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Section 1. Welcome

Welcome to the Department of Engineering Education (EED) in the College of Engineering at Utah State University (USU). We are sure you will find a dynamic faculty, talented student colleagues, and a supportive staff in the Department. The Ph.D. in Engineering Education program will provide you the knowledge and tools that are necessary to compete in today’s competitive global environment, while preparing you to be a leader in teaching tomorrow’s engineers. Please familiarize yourself with information in this manual, so you will be informed about the program, its policies, and its procedures. We trust you will find this manual useful in assisting you with guidelines to ensure your success. In the new school year and beyond, our program will meet and exceed your expectations of a successful graduate experience. Always feel free to contact anyone in the program with questions.

Congratulations on becoming a productive and important part of our graduate program. The faculty, staff, and students wish you a warm welcome.

Section 2. Teaching and Research Assistantships

Teaching Assistantships (TAs) and Research Assistantships (RAs) are different types of graduate assistantships offered to students as a means to receive the financial support necessary to commit to their academic programs. Students must be enrolled in a minimum of 9 semester hours and must be in good academic standing each semester they are appointed. TA and RA appointments are meant to provide students with invaluable experiences in teaching, research, and other scholarly activities, as well as to allow students to engage in an optimal full-time graduate school experience. In EED, some students who assist with both teaching and research qualify as both a TA and RA.

2.1 Teaching Assistants

Graduate Student TAs and/or RAs are employed an average of 20 hours per week to help meet the instructional and/or research needs of the university. The Graduate TA, under the direction of an assigned faculty member, will aid in the teaching of one or more courses. TAs are paid from Departmental funds; appointments and reappointments are subject to several factors and are on a semester-by-semester basis.

2.2 Research Assistants

Graduate Student RAs are employed an average of 20 hours per week and are focused on assisting the research efforts of their faculty mentor in a way that relates to the student’s educational objectives. Graduate Student RAs are typically paid from individual research awards or from externally funded contracts and grants. The Principal Investigator of the award will direct and supervise the RA’s research activities. Appointments and reappointments are evaluated on a yearly basis.

As new TAs and RAs, graduate students take on multiple roles in the university. First, as employees, they are responsible for issues such as compliance, rules of conduct, regulation, and appropriate human resource procedures. Second, as new graduate students, they learn about available resources to assist them with the inherent challenges found in juggling the work
of teaching and/or research with the demands of graduate school. Finally, in their new professional roles of teachers and researchers, graduate students learn and implement tactics for interacting with undergraduates, structuring learning experiences, engaging with cultural issues in a multi-cultured university, and fulfilling faculty expectations of TAs and RAs.

Section 3. Program Requirements

3.1 Core EED Program Requirements

The core EED program requirements can be found in the table on page 8.

3.2 Additional EED Program Requirements

A full-time matriculated Ph.D. graduate student must fulfill one of the following:

- Register for 9 or more graduate credits; or
- Register for 6 or more graduate credits if employed as a graduate assistant for 20 hours per week **; or
- Register for 3 graduate credits with all required coursework completed and only the research component of the degree remaining (the student’s Program of Study must have been submitted to the School of Graduate Studies); or
- Register for at least 3 graduate credits during the semester of the final thesis/dissertation defense.

** International students are allowed to take 6 credits only in their first semester.

In addition, a full-time matriculated Ph.D. graduate student must

1. Maintain a minimum cumulative GPA of 3.0 during your graduate study.

2. Identify courses with pre-requisites (such as STAT 5200 and EDUC 6570) and discuss in advance with your Faculty Advisor (Major Professor) and EED Senior Staff Assistant. They will help solve relevant issues.

3. If you have finished all required coursework and research credits for the program but are not yet finished with your research, you must register for 3 credits of Continuing Graduate Advisement (CGA) each semester you are in the program including the semester you defend. You do not have to register in the summer but must be registered during the fall and spring semesters. The maximum number of CGA credits available is 10; this equates to 3 semesters of 3 credits each to finish.

4. If you are using CGA credits and are an international student, you must file a Reduced Course Load Form each semester you take only 3 credits. You can find the form at the USU School of Graduate Studies website: https://rgs.usu.edu/graduateschool/reduced-course-load. Complete this form and give to the EED Graduate Program Coordinator in order to remain visa compliant.
5. If you are using CGA credits, you are still eligible for the subsidized graduate student insurance as long as you are still 0.5 FTE and receiving a graduate assistantship.

6. If you would like to learn the latest statistical analysis/data analytics tools and techniques, you can take an alternative elective course—a course that is not listed on the current course electives list—as an elective course. Prior approval from both your Faculty Advisor and dissertation committee is necessary to take an alternative elective course. If you would like to enroll in an alternative elective course, discuss the situation with your Faculty Advisor (Major Professor), and then your committee, to get approval prior to registering for the course.

USU graduate programs that typically offer course of interest include Education (EDUC), Psychology (PSY), and Instructional Technology and Learning Sciences (ITLS). Note that several advanced quantitative measurements courses, including EDUC/PSY 7050 Instrument Design, EDUC/PSY 7070 Advanced Measurements Theory and Practice, and EDUC/PSY 7610 Research Design & Analysis II, are currently listed on the approved electives list. See the USU course catalog to find other courses of interest for elective credit.

3.3 Institutional Requirements

1. **Research Scholars Orientation:** Typically occurs a week before the beginning of classes in the fall semester and immediately following the New Graduate Student Orientation. There will be a sign-in sheet for attendance credit. It is possible to watch a video through Canvas and take a quiz if you are not able to attend in person.

2. **Fall Research Scholars Forum:** Typically occurs during the fall semester. You have the option to watch a video through Canvas and take a quiz if you are not able to attend in person.

3. **Spring Research Scholars Forum:** Typically occurs in the spring semester. You have the option to watch a video through Canvas and take a quiz if you are not able to attend in person.

