core, the student is encouraged to take additional supporting courses in other areas that will help them meet their own professional and career goals. For example, supporting courses outside the ETE program can be taken from other disciplines such as Agricultural Systems Technology & Education, Business Information Systems & Education, Computer Science, Instructional Technology, and Engineering.

Master's Degree Options

Students can either select the thesis (Plan A), non-thesis (Plan B), or the Plan C option. A brief description of each plan follows:

Plan A Requirements

This is a thesis degree program that requires a minimum of *30 semester credit hours*. Students enrolled in this option must meet a residency requirement of 15 semester hours at Utah State University. The degree program requirements are as follows:

- 15 Semester Hours Professional Core
- 6 Semester Hours Thesis
- 3 Semester Hours Statistics
- 6 Semester Hours of Electives
- A thesis following graduate school guidelines.
- From 6-12 semester credits of thesis research (ETE 6970) are required.
- A Program of Study Sheet submitted to the School of Graduate Studies.

- A **thesis proposal**, signed by the entire committee should be submitted by the student to the School of Graduate Studies along with the Program of Study.
- The thesis proposal should be developed by the candidate. The proposal should be approved by the committee chairperson before going to other committee members.
- A **Thesis**. At the completion of the research, the student will prepare a paper (following the same specifications as required in the USU Publication Guide for Graduate Students: www.usu.edu/graduateschool/student_resources/doc/Publicationguide.pdf). This paper typically includes the information contained in the proposal, along with the results and conclusions of the project. The thesis should be approved by the committee chairperson before being distributed to the other committee members.
- A **Thesis Defense**. At the completion of the student's research, the student will be required to present to the committee in a formal setting the thesis project. Students are required to schedule this final defense meeting with the graduate school **at least 10 working days** prior to the defense.

Plan B Requirements

This is a non-thesis option that requires a minimum of *33 semester credit hours*. This degree option requires the development of a creative project. The degree program requirements are as follows:

- 15 Semester Hours Professional Core
- 3 Semester Hours Experimental Lab
- 3-6 semester credits of ETE 6960 Masters Project.
- 9-12 Semester Hours of Electives
- **A Masters Project**. A Masters Project is scholarly work produced by the candidate working with their advisor and/or committee. Examples of Masters Projects include the development of new curricula, revisions of old curricula, or a descriptive survey research project (i.e., a survey to gather information on a selected topic).
- A Program of Study Form submitted to the School of Graduate Studies.
- A **Plan B Proposal**. A proposal should be developed by the candidate. The proposal should be approved by the committee chairperson before going to other committee members. Typical sections found in a proposal include:
- A **Plan B Paper**. At the completion of the project, the student will prepare a paper (following the same specifications as required in the USU Publication Guide for Graduate Students: www.usu.edu/graduateschool/student_resources/doc/Publicationguide.pdf). This paper typically includes the information contained in the proposal, along with the results and conclusions of the project. The Plan "B" paper should be approved by the committee chairperson before being distributed to the other committee members.
- A **Plan B Final Defense**. At the completion of the student's Plan B project, the student will be required to present to the committee in a formal setting the Plan B project. Students are required to schedule this final defense meeting with the graduate school **at least 10 working days** prior to the defense.
- Submission of the Plan B Paper to the library so that it can be microfiched.
- Required Project Documentation

Plan C Requirements

The program of study in this option consists entirely of course work. **The Plan C option consists of additional coursework in the area of concentration, for a minimum total of 36 credits** The degree program requirements are as follows:

- 15 Semester Hours Professional Core
- 3 Semester Hours Experimental Lab
- 18 Semester Hours of Electives
- At the conclusion of the program, a culminating or “capstone” experience is developed by the student under the direction of the advisor. This experience may consist of:
 - a) an oral comprehensive examination under the supervision of the advisor and supervisory committee;
 - b) a written comprehensive examination under the supervision of the advisor and supervisory committee; or
 - c) another culminating experience (e.g., professional presentation, writing for publication, student organization leadership, community project, etc.) developed by the student and advisor and approved by the department head and supervisory committee.

