Guidelines for UTeach Summer Master’s Reports:

This document describes the general form for all UTeach Engineering Summer Master’s Reports. Individual reports will vary from these general guidelines as necessary and as agreed upon by the Faculty sponsor for each candidate. It is important for you to negotiate the form of your report with your faculty sponsor. This information is based on the guidelines presented for Master’s Reports submitted to the Graduate School of the University of Texas, found at:

http://www.utexas.edu/ogs/pdn/pdf/format_guidelines-m.pdf

The first two sections of your Master’s Report should be in draft form or completed by the end of the spring semester preceding your summer of research. These first two sections may or may not be relevant if you select the design rather than the research option below. You should discuss this with your supervisor.

1) Introduction and Statement of the Problem. This section should provide an overview, laying out the big picture and indicating its importance. The specific focus of the report should also be identified and related to the general area of inquiry, along with the plan or organization of the report.

2) Review of the Literature. The review should include general and up-to-date research addressing the topic of the report. In most cases, pertinent theory or conceptualizations of the topic should also be described. If they are available, published reviews on the topic should also be examined. Depending on the nature of the topic, this review may include theoretical articles and/or empirical studies. Your critical evaluation of such literature is also important.

To help you think through what you should be preparing to do this summer and what you need to write to complete you’re the two sections listed above in the content seminar this semester, please consider and discuss the following topics with your faculty sponsor:

a. What is the Big Question – i.e. – what is/are the important research efforts going on in your laboratory or research group? And how does your work this summer interface with the laboratory’s “Big Question”?

b. What is your goal for the summer in this research experience?

c. What do you think the focus of your report will be? (Submit an outline)

d. What kinds of data will you gather and how will you analyze it?

Part 3 of your Master’s Report – Research or Design Report

3) Research or Design Report. The 3rd section of your Master’s Report will focus on Methods, Results and Data Analysis and Conclusions OR on a report of your design process, including Problem/Need and Constraints, Model of the Problem System, Solutions Evaluated, Solution Selected (with justification), Development and Prototype Design Documentation, Prototype Test Data with Evaluation, Revisions, and Documentation of Final Design, Final Performance Report. This section is not described
Research Project:

a. In the Methods section of your report you should clearly state what techniques, equipment or procedures you followed to carry out your research. If these procedures are used routinely, they can be simply named and referenced. If these procedures were extensively modified or newly developed by you, you will need to describe them in more detail. The Methods section should make it clear to your readers that care was taken to gather meaningful data – for example, you should describe the controls employed or calibration procedures used.

b. In the Results and Data Analysis section of your report you should clearly describe the data that was gathered, presenting it in summary form using tables and graphs as appropriate. If preparing graphs of quantitative data, be sure to include error bars. This section is where you will describe the statistical analysis of your data.

c. In the Conclusions section of your report you will state the significance of your results and data analysis as well as describe any sources of error. Describe how your results fit into the big questions of the research group and how they might lead to future research efforts. It is also appropriate to describe what you would do differently if you could continue this work.

Design Project [NOTE: It may be useful to use the UTeachEngineering Design Process schematic as an organizing structure for your report.]

a. Problem/Need and Constraints. Should include a detailed description of the need, including background, all specifications provided by the customer if applicable, an RFP if available. This section should discuss how needs might vary across a diversity of individuals or clients. This section should also document the quantitative specifications you have developed from the customer needs. It might be useful to include sections of your engineering notebooks here, at least as an appendix.

b. Model of the Problem System. This section should include both a qualitative and quantitative description of the system in which your design will operate. It should include representations of the user/user input if appropriate. For example, in modeling the system of a pinhole camera, you should include the person using it (or at least her eye!) as well as the object being imaged and light sources. If you have used a system like MathCAD or myDAQ to model the system, those outputs should be included. It might be useful to include sections of your engineering notebooks here, at least as an appendix.

c. Solutions Evaluated & Solution Selected. This section should describe, at least briefly, all the solutions you considered and how you selected one solution to develop. It might be useful to include sections of your engineering notebooks here, at least as an appendix.

d. Development & Prototype Design Documentation. This section should document the process you used to develop your prototype as well as
documentation of the prototype design. It might be useful to include sections of your engineering notebooks here, at least as an appendix.

e. **Prototype Test Data with Evaluation.** This section should include a detailed description of the test you used to evaluate the prototype against specifications, results of the tests, as well as a general summary performance evaluation. It might be useful to include sections of your engineering notebooks here, at least as an appendix.

f. **Revisions.** This section should describe revisions made to address the performance evaluation above, and may include several iterations. It might be useful to include sections of your engineering notebooks here, at least as an appendix.

g. **Documentation of Final Design & Final Performance Report.** This section should include documentation of the final design, including performance data, appropriate for reporting to a customer or archiving in company or personal records. This is the record you or someone else would start with in developing the next generation of the design.

**Part 4 of your Master’s Report – Application to Practice**

4) **Applications to Practice.** The purpose of the UTeach Summer Master’s program has been to grow teacher leaders, individuals capable of bringing a high level of scholarship to the reform of teaching practices. In this section of your Master’s Report you should demonstrate how your experiences in the UTeach Summer Master’s (MASEE) program have supported your growth as a teacher leader and how you will use what you have learned when you return to your schools and school districts.

In particular, you should discuss how you have developed in regard the four UTeachEngineering outcome dimensions, providing specific evidence and discussing any areas where you feel the program has not helped you to grow:

(1) **Developing Engineering Awareness.** This section should document how prepared you feel to represent engineering careers and practices to your future students and why, as well as your specific plans for accomplishing this in your future classroom or other educational endeavors (e.g., curriculum design.)

(2) **Developing Engineering Habits of Mind.** This section should include examples of how you have employed engineering habits of mind and how you will facilitate your students’ development of these habits.

(3) **Developing an Understanding of the Design Process.** This section should detail how your research or design project contributed to your understanding of the design process, including ways in which you feel that your work was not representative of the design process as presented by UTeachEngineering.

(4) **Developing Knowledge for and of Engineering Teaching.** This section should include specifics of how what you have learned in the MASEE program will affect (or has already affected) your practice in engineering education.