4. **Complete the Online Responsible Conduct of Research Module** provided by the Collaborative Institutional Training Initiative (CITI).

5. **FERPA Training:** If you will be participating as a teaching assistant in a course and will be handling grades, you must complete FERPA training. You have the option to take this training online.

6. **USU 6900 – Research Integrity:** The Research Integrity course provides an introduction to key topics of Responsible Conduct of Research, which helps students and researchers understand their responsibilities related to proper research conduct and the regulations that ensure research is scientifically sound, ethical, and safe. This understanding is critical for any career in scholarly research, whether in academics, government, or industry.

The individuals are required to complete the Research Scholars Certification program:
- Graduate and undergraduate students as well as postdoctoral fellows who are supported through National Science Foundation funding
- Trainees supported by some categories of grants from NIH, including training grants, development grants, and dissertation grants
- Trainees supported through NIFA grants administered by the USDA

USU 6900 is used to record completion of the Responsible Conduct of Research requirements. Students working toward completion of the certificate must register for USU 6900 during one semester. The course provides an underpinning of ethical conduct for students entering the research enterprise at USU. The course is designed for graduate students, upper-level undergraduate students, and postdoctoral fellows based on regulatory requirements from federal funding agencies.

All doctoral students should include USU 6900 in their Program of Study; the course will appear on the transcript of any student who completes the training. We strongly encourage completion of the Research Integrity course near the beginning of a student’s research activities. The certification is an indication to the institution and the scientific community that the recipient is dedicated to the responsible conduct of research. For information concerning this program, contact Jodi Roberts, Director of Research Integrity and Compliance, at jodi.roberts@usu.edu or (435) 797-4208.

7. **Tuition Residency Requirements**: The Utah law states: If a student who has not previously acquired domicile in Utah enrolls at a Utah system of higher education school, the student must reside in Utah for 12 continuous months and meet the other criteria or qualify for an exception in order to gain residency for tuition purposes. If you are not a resident, see deadlines and instructions on how to apply. [https://www.usu.edu/admissions/residency/](https://www.usu.edu/admissions/residency/)

8. **Sexual Assault Prevention and Alcohol Education**: As part of our comprehensive health and safety program, USU expects all incoming students – including first-year students, transfer students, and graduate students – to complete health and safety online courses before they can register for spring semester courses. These courses will empower students to make informed decisions about issues that affect college students and our USU community. [http://studentaffairs.usu.edu/haven-alcoholedu/](http://studentaffairs.usu.edu/haven-alcoholedu/)

9. **Motorpool Mandatory Driver Training**: To be able to borrow vehicles from the USU Motor Pool or drive any USU vehicle, please complete all of the following steps:

1) Review the tutorial (video) on how to use the Utah Learning Portal.
2) Create a new user account in the Utah Learning Portal and be sure to save your username and password for later use.
3) From the Utah Learning Portal, select the Public & Higher Ed portal link, log in to your account, and select the Defensive Driver Training course.
4) When you have completed the Defensive Driver Training, be sure to save a copy of your completion certificate from the Utah Learning Portal.

Once all of these steps are complete, fill out the USU Driver Training Certification form. Please note you cannot drive or rent a University vehicle without completing the training and filling out the required form.
10. **Title IX / Affirmative Action:** Students are encouraged to report an incident involving an alleged violation of the USU Sexual Misconduct Policy, which includes: sexual harassment, sexual assault, gender-based harassment, intimate partner violence, domestic violence, and stalking. You can file a report on your own behalf or on behalf of anyone who may have experienced sexual harassment, misconduct or violence [https://aaeo.usu.edu/](https://aaeo.usu.edu/). Graduate students teaching classes are required to report any student disclosure of sexual harassment, misconduct, or violence to the Affirmative Action office.

11. **Laboratory Safety:** The Office of Environmental Health and Safety (OSHA) requires training for anyone working in a chemical laboratory including principle investigators, lab employees, research technicians, teaching assistants, and graduate students. Chemical hygiene principles, spill prevention, hazardous waste management, and fire safety are discussed. Check with your Faculty Advisor (Major Professor) for more information and to schedule training [http://rgs.usu.edu/ehs](http://rgs.usu.edu/ehs).
## EED Ph.D. Program Requirements

### Engineering Education Core (16 Credits)

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EED 6090</td>
<td>Developing an Online Educational Curriculum</td>
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</tr>
<tr>
<td>EED 6150</td>
<td>Teaching, Learning &amp; Assessment in Engineering Edu.</td>
<td>3 cr</td>
</tr>
<tr>
<td>EED 7010</td>
<td>Role of Cognition in Engineering Education</td>
<td>3 cr</td>
</tr>
<tr>
<td>EED 7230</td>
<td>Foundations of Engineering Education</td>
<td>3 cr</td>
</tr>
<tr>
<td>EED 7460</td>
<td>Finance &amp; Grant Writing</td>
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<tr>
<td>EED 7810*</td>
<td>Research Seminar</td>
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### Engineering Elective – Area of Specialization (Minimum 5 Credits)

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<td>EED 6910</td>
<td>Special Topics in Engineering Education</td>
<td>3 cr</td>
</tr>
<tr>
<td>EED 7500</td>
<td>Internationalizing Institutions of Higher education</td>
<td>3 cr</td>
</tr>
<tr>
<td>EDUC/SPED 7700</td>
<td>Subject Methods &amp; Design</td>
<td>3 cr</td>
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<tr>
<td>PSY 7030</td>
<td>Instrument Development</td>
<td>3 cr</td>
</tr>
<tr>
<td>PSY 7070</td>
<td>Adv. Measurement Theories &amp; Practice</td>
<td>3 cr</td>
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<td>PSY 7650</td>
<td>Longitudinal Res. Design &amp; Analysis</td>
<td>3 cr</td>
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<tr>
<td>TEAL 6150</td>
<td>Foundations of Curriculum</td>
<td>3 cr</td>
</tr>
<tr>
<td>TEAL 6410</td>
<td>Educational Foundations</td>
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<tr>
<td>TEAL 7300</td>
<td>Historical, Social, &amp; Cultural Foundations of Education (Prerequisite: TEAL 6410)</td>
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<tr>
<td>EDUC 7670</td>
<td>Literature Reviews in Education &amp; Psychology</td>
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### Research Theory Core (9 Credits)