Graduate Committee

When you are matriculated, you will be assigned a temporary adviser. During your first semester, it will be **your responsibility** to select a graduate committee and submit a **Supervisory Committee Approval** form to the Department Head who will sign it and submit it to the School of Graduate Studies. The graduate supervisory committee should be selected based on your professional career goals. Your graduate committee must consist of a minimum of three members: At least one member must represent your area of specialization, and at least one must be from outside the specialization area.

Your graduate committee will work with you to complete a required **Semester Program of Study for Master’s Degree** form (available at: www.usu.edu/graduateschool/student_resources/doc/Publicationguide.pdf). This form should be completed as soon as possible and submitted to the School of Graduate Studies. The Program of Study form must be submitted to the Graduate School Office by the student at least two months prior to the final exam. Ultimate approval of your program of study, creative projects, etc. rests with the graduate supervisory committee and the School of Graduate Studies.

Doctoral Degrees in Engineering and Technology Education

The doctoral degree in Engineering and Technology Education is offered through the College of Education's Interdepartmental Doctoral Program. Within this program students are enrolled in the Curriculum and Instruction Specialization. Additional information on this program and specialization are located at <http://www.coe.usu.edu/idp/guidebook.pdf>. The *Semester Planning Guidebook*, available at the web site, lists the degree requirements and policies of the Interdepartmental Doctoral Program. This handbook provides supplemental and clarifying information on the degree requirements and includes department specific information.

Doctoral Comprehensive Examination Study Topics

The comprehensive examinations for doctoral students are a major assessment point in a doctoral student's academic career. In the examinations, the student's knowledge of engineering and technology education and their ability to perform independent research will be assessed.

Format

The comprehensive examination will consist of two 4-hour examinations, Engineering and Technology Education (day 1) and Research (day 2). The examinations will be given on two consecutive days with the first date specified by the College of Education.

Study Topics

The comprehensive examinations are composed by the members of the student's doctoral committee. Because of this, the content of the examination will vary between students depending on their coursework and research topic. The department *strongly recommends* that you consult your committee members for guidance prior to studying for the examination.

Below is a list of topics for the general portion of the comprehensive examinations. In addition, each student's examination will also include questions directed at their research and course of study. Each examination may include, but is not limited to, the following topics:

Engineering and Technology Education – Day 1

- Foundations of Education
 - Historical Perspectives of Education
 - Curriculum Development
 - Teaching and Learning in Higher Education
 - Evaluation and Assessment
 - Facilities Management
- Foundations of Engineering and Technology Education
 - The Standards for Technological Literacy
 - Content
 - What is needed to implement the Standards for Technological Literacy
 - Standard for Technological Literacy and advancing excellence in engineering and technology education
 - Current and historical issues in engineering and technology education
 - Issues and trends in technology education
 - Trends in historical development of curriculum, instruction, and evaluation in industrial technology
 - Literature associated with engineering and technology education
 - Critical issues (e.g., knowledge base, recruitment, etc.) in engineering and technology education
 - Historical perspectives of engineering and technology education
 - Engineering Education, Implications for inclusion in Technology Education

- o Curriculum Development in Technology Education
 - Standards for Industrial Arts
 - Jackson's Mill Curriculum Theory
 - Conceptual Framework
- o Familiarization with related professional organizations and their role in educational policy.

Research Design, Measurement and Statistics – Day 2

- Research Design
 - o Measurement validity for research, evaluation, and assessment
 - o Internal validity
 - o Define and contrast similarities and differences found in qualitative and quantitative research
- Proposal Writing
 - o Major components of a research proposal
 - o Major components of a grant proposal
 - o Developing a research agenda
- Statistics
 - o Experimental design
 - o Statistical significance
 - o Errors in determining statistical significance
 - o Randomization/randomized design
 - o Effect size
 - o Correlation and causality
- Your research project
 - o Design
 - o Issues
 - o Structure

Research Proposal Guidelines

General Format Guidelines

The format presented in the APA style manual, used by most journals in education and psychology, is accepted for proposals. To facilitate publication, the Department will also accept a document prepared in the format of a journal to which a report of the research is to be submitted. The use of an alternative format may only be used after approval by the student's supervisory committee.