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<tr>
<td>EDUC/PSY 6570</td>
<td>Introduction to Educational &amp; Psychological Research</td>
<td>3 cr</td>
</tr>
<tr>
<td>STAT 5200 or EDUC/PSY 6600</td>
<td>Design of Experiments Measure, Design &amp; Anal. I</td>
<td>3 cr</td>
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<tr>
<td>EED 7040</td>
<td>Qualitative Methods in Engineering Education</td>
<td>3 cr</td>
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</tbody>
</table>

### Dissertation (12 Credits minimum)

**Ph.D. Dissertation:** Students must take an appropriate number of research credit hours to complement their graduate program and be consistent with the Graduate School requirements.

### Additional Degree Requirements

1. Qualifying Examination
3. Final Dissertation Defense
4. One peer-reviewed, first-author journal paper submission or a conference presentation with a peer-reviewed, first-author paper per 12 dissertation credits. The publication should be generated from the research under supervision of the student’s Faculty Advisor during the course of graduate study at USU.
5. EED 7810* - Research Seminar (1 credit): This course is offered each spring semester. Attendance is required throughout the entire Ph.D. program. However, students are required to register for this course only once while in the Ph.D. program.
6. Teaching experience including one or more of the following:
   a. Two semesters of guided teaching experience
   b. Experience as a K-12 teacher
   c. Experience as university/college/community college faculty
   d. Other equivalent experience approved by the Department Head and the student’s graduate committee

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Other alternative elective courses may be approved by your Faculty Advisor.
Section 4. Course Schedule

Graduate Course Schedule
Two-year cycle, subject to change

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<th>EED</th>
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* If you need to take EED 6910 Special Topics course or an EED 7900 Independent Study course, consult with your Faculty Advisor (Major Professor) in advance to determine potential topics for study.
Section 5. Milestones for Ph.D. in Engineering Education Degree

The following table shows general guidelines, rather than mandatory requirements, for you to plan academic activities. For example, you may start Institutional Review Board (IRB) training in Semester 1. You should work closely with your Faculty Advisor (Major Professor) while planning these activities.

<table>
<thead>
<tr>
<th>Typical Academic Activities</th>
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<tbody>
<tr>
<td><strong>First Year</strong></td>
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<tr>
<td>Semester 1</td>
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<tr>
<td>9 credits coursework</td>
</tr>
<tr>
<td>Form Graduate Committee</td>
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<tr>
<td>PoS¹ meeting</td>
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</tbody>
</table>

¹PoS = Program of Study - The Program of Study (PoS) constitutes a contract between the student, the committee, and the School of Graduate Studies regarding what courses a student will take in completion of his or her program requirements. The PoS should be completed within the second semester of coursework. In some cases, your PoS may be completed in the third semester of coursework, which may delay your progress toward graduation.

²IRB = Institutional Review Board (IRB) - The IRB reviews proposed research involving human participants in order to protect citizens against potential risks of research participation while promoting high-quality studies that can provide rewards to participants and/or society. IRB applications should be reviewed by your Faculty Advisor (Major Professor) before submission.

³CGA = Continuing Graduate Advisement

⁴Only if necessary

Section 6. Checklist for Degree Completion and EED requirements

Any pertinent institutional requirement must be completed in addition to the following checklist.

<table>
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<tr>
<th>√</th>
<th>Activities</th>
<th>Date of Completion</th>
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<tbody>
<tr>
<td>☐ Program of Study (PoS) Meeting (see Section 7)</td>
<td>By the end of the second or third semester, students must form a supervisory committee that will work with them throughout the proposal and final defense phases of their dissertation research. For further information visit: <a href="http://rgs.usu.edu/graduateschool/forms/#requiredforms">http://rgs.usu.edu/graduateschool/forms/#requiredforms</a></td>
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<td>Activities</td>
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<tr>
<td><strong>Initial Supervisory Committee Form</strong></td>
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<tr>
<td>In parallel to the Program of Study, students must complete the Initial</td>
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<td>Supervisory Form by the end of your third semester through the Graduate</td>
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<tr>
<td>School. For further information, please visit:</td>
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<tr>
<td><a href="http://rgs.usu.edu/graduateschool/forms/#requiredforms">http://rgs.usu.edu/graduateschool/forms/#requiredforms</a> under &quot;Doctoral&quot;</td>
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<td><strong>Core Courses (25 credits) Completion</strong></td>
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<td>The Engineering Education Department (EED) requires students to enroll in</td>
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<tr>
<td>a minimum of 25 core course credits prescribed in the EED Ph.D. curriculum</td>
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<tr>
<td>and maintain a cumulative GPA of 3.0. For further information visit:</td>
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<td><a href="http://eed.usu.edu">http://eed.usu.edu</a></td>
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<td>curriculum and maintain a cumulative GPA of 3.0. For further information</td>
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<td>visit: <a href="http://eed.usu.edu">http://eed.usu.edu</a></td>
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<tr>
<td><strong>Qualifying Exam (see Section 8)</strong></td>
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<tr>
<td><strong>Dissertation Research Proposal (see Section 9)</strong></td>
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<td>□ Data Analysis and Results&lt;br&gt;Students need to discuss with their Faculty Advisor (Major Professor) the data analysis and results of the data collection.</td>
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<td>□ Final Dissertation Defense&lt;br&gt;Students need to discuss with their Faculty Advisor (Major Professor) before scheduling for a defense. The Faculty Advisor (Major Professor) must read and approve the dissertation document before circulating it to the committee members. At least 4 weeks before the dissertation defense, the dissertation document needs to be provided to all committee members. At least 2 weeks before the defense, Ph.D. candidates need to have the Appointment for Examination form completed and submit a draft of the dissertation title page. For further information visit: <a href="http://rgs.usu.edu/graduateschool/forms/#requiredforms">http://rgs.usu.edu/graduateschool/forms/#requiredforms</a>&lt;br&gt;Students must submit an unsigned (draft) title page of their dissertation research with the Appointment of Examination form before the defense.</td>
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<tr>
<td>□ Final Dissertation Submission to Graduate School&lt;br&gt;A dissertation report must be submitted to the School of Graduate Studies with appropriate signatures on the document. For further information visit: <a href="http://rgs.usu.edu/graduateschool/doctoral-forms-guide/">http://rgs.usu.edu/graduateschool/docto</a></td>
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<td>□ Submission of a Hardcopy of Dissertation to EED&lt;br&gt;One hardcopy of the student's dissertation must be submitted to the EED through the Senior Staff Assistant. The question of whether to order additional bound copies of the dissertation for the Faculty Advisor and/or committee members should be discussed by the Faculty Advisor and candidate.</td>
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<tr>
<td>□ Commencement&lt;br&gt;Utah State University holds a graduate ceremony once a year (typically in early May).</td>
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### Section 7. Forming the Committee for the Program of Study and Guidelines