Additional information regarding the proposal for a doctoral dissertation is found at www.coe.usu.edu/idp/guidebook.pdf. The *Semester Planning Guidebook*, available at the web site, lists the degree requirements and policies of the Interdepartmental Doctoral Program.

Required Content

Research proposals will be directly linked to your research problems and approaches and must be approved by your committee prior to your research. This does not preclude the acquisition of preliminary data to validate your approach or to help focus your research. Rather, you should recognize that, until this document is approved, your committee can require changes in the research design. These changes can be, and often are, significant.

The exact contents of your proposal will depend on the nature of your research. In general, every proposal must have the following components:

- I. Problem Statement
- II. Review of Literature: (A review of literature related to project).
- III. Purpose and Objectives: (Describes the need and importance of the project. May include a problem statement or research question that the project addresses).
- IV. Procedures (Describes how the project will be conducted. Should include details about the population or sample, and information related to data collection and analysis).
- V. References
- VI. Appendices

Additional Information on Content Depending on Proposal Type

Typically, engineering and technology education research falls into one of three categories.

- Quantitative Research
- Qualitative Research
- Mixed Quantitative and Qualitative Research

Below are some suggestions for content in quantitative and qualitative research proposals. Mixed research proposals are usually a hybrid of these two styles and your proposal will contain elements from both types.

Recommended Contents of a Quantitative Proposal

The following is an example of a format you might use in a quantitative proposal:

- I. The problem and its setting
 - A. The statement of the problem and sub-problems
 - B. The hypotheses
 - C. The delimitations
 - D. The definitions of terms
 - E. The assumptions
 - F. The importance of the study
- II. The review of the related literature
- III. The data and the treatment of the data
 - A. The data needed and the means for obtaining the data
 - B. The research methodology
 - C. The specific treatment of the data for each sub-problem
 1. Sub-problem 1
 - a. The data needed to address the sub-problem
 - b. The treatment of the data
 2. Sub-problem 2 (*The same format for Sub-problem 1 is followed here.*)
 3. Additional sub-problems are discussed in the same manner.
- IV. The qualifications of the researcher and any assistants
- V. An outline of the proposed study (steps to be taken, timeline, etc.)
- VI. References
- VII. Appendixes

Recommended Contents of a Qualitative Proposal

- I. Introduction
 - A. General background for the study
 - B. Purpose of the study
 - C. Guiding questions
 - D. Delimitations and limitations
 - E. Significance of the study
- II. Methodology
 - A. Theoretical framework
 - B. Type of design and the assumptions that underlie it
 - C. Role of the researcher (including qualifications and assumptions)
 - D. Selection and description of the site and participants
 - E. Data collection strategies
 - F. Data analysis strategies
 - G. Methods of achieving validity
- III. Findings
 - A. Relationship to literature
 - B. Relationship to theory
 - C. Relationship to practice
- IV. Management plan, timeline, feasibility
- V. References
- VI. Appendix

Additional Curriculum Guidelines

Undergraduate Courses as a Graduate Student

The department recognizes that students may wish to take undergraduate courses from the department to either act a refresher courses or to update the student's skills. A maximum of 3 credits may be obtained from such courses. These courses are taken as independent study courses and there are additional requirements placed to meet graduate level credit.

Project Lead The Way (PLTW) Workshop Credits

These credits may be used for graduate credit in our programs:

- A typical two week (8 hours per day) PLTW workshop will count for 3 graduate credits. Although the host university may give more than 3 credits, we will only apply 3 credits to the student's program.
- A total of 6 PLTW related credits can be applied to a student's graduate program. A student may apply 6 credits towards the master's degree or 6 credits towards the doctorate or 3 credits towards the master's degree and 3 credits towards the doctorate.
- Students will be required to sign up for graduate credits from the host university and transfer those credits into their program at USU. Credits transferred will require a letter grade and meet transfer credit guidelines outline by USU's School of Graduate Studies.

Departmental Research/Project Documentation Requirements

Thesis and Dissertation Format

The format presented in the APA style manual, used by most journals in education and psychology, is accepted for theses and dissertations. To facilitate publication, the Department will also accept a document prepared in the format of a journal to which a report of the research is to be submitted. An alternative format may only be used after approval by the student's supervisory committee.

In addition, both theses and dissertations must meet the format requirements of Utah State University and dissertations must meet the requirements of the Interdepartmental Doctoral Program found at www.idp.usu.edu.

Research/Project Publications

An essential component of academic research is the peer review process. Master's candidates should work with their advisor to prepare a presentation or a paper for publication. As part of their degree program, graduate students are expected to meet the following presentation/publication requirements:

- Master's Degree (Plan A)
 - 1 publication submitted to an appropriate peer-reviewed journal on the thesis topic
- Doctoral Degree
 - 1 publication submitted to an appropriate peer-reviewed journal on the dissertation topic
 - 1 presentation at a national or regional professional meeting

All publications and presentations submitted by students must be approved by the student's major advisor(s) and must contain the major advisor's name in the authorship listing, unless specific written permission is obtained from their major advisor.

Electronic Document Retention

While the Department's documents server is backed up on a regular basis, you are responsible for maintaining back ups of your documents and data. The Department recommends that you keep a minimum of two copies of your files. Do not keep them in the same location (e.g. keep one copy in your lab and one copy at home).

Graduation Requirements

The research or project that students complete as a component of their degree is an important record and may be used as the basis of future research or publications. Data created as part of your degree program or your assistantship is property of the Engineering and Technology Education Department and your major advisor. For these reasons, it is important that the documentation be retained by the Engineering and Technology Education Department. Prior to graduation, the following materials must be provided to the department chairman:

- Hardbound copy of your project/thesis/dissertation (2 copies – one each to the advisor and the department)

- Electronic copy of your project/thesis/dissertation (on CD-ROM/DVD)
- Electronic copy of *all* of the data and analysis results from your research/project (on CD-ROM/DVD).
- Bound paper copy of the thesis to each committee member.

Faculty Research and Interests

One of the strengths of the ETE graduate program is its faculty. The graduate faculty in the department is here to assist you in obtaining your degree. Current faculty members include:

Kurt H. Becker, Professor and Interim Department Head (PhD - Texas A&M) Kurt Becker is a Professor and the Department Head of Engineering and Technology Education. He is the Co-Principal Investigator for the National Science Foundation (NSF) funded *National Center for Engineering and Technology Education* and Principal Investigator for the NSF funded project: *Communities of Effective Practice: A professional STEM Development Partnership Model for Teachers of American Indian Students*. His areas of research include adult learning cognition, engineering education professional development and technical training. He works with the technology teacher education program in the department and teaches undergraduate and graduate courses in methods of institutions of higher education. He has extensive international experience working on technical training projects funded by the Asian Development Bank, World Bank, and U.S. Department of Labor, USAID. Countries where he has worked include Bangladesh, Bulgaria, China, Macedonia, Poland, Romania, and Thailand. He is currently a consultant on a USAID-funded project that involves workforce development and enterprise competitiveness. He has numerous publications in technology education and international training.

Edward M. Reeve, Professor (PhD - The Ohio State University) Edward Reeve's professional interests include developing standards-based curricula for technology education and communication technology. Other professional interests include those related to developing competency-based education and internationalizing the curriculum. He currently serves as a Standards Specialist for the International Technology Education Association, and is a former American Council on Education (ACE) Fellow and Fulbright Scholar.

Maurice G. Thomas, Professor Emeritus (EdD - Texas A&M) Maurice G. Thomas teaches classes in Technology Education. He is Co-PI for the NSF-funded Center for Engineering and Technology Education, the goal of which is to infuse engineering concepts and design principles into the K-12 curriculum through the discipline of Technology Education.

Ward P. Belliston, Associate Professor (PhD - Colorado State University) Ward Belliston teaches courses in computer electronics technology and supports the electronics laboratory housed in the Industrial Science building. He also serves as the mediator for the College of Engineering as part of USU's Faculty Mediation Program.