You are encouraged to consider the following information when selecting your Doctoral Dissertation Committee. Before you complete 18 credits of doctoral courses, select a Faculty Advisor (Major Professor). Typically, the Faculty Advisor (Major Professor) is your initial advisor who offers you a research and/or teaching assistantship. They will provide you with the majority of your research and/or teaching feedback and will work closely with you throughout your program experience. Your primary advisor’s area of research will have a strong influence in the direction of your research.
It is extremely important you both share common scholarly interests. If you believe another faculty member is a better match for guiding you through your program and dissertation efforts, it is recommended you first attempt to discuss this with your Faculty Advisor (Major Professor) to finalize any projects or work on transition deliverables/details. If the latter is not a feasible option, you can request a change of Faculty Advisor (Major Professor) by the Department Head. Be aware, however, a change of initial Faculty Advisor (Major Professor) will result in an automatic termination of your teaching and/or research assistantship with your initial Faculty Advisor (Major Professor).

You and your Faculty Advisor (Major Professor) should work together to select two or three additional faculty members in EED who have the expertise in your area or areas related to your research. Make sure the members you select can work well with you and your Faculty Advisor (Major Professor) and whose styles are complementary. All committee members must have been approved by the USU Graduate School. Note that faculty members may decline to serve. You are encouraged to have additional faculty members in mind in case this happens. Once you have selected your committee, complete the appropriate Initial Supervisory Committee Approval Form in the Graduate School (http://rgs.usu.edu/graduateschool/forms/#requiredforms under "Doctoral" or http://rgs.usu.edu/graduateschool/supervisory-committee-approval/?utm_source=sgs&utm_medium=forms&utm_campaign=plans&utm_term=doctoral&utm_content=supervisory_committee_approval) within 2 semesters of completing coursework in the department.

At the time you submit your Program of Study (see Section 5 Milestones for Ph.D. in Engineering Education Degree), you must have a five-person committee in place. At least one of the members on your committee should be a faculty member outside of your area of study who is a member of the graduate faculty in their department. This person’s area of scholarly interest should be closely related to the concept behind your dissertation. As such, any committee member outside of EED must be consulted and approved by your Faculty Advisor.

In selecting an outside committee member, keep in mind they should provide specialized assistance in your overall research design but not have a primary role in chairing or co-chairing your committees. For example, if your goal is to validate a survey, this committee member should be skilled in surveys. If your dissertation topic crosses research areas outside the expertise of your Faculty Advisor (Major Professor), you must discuss with your advisor the stipulations by which this research will be conducted, and your advisor must approve the outside committee member.

Note: It is not unusual for your committee to change due to leaves of absence, sabbaticals, reassignments, change of research interests, or arrival of a new faculty member. If this is the case, be sure to complete a Supervisory Committee Revision Form (http://rgs.usu.edu/graduateschool/forms and select “Doctoral” or http://rgs.usu.edu/graduateschool/supervisory-committee-approval/?utm_source=sgs&utm_medium=forms&utm_campaign=plans&utm_term=doctoral&utm_content=supervisory_committee_approval) and submit the form to the Graduate School at least 6 weeks prior to the final defense of your dissertation.
Section 8. Guidelines for Qualifying Exam

8.1 Exam Dates

The qualifying exam is offered two times a year:

- Thursday and Friday of the fourth week of January, 8:00 am - 12:00 noon for each day
- Thursday and Friday of the fourth week of August, 8:00 am - 12:00 noon for each day

8.2 The Purpose of the Qualifying Exam

The main purpose of the qualifying exam in the Engineering Education Department (EED) is to assess the extent to which you have achieved mastery of knowledge gained from the core courses in the Engineering Education curriculum and to gauge your readiness for future doctoral study in engineering education. Evidence of mastery is exemplified with your attainment of a satisfactory decision by the Department as it will allow you to proceed to the next phase of your research program.

The qualifying exam assesses three key measures that indicate the readiness of the student to engage in their own educational research project. These key measures are:

1. A mastery of EED Core course learning objectives. Mastery means you are able to express your knowledge about the main themes you learned in each EED core course in writing.
2. An ability to effectively synthesize educational research articles in writing.
3. An ability to apply core course knowledge and synthesized knowledge of the educational research literature to new teaching and learning contexts, situations, problems, and research designs.

8.3 Eligibility

To participate in the qualifying exam, you must complete, at the minimum, all but one course in your doctoral program. Proof of completing this course requirement should be shared with your Faculty Advisor (Major Professor) before setting up an official examination request.

8.4 Coverage of the Qualifying Exam

The qualifying exam consists of two sections administered over two days. You are given 4 hours to complete each section. You will have a short 15-minute proctored-supervised break each day of the exam. The qualifying exam is designed to assess your ability to synthesize and communicate in writing the theoretical, conceptual, and empirical core knowledge of and research methodology in engineering education. Based on the current EED Ph.D. curriculum, the Exam on Day 1 covers knowledge gained from EED 6090, 6150, 7010, and 7230. The Exam on Day 2 covers knowledge gained from EDUC/PSY 6570, EED 7460, EED 7040, and STAT 5200 (or EDUC/PSY 6600).
8.5 Facility During the Two-Day Qualifying Exam

You will be provided with a non-Internet accessible computer and proctor for monitoring during the exam. No reading (paper or electronic) materials will be permitted in the exam room. **At least three days prior to the exam**, you can email a prepared list of references that may be relevant to your responses to the EED Graduate Program Coordinator. The list of references can be arranged in any order you like. Your prepared list of references will then be stored on the above-mentioned computer for you to use (copy and paste) during the exam. This will save you time in typing the references when you are taking the exam.

Your exam must be saved in the designated folder on the hard drive of the computer before leaving the exam room. Your exam must follow American Psychology Association (APA) format.

8.6 Qualifying Exam Evaluation

An EED Exam Review Committee, including your Faculty Advisor (Major Professor) and other EED faculty members, will read and review your exam to determine if the quality of the exam is satisfactory (absolute or partially) or unsatisfactory. The final decision of the exam result will be based on the discussion and consensus made by the Exam Review Committee and announced to you approximately 30 days from the exam. If your manuscript is deemed to be partially satisfactory, you are then required to rework the part(s) of the exam suggested by the Committee. If you receive an unsatisfactory result, you must retake the exam on the next available date. The exam can be retaken no more than two (2) times.

Responses to your exam will be evaluated by the Review Committee using the following general criteria, among others:

- Did you respond to all the issues and problems presented in the question?
- Are your responses accurate, concise, clear, well-organized, and conceptualized?
- Do your responses reflect an in-depth understanding of the issues and problems that were presented in the questions?
- Are your responses based on well-established research and theory and did you reference accordingly?

8.7 Tips for Preparing and Studying for the Qualifying Exam

1. Maintain good records of your work completed in each EED core course and then spend ample time reviewing this work prior to the exam. During your review you may want to:
   a. Reflect on the learning objectives of each EED core course to consider how you might be asked to apply the course material during the exam.
   b. Summarize the major pieces of literature you were asked to read/discuss during each course.
   c. Practice summarizing the main points of each course in writing (1-2 pages per course) and time yourself in the process.

2. Maintain an up-to-date list of journal articles or references that you have used in your own classes or research. You can email a prepared list of references that may be relevant to your responses to the qualifying exam to the EED Graduate Program
Coordinator for use during the qualifier exam. The list of references can be arranged in any order you like.

3. Talk to other graduate students who have gone through the examination process and ask them how they prepared for the exam. To maintain academic integrity, you should not ask what particular questions were included on the exam. Please note that the qualifying exam questions are subject to change from semester to semester.

8.8 Advancement of Ph.D. Candidacy (Completion of Qualifying Exam)

Upon successfully completing your qualifying exam, you have now advanced to “Ph.D. Candidate” status. This means that at this point, you should have already formed your dissertation committee (filled out the PoS and supervisory committee forms; see checklist for more details) and you are ready to delve into your dissertation topic. You must complete an Application for Candidacy form (http://rgs.usu.edu/graduateschool/candidacy-application/) soon after completing your qualifying exam or within three semesters before your defense.

As you decide on your dissertation topic, you need to enter a new IRB protocol that has been pre-approved by your dissertation committee. As such, it is recommended that you plan ~2-3 pre-dissertation meetings beforehand to make sure your research questions as well as your proposed research design are appropriate to the scope of your dissertation project. In your first meeting, you should plan to provide justification of your research topic, along with a brief description of your PoS and intended research questions (~6-10 slides). Your second and/or third meetings should be more focused on your proposed research methodology and/or design (~15-20 slides). The latter meeting(s) should be accompanied by your first three chapters of your dissertation (see Dissertation Research Proposal section below). The dissertation research proposal should be sent to the committee at least 2 weeks prior to the latter meeting(s).

Upon receiving committee approval for these pre-dissertation meetings, you will have to complete the appropriate IRB Protocol forms before you can move forward with your dissertation (http://rgs.usu.edu/irb/) and you should plan to also complete any additional forms from the Graduate School (http://rgs.usu.edu/graduateschool/doctoral-forms-guide/). Upon receiving IRB approval for your dissertation, you may proceed to conduct your dissertation research.


9.1 Strategies for Choosing a Dissertation Topic

Some students may be lucky in this regard - they may be paid as an EED RA to do research in an area of interest and decide to continue with a dissertation study in the same area. If this is not the case, reading literature - as much as you can - is the best way to conceive a dissertation research area from scratch. As you read, notice what kinds of papers, e.g., topics, theoretical perspectives, methodologies and methods, hold your interest and what kinds do not. You may periodically ask yourself questions like: What interests me about education/engineering? Where do I hope to pursue a career? Answering these questions can help you identify your area of interest.
It is important to understand an area of research interest is not necessarily a useful dissertation topic. This means you have to keep reading and have plenty of discussions with your Faculty Advisor (Major Professor). Once you have an area of research interest in mind, begin to focus your reading within this area. Ask yourself questions like: What are the big questions that pertain to this area? What has been accomplished? What needs to be accomplished? Where could I potentially contribute? This is usually called “finding the gap.” Ultimately, you will have a fitting dissertation topic when you find something that is both interesting to you AND compelling for the field.