Ning Fang, Associate Professor (PhD - Huazhong University of Science and Technology, China). Ning Fang is an Associate Professor of the Department of Engineering and Technology Education. He currently works on two National Science Foundation-funded projects: one project on developing new course curriculum to improve undergraduate manufacturing engineering education, and the other project on integrating lean manufacturing into manufacturing curriculum. His area of research includes engineering education reform, developing innovative and effective teaching pedagogy and course curriculum, as well as the retention of freshmen in engineering. He is also a mechanical engineer and currently teaches college-wide fundamental engineering courses (such as Dynamics) and specialized

manufacturing courses. He has extensive collaboration with faculty in multi-disciplinary areas in engineering education.

Gary A. Stewardson, Associate Professor (PhD - University of Maryland) Gary Stewardson helps prepare undergraduates to become technology and engineering teachers in grades 6-12, teaches and advises graduate students at both the masters and doctorate levels, and has experience in technology and engineering activities at the elementary school level. His research interests include developing curriculum activities that require creative-problem solving and cooperative learning strategies to solve real-world problems. He also has interests and experience, nationally and internationally, developing skill standards, training programs, and skill assessment instruments for industry utilizing an occupational and task analysis approach. His technical areas of expertise include manufacturing, automation, and control technology.

Paul Schreuders, Assistant Professor (PhD - University of Texas, Austin) Paul Schreuders is a biological engineer and is interested in engineering education activities. His BS and MS degrees are from Clemson University and his PhD is from the University of Texas at Austin. He was a post-doctoral research fellow at the Oak Ridge National Laboratory in Knoxville, Tennessee. His interests in engineering education include the use of modeling engineering education, teaching methods for engineering design processes, and gender issue in engineering. His interests in biological engineering are linked to biological systems modeling.

Christine E. Hailey, Associate Dean in the College of Engineering. Christine Hailey's responsibilities within the College include supporting the research infrastructure, budget issues, assessment, and faculty development. She is Director of the National Center for Engineering and Technology Education, an NSF-funded Center for Learning and Teaching. She is a member of the ADVANCE-US team, an NSF-funded program to address issues that impact female faculty's effectiveness and satisfaction in the four engineering and science colleges at Utah State. She also is a Co-PI on an NSF-funded project entitled "Learning Companions as Change Agents: Improving Girls' Self-Efficacy Beliefs in Learning Math."

Appendix A – Master’s Degree Program Requirements

Department of Engineering and Technology Education Utah State University

Required Professional Core:

Course #	Title	Semester Credit
ETE 6090	Program Design	3
ETE 6100	Contemporary Issues	3
ETE 6150	Evaluation and Assessment	3
ETE 6450	Administration and Organization	3
ETE 6750	Research Methods and Design	3

Total Semester Hours 15

ETE Electives:

Course #	Title	Semester Credit
ETE 6250	Internship	1-6
ETE 6520	Explorations of Industry	3
ETE 6440	Technology and Society (4440 d)	3
ETE 6800	Seminar	1-2
ETE 6900	Reading and Conference	1-3
ETE 6910	Experimental Lab	3
ETE 6930	Independent Study	1-6
ETE 6960	Master’s Project	3-6
ETE 6970	Thesis Research	1-9
ETE 6990	Continuing Graduate Advisement	1-3
ETE 7230	Foundations of Technology	3
ETE 7400	Occupational Analysis and Curriculum Development	3
ETE 7460	Finance and Grant Writing	3
ETE 7810	Research Seminar	1-6
ETE 7970	Dissertation Research	1-15
ETE 7990	Continuing Graduate Advisement	1-3

IMPORTANT NOTE: Those who have “quarter hour transfer credits,” will have to convert quarter hours to semester hours. 1 quarter hour = 2/3 of a semester hour.