In addition to reading and having discussions with you Faculty Advisor (Major Professor), other actions you can take are to solidly prepare for your classes and participate deeply in class discussions. Take personal notes about things you have discussed or read in your courses to look into or study more. Keep your own set of literature comprised of the studies you find interesting. Talk with others outside of class about research and literature.

9.2 Why Require a Dissertation Research Proposal

As part of the requirements for completing the Ph.D. degree in Engineering Education, students must independently write and defend a dissertation research proposal. The dissertation research proposal is not the final dissertation. The dissertation research proposal is a proposal given to your committee before conducting the dissertation research. The dissertation research proposal has two main objectives. First, the proposal articulates the student's dissertation research plan. Second, the proposal provides an opportunity for the student to gain experience in research proposal writing, which is a necessary component to writing the dissertation.

The process to write and defend a dissertation research proposal includes a series of meetings with the Faculty Advisor (Major Professor) and, possibly, the doctoral dissertation committee. Students must submit the proposal electronically to their entire committee 2 weeks before the defense of the proposal. The dissertation research proposal must be approved by the doctoral dissertation committee before the dissertation research can begin.

9.3 Guidelines for Dissertation Research Proposal

This section provides guidance for Ph.D. students to prepare a dissertation research proposal. The items described in the Dissertation Research Proposal Content and Components section shown below consists of the minimum requirements stipulated by the Department. The recommended page length for the proposal is 30-50 pages, not including references and appendix. You should work with your Faculty Advisor (Major Professor) to determine the most appropriate length of the proposal. The proposal should follow APA guidelines, use 1-inch margins on all sides, be double spaced, be single sided, and use 12 point Times New Roman font.

The dissertation research proposal consists of Chapters 1-3 of your final dissertation, along with the description of a pilot study (as an additional chapter), if needed. If you are including a pilot study chapter, the text in this chapter should not be an exact copy of a previously submitted or published manuscript. Doing so would constitute copyright infringement. Instead, the pilot study chapter should include a synthesis or summary of other related work to this dissertation and reference a publication already published. If elements of a published or submitted article must be included in the pilot study, this work then needs to be presented in a manner that does not overlap with the published work. If you will use information or data collected from a grant given to your faculty advisor, please plan to discuss authorship and copyright issues beforehand. For
The dissertation proposal (Chapters 1-3 of your dissertation) should contain the following:

- **Title Page:** Should include the title of the research study the graduate student will conduct, student's name, Faculty Advisor (Major Professor), and department name.
- **Chapter 1, Introduction** (3-10 pages): Should include a well described rationale for the study as well as the research questions/hypothesis pertinent to this work.
- **Chapter 2, Review of Literature** (10-25 pages): Should include selected literature on the state of art of the research in the field as well as a discussion of how the graduate student’s work will help fill a gap in the engineering education field.
- **Pilot Study Results** (optional): Should include preliminary findings from current research, a recent conference proceeding, or poster that is relevant and will help support the justification for the work as introduced in the Introduction and Review of Literature sections.
- **Chapter 3, Research Methodology/Design** (10-20 pages): Should include an overview of the intended methodology or research design along with citations to justify the research study selection. In addition, a discussion of the methods and overview of the intended data analysis procedures should be discussed.

### 9.4 Guidelines for Final Dissertation

The following paragraphs describe specific components of your final dissertation. These components for Chapters 1-3 and the pilot study (if included) also apply to the dissertation research proposal. To fulfill the responsibilities of the first three chapters in the dissertation research proposal, IRB approval will be needed before you conduct the proposed dissertation research. At the conclusion of your final dissertation document (e.g. Chapters 1-6 or higher) you must include the copy of the IRB approval certificate and report as an appendix in your final dissertation.

Writing the final dissertation will require you to refine the work presented in the dissertation research proposal in coordination with your Faculty Advisor (Major Professor). The following are minimum requirements stipulated by the EED.

**Chapter 1. **Introduction

1. Frame the problem, i.e., background or need for the study.
   1) Why is this research important?
   2) Cite literature as needed using APA style
2. Summarize your purposes/goals and objectives.
3. Summarize research questions and/or hypotheses, which should align 100% with objectives.
4. Briefly describe your research approach, i.e., qualitative, quantitative, or mixed-methods.
5. Briefly describe the theoretical framework guiding the study, if used, and positionality as a researcher.
6. Briefly discuss the research methodology and/or research design.
7. Summarize the assumptions taken in order to conduct the research.
8. Summarize the significance of the study and implications of the study.
9. Summarize the limitations of the study, from a research design and results standpoint.
10. List the definitions of key terms used in your dissertation.

Chapter 2. Review of Literature

1. Introduction: “This literature review will....”
2. Use subsections that indicate the topics of your theoretical framework.¹
3. Show in your theoretical framework there is a gap in existing research and how your study will help fill this void.¹
4. Include a summary of the Review of Literature as it relates to your theoretical framework and main objectives of the research.

Pilot Study (optional)

This pilot study section is optional and required only if pilot work was done to help argue the research. If used, the study becomes Chapter 3 and other chapters increment accordingly.

1. Purpose and overview.
2. Appropriate subsections to define and describe the components of the pilot work, i.e., methods, results, discussions, conclusions, implications, etc.
3. As indicated above, this pilot work should not be copyrighted from previously submitted, reviewed, or published work; this chapter should be original in approach and in writing.

Chapter 3. Research Methodology/Design

1. Describe the research approach (i.e. mixed methods, qualitative, quantitative) and justify your selection (e.g., an explanatory sequential mixed method design was selected because ...).¹
2. Restate the research questions for qualitative and mixed-methods research AND/OR hypotheses for quantitative and mixed-methods research.
3. Describe the research methodology/design and its appropriateness based on your theoretical framework (if used) and positionality as a researcher.¹
4. Discuss IRB approval for your dissertation research. Proof of IRB must be included in an appendix in your final dissertation.
5. Describe the population from which the participants were recruited.
6. Describe participant recruitment or sampling procedures (e.g. purposeful sampling considerations, sample size estimations, and randomization).¹
7. Describe the participants.
8. Describe the data collection methods and discuss how they align with the research methodology.

¹ There is often confusion whether material should be duplicated in Chapter 2 and Chapter 3. The best answer is that you may often need to include discussions in both chapters but with different objectives. For example, you may decide to use a case study qualitative research method in your research. You should then include a literature review of whether any existing case study research has been done in this area (showing the uniqueness of your work) as well as any literature that shows the method is viable for the work you are proposing (similar work done with a case study method). In Chapter 3, you would also want to reference methods publications showing you are following an accepted research methodology and arguing the selection of this method is appropriate.
9. Describe the data analysis techniques (e.g., types of coding techniques, types of statistical analysis techniques, and data mixing procedures).

Chapter 4. Results

1. List and describe your results. Be careful not to discuss or interpret your results to any substantial extent in this section.
2. Clearly describe how your results map to or “answer” your research questions and/or hypotheses.

Chapter 5. Discussions

1. Interpret your results in the context of the previous work discussed in your literature review and theoretical framework (if used) sections. Be sure to draw connections between your results and those of other researchers.
2. Consider the limitations of your study when making interpretations and, if needed, discuss how the study limitations moderate your interpretations.
3. Discuss how the study met its goals/objectives.

Chapter 6. Conclusions/Significance/Implications

1. Summarize the major, most important outcomes from the study.
2. Provide recommendations for future researchers in the same field. These recommendations can include:
   1) Recommendations for future research topics.
   2) Pertinent research questions that need to be answered within the field.
   3) Implications of the research for teaching and/or professional engineering practice.

Section 10. Expectations

10.1 Overall Expectations

Ph.D. students are responsible for working towards completion of their degree programs in a timely manner. In addition to gaining expertise in Engineering Education, you are expected to expand the knowledge of the discipline by discovering and pursuing a unique topic of scholarly research, resulting in the Ph.D. dissertation. It is your responsibility to ensure continued progress of your academic program and research.

- Expectations: Students working on an Assistantship (RA or TA) are expected to work an average of 20 hours per week (12 months per year for RAs and 9 months for TAs). This includes adherence to timelines for the successful completion of any duties, such as research projects, teaching assignments, and work related to the assistantship. Program coursework, class assignments, and working jobs outside the campus are not part of the 20 hours per week. Also, this time needs to be reported to your Faculty.

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2 A common, standard organization of Chapters 4-6 is provided here. Be aware there is creative flexibility that exists when developing and organizing the results, discussion, and conclusions of your research. Other organizational schemes may be more appropriate for your particular study. You should discuss how to structure Chapters 4, 5, and 6 with your Faculty Advisor before beginning to write your results.
Advisor (Major Professor). Be sure you discuss the best strategy to report hours worked.

Presidential Doctoral Research Fellowship (PDRF) recipients are also expected to commit to an average of 20 hours of work per week (12 months per year). Funding provided through their fellowship by the Office of Research and Graduate Studies and the Department is under the direction of their Faculty Advisor (Major Professor), and research should align with what has been agreed upon by the Faculty Advisor (Major Professor) and the student. Students should also review the additional requirements and expectations needed as a recipient of this fellowship.

- **Resources:** Students will receive appropriate resources, including office space, reasonable access to faculty, appropriate course offerings to meet the student’s approved program of study, and facilities to allow completion of the program per discretion of each Faculty Advisor (Major Professor).

- **Guidance:** Students will receive advice and direction regarding the academic program as well as dissertation research.

- **Training:** Students will receive training on the current best practices in research and teaching, including appropriate techniques, tools, methods, and equipment needed to successfully carry out research or teaching duties.

- ** Appropriateness:** Students will have projects and tasks that are assigned appropriately for the program of study and designed to help make continued progress towards completion of the degree.

- **Evaluation:** Students will receive timely and fair assessment of their work, including course work, program exams, research, and teaching.

- **Professional Development:** Students will be provided, in appropriate cases, with opportunities to publish research; present the student’s work; apply for patents and copyrights for the student’s work; and attend colloquia, seminars, and workshops to support professional development.

- **Fair Treatment:** Students will be given appropriate credit for work and provided clear guidelines on authorship, data ownership, and research practices when engaged in joint research projects (see details in Ethnical Conduct and Intellectual Property below).

- **Conflict of Interest:** Students will receive appropriate instruction about avoiding conflicts of interest.

- **Feedback:** Students will be provided feedback on performance and given clear guidelines and agreements on the required areas of improvement when performance is deemed poor and the student is in jeopardy of being removed from the program.

### 10.2 Academic Progress Report

The academic progress report consists of two components and allows you to report your progress towards graduation concerning what you have learned as well as your research progress on funded research areas.
Component One: The first component involves a written report that is to be submitted at the end of each spring semester to your Faculty Advisor (Major Professor) and the Department Head. This report should not be longer than two pages and should be succinct. The report should indicate the milestones you have achieved in your directed research under your Faculty Advisor. This reported research is not meant to reflect any research work done as part of any courses you have taken or are taking but rather should reflect work done towards research in directions that your Faculty Advisor (Major Professor) and you have chosen and collaborated on. Examples may include a list of abstract submittals for conference publications, submitted journal articles, accepted and published journal articles, submittal of a grant you helped to develop, data collection, data analysis, and in general, any work you have completed in regards to research and publication activities. This document should clearly illustrate you are making progress towards a research agenda.