For Example: Nine quarter hours, it is equivalent to six semester hours. (9 quarter hours x 2 divided by 3 = 6 semester hours)

Appendix B – Master’s Degree Program Checklist

**Department of Engineering and Technology Education
Utah State University**

NAME: _____ Matriculation Date: _____

Plan A _____ (30 Credits Minimum)
 Plan B _____ (33 Credits Minimum)
 Plan C _____ (36 Credits Minimum)

I. Required Professional Courses (Required in Plans A, B & C)

Course #	Title	Credit	Grade	Completed
ETE 6090	Program Design	3		
ETE 6100	Contemporary Issues	3		
ETE 6150	Evaluation and Assessment	3		
ETE 6450	Administration & Organization	3		
ETE 6750	Research Methods and Designs	3		
Plan A (Thesis) Required Courses				
STAT 5200	Design of Experiments (Undergrad Prerequisite STAT 2000 or STAT 3000)	3		
ETE 6970	Thesis Research	1 - 9		
Plan B (Non-Thesis) Required Courses				
ETE 6910	Experimental Lab	3		
ETE 6960	Master’s Project	3 - 6		
Plan C (Course Work Only)				
ETE 6910	Experimental Lab	3		

Total Credits _____

Appendix C – Future Graduate Course Offerings

Engineering and Technology Education (ETE) Graduate Course Schedule (Subject to Change)

Semester	Courses Offered	MS	PhD
Summer 2007	ETE 6150 * (Eval & Assm) ETE 6750 * (Res Meth & Design) ETE 6910* (Exp Lab) ETE 7500 (Intern HE)	ETE 6150 * ETE 6750 * ETE 6910	ETE 7500
Fall 2007	ETE 7230 * (Foundations)		ETE 7230 *
Spring 2008	ETE 7810 * (Res Seminar)		ETE 7810 *
Summer 2008	ETE 6090 * (Prog Design) ETE 6100 * (Contemp Iss) ETE 6450 * (Admin & Org) ETE 7460 (Fin & Gr Wr)	ETE 6090 * ETE 6100 * ETE 6450 *	ETE 7460
Fall 2008	ETE 7400 (Occup Analy)		ETE 7400
Spring 2009	ETE 7810 * (Res Seminar)		ETE 7810 *

* Required Courses

Every Semester

ETE 6800, ETE 6910, ETE 6930, ETE 6960, ETE 6970, ETE 6990

1/08

Appendix D – Doctoral Degree Program Requirements

Doctor of Philosophy (PhD) C&I Specialization Area of Emphasis in Engineering and Technology Education

COE PhD Core Requirements (18 Cr)

Unifying Program of Studies (6 cr)

EDUC 7300 Hist/Soc/Cult Foundations of Educ	3 cr
EDUC 7310 Teaching-Learning Found. in Educ	3 cr

Research and Statistics (12 cr)

Required

EDUC/PSY 6600 Research, Design and Analysis I	3 cr
EDUC 6770 Qualitative Methods I	3 cr

Electives – two required

EDUC 6010 Intro. to Program Eval.	3 cr
EDUC 6700 Single Subj. Research Meth. & Dsgn	3 cr
EDUC 6780 Qualitative Methods II	3 cr
EDUC 7610 Research, Design & Analy. II	3 cr

Dissertation (12 cr)

Engineering and Technology Education (24 cr)

Required Core

ETE 7230 Foundations of Technology	3 cr	
ETE 7460 Finance and Grant Writing	3 cr	
*ETE 7010 Cognition in ETE	3 cr	University of Illinois
*ETE 7020 Design Thinking in ETE	3 cr	University of Minnesota
*ETE 7030 Engineering Design & Analy for TE	3 cr	University of Georgia
*ETE 7040 Dynamic & Netw Engring Processes	3 cr	Utah State University
ETE 7810 Research Seminar	1-6 cr	

Optional Electives

ETE 6090 Program Design	3 cr	ETE 6100 Contemporary Issues	3 cr
ETE 6150 Evaluation and Assessment	3 cr	ETE 6440 Technology and Society	3 cr
ETE 6450 Admin. And Organization	3 cr	ETE 6750 Research Methods & Design	3 cr
ETE 7400 Occup Analysis & Curr Devel	3 cr	ETE 7500 Internationalizing Inst. of H.E.	3 cr
ETE 7600 Academic Issues & Politics in H.E.	3 cr	ETE 6930 Independent Study	1-6 cr

*For NCETE Fellows only