An appropriate allocation of time towards research should be an average of 20 hours per week. Please note that a 20-hour per week time allocation is a targeted average and is not meant to include homework for courses, research engaged in for other courses, your own personal work, or service work you are completing for others.

Component Two: The second component consists of a presentation of your research developed and delivered in the Research Seminar class (EED 7810). You are required to attend this course each year of your graduate experience and register for the course once. During this course, you will be expected to present your current research endeavors and progress to both faculty and fellow EED graduate students. This is an opportunity for you to gain experience making presentations and to receive feedback that will prove beneficial as you progress towards presenting at professional conferences.

10.3 Ethical Conduct and Intellectual Property

- High standards of integrity and ethical practice are important in your academic and professional career. You are encouraged to read carefully the Utah State University ethical conduct policy, which is available online at https://studentconduct.usu.edu/.

- During your graduate study, some courses may require you to design and/or execute a course research project, which may potentially result in conference and/or journal publications. Your Faculty Advisor (Major Professor) might not be aware of these course requirements. You should discuss in advance with your Faculty Advisor your course research project and determine if it is appropriate to use the research topic and/or the research method (such as data collection and data analysis) that are similar to, or the same as, your dissertation research or any other research project that is under supervision of your Faculty Advisor.

- You are encouraged to read carefully what constitutes intellectual property (visit: https://www.usu.edu/policies/587/). For example, you may receive wages, financial support, training, and/or research experience associated with a USU research project (either internally or externally funded) and/or employment under the direction of a Faculty Advisor. In the process of your research, you may come in contact with or generate certain proprietary and confidential information. This includes: data, formulae, computer software, specifications, processes, designs, inventions, creative works, patent applications, copyrights, trade secrets, “know-how”, and/or other technical or product
information associated with your research; anything marked as or later designated as "confidential" or "proprietary"; and anything you reasonably should understand to be confidential or proprietary ("Proprietary and Confidential Information").

You should understand that 1) Proprietary and Confidential Information is owned and controlled by USU; 2) you are not to publish or disclose any Proprietary and Confidential Information to third parties, except as otherwise authorized by USU in writing; and 3) you are not to make any use of Proprietary and Confidential Information, except in the course of your participation in the research or as otherwise authorized by USU in writing.

- To be listed as an author on a publication, criteria generally require you make a significant, identifiable, original intellectual contribution to the project; contribute more than "serving as a pair of hands" (recording data, entering data, typing, analyzing data); understand the study reported in the paper as a whole; and participate in the writing of the technical paper.

As a general guide, you should always discuss with your Faculty Advisor (Major Professor) the order of authorship on publications generated from your course work and project and dissertation research. For additional information on authorship, you are encouraged to review:

- APA’s publication: “A Graduate Student’s Guide to Determining Authorship Credit and Authorship Order” [Link]
- The responsible conduct of research, including responsible authorship and publication practices by Ruth Ellen Bulger [Link]
- A Guide To Responsible Conduct In Research Third Edition [Link]

- If you intend to publish in open access journals, you should discuss with your Faculty Advisor (Major Professor) in advance. The Directory of Open Access Journals, [Link], provides a rigorous directory of legitimate open-access journals. You are encouraged to read the following articles about predatory publishing:

  - “Caught in the Trap: The Allure of Deceptive Publishers”: [Link]
  - “Question / What to Look For / Red Flags” table: [Link]

### 10.4 Department Check-In Procedures

- If you are an international student, you will need to see the Immigration Advisor in the Office of Global Engagement [Link] as soon as you arrive at Utah State University.

- If you are receiving an assistantship through the Department, you will need to be put on payroll. I-9, W-4, and direct deposit forms will need to be completed. There is specific documentation required for each form. This information will be provided to you by the EED Graduate Program Coordinator once you arrive.
For office space in the graduate student cubicles, please see the Graduator Program Coordinator of the Engineering Education Department.

Keys and/or prox cards will be ordered for you once you arrive. It is your responsibility to visit the Key Office once you are notified keys are ready.

A computer is provided for your use in the Engineering Education student offices. It is your choice to use this computer or you may provide your own computer.

10.5 Department Check-Out Procedures

Clean out your office space; return the space to its original condition (EED office staff must check the office space).

Return key and/or prox cards to the Key Office when you have completed the program. If keys are not returned, you will be billed $25 for each key and/or prox card.

If you used a Departmental computer, make sure all documents are removed from the hard drive and ask the IT personnel to verify the computer is clean of any viruses.

Turn in a bound copy of your dissertation to the Department.

Provide employment information: institution where you will work, job title, and permanent email address.

Section 11. Other Useful Information

- Engineering Writing Center:
  https://engineering.usu.edu/students/ewc/

  The Engineering Writing Center (EWC) assists engineering students (both undergraduate and graduate) in developing their technical writing skills. Through one-on-one consultations, students refine document structure, apply technical writing standards, and use correct grammar and format. The EWC is located in SER 130, and appointments can be made at ewc.usu.edu. Hours of operation are Monday through Friday from 1:30-4:30 pm (for scheduled appointments) and Monday through Thursday from 4:30-6:30 pm (for walk-ins).

  The EWC does not provide assistance for theses and dissertations due to the specialized nature of these documents. Graduate students are encouraged to see their Faculty Advisors for assistance with these documents.

- USU Graduate School:
  http://rgs.usu.edu/graduateschool/

- USU Graduate Catalog:
  http://catalog.usu.edu/preview_entity.php?catoid=12&ent_oid=998
• USU Office of Global Engagement:
  http://globalengagement.usu.edu

• Purdue’s Online Writing Lab:
  https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html

• Publication Manual of the American Psychological Association, Sixth Edition

• Engineering/Engineering Education Librarian, Pam Martin (pam.martin@usu.edu)