

TECH 4945 Senior Project

Fall 2018

Guidelines for the Project Report

Changes from TECH 4943 to TECH 4945 are highlighted in **RED**. Other sections should be corrected/updated to improve the writing or to correct for major changes in the project. Ask instructor if unsure about required changes.

COVER PAGE Each student will design a cover page which contains the following:

Project Title
Student's Name
Date Submitted
Course Number and Course Name
Department of Engineering Technology
The University of Memphis

PROJECT SUMMARY The summary is an informative abstract of the proposal that briefly outlines the most important points. It may contain a brief description of the problem, proposed solution and benefit. You need to convince your reader that this project has value. (250 word min 350 word max)

INTRODUCTION Provide background information on the project. (800 word minimum)

If the nature of the project is one in which you are proposing a solution to a problem for a company be sure to set the stage by including the industry in general, company if applicable, and department if applicable. Continue with an explanation of the problem or situation that is being addressed in the thesis. How has the situation developed and why is it significant? How important is the solution to this problem? Describe the how the existing technology works. Describe how the new technology works and why it is better. **Conclude with a bullet list of the specific objectives for this thesis. These objectives must be measurable and/or observable.**

OR

If the project is one in which you are proposing a new design for a product or service be sure to set the stage by including similar projects/products already available on the market and how your design will be different or better. Continue with an explanation of the value of your design. Describe the how the existing technology works. Describe how the new technology works and why it is better. **Conclude with a bullet list of the specific objectives for this thesis. These objectives must be measurable and/or observable.**

OR

If the project is one in which you are repairing equipment for the department and developing a lab exercise be sure to mention the course in which the lab will be performed, discuss the objectives for the lab exercise, explain how the equipment should work, and how these learning objectives are used in industry. **Conclude with a bullet list of the specific objectives for this thesis. These objectives must be measurable and/or observable.**

TECHNICAL PLAN Provide **DETAILS** on the project will be done from a technical standpoint

This section will cover the technical details of how the project will be accomplished. Although not every technical detail is expected to be worked out in TECH 4943, major decisions on methods, materials, and methodologies should be researched and decided upon while planning the project.

Software Design – discuss the platform, programs and/or languages to be used (ie Raspberry PI running Linux, with PHP, Apache and mysql), how the various programs, libraries, scripts, databases, and applications will be used within the system to complete the project. Discuss major issues with user interfaces, web site designs etc. Block or System Context Diagram (or similar) should be included.

System / Networking Administration – (TBD)

Microprocessor / Microcontroller –(TBD)

Automation & Control System – Describe the process or system to be controlled, what types of controls, sensors, transmitters and actuators will be used and how they will be implemented. Process diagram, System diagram, block diagram or other appropriate overview should be included.

Mechanical Systems / Product Realization – Should include sketch of product, materials to be used, and methodology for construction (ie welding, 3d printing, laser cutting etc).

Operations Strategy & Lean Principles – (TBD)

TECHNICAL IMPLEMENTATION Provide the finalized technical details of your project. This should include ALL diagrams (3D CAD, schematics, finalized flowcharts, finalized network diagrams, etc) as well as a full description of the implementation of the project.

EXPLANATION OF TECHNICAL CHANGES provide information as to why any differences between the Technical Plan and Technical implementation occurred.

PLAN OF THE WORK Document the plan to be implemented in achieving the specific objectives listed in the Introduction. This section must convince the reader that you know exactly what needs to be done and how long it will take.

This documentation will include:

A Work Breakdown Structure (WBS) that lists every task that will have to be completed and how long it will take in hours. Your project must have a minimum of 15 technical tasks required for completion. Points will be deducted if there are fewer than 15 technical tasks.

| Task | Time to Complete in Hours |
|-----------------|---------------------------|
| | |
| | |
| Total Man-hours | # |

Table 1 Work Breakdown Structure

A Gantt Chart produced using appropriate software. Regardless of the format there needs to be a detailed explanation using the Work Breakdown Structure approach and define the exact tasks and sub-tasks (down to level 3) that must be completed (when the task is scheduled to start and when it is expected to finish), the deliverables and their associated due dates, the predecessors and if working as a team a description of who is responsible for each task. A typical project will require approximately 80 hours of technical work and 40 hours of documentation.

Insert your Project Chart Here

Figure 1 Plan of the Work

Teams of two or more also need to stipulate who is responsible for each task. The project will require an additional 50 hours per team member. (i.e. a two person team will require a total of 170 hours of work.)

ACTUAL PROJECT TIMELINE add a 2nd WBS and Gantt chart showing the ACTUAL TIME the project took. Analyze differences and explain how delays and other issues could have been planned for or avoided.

QUALIFICATIONS Normally this section would include an explanation of your qualifications, work experience, education, and certification, to complete this project. Since this is an academic exercise this section will be used to demonstrate the integrative and capstone nature of the project. Consequently, in this section list each course you have taken at the University that provided you with the skills and knowledge to complete this project. Next to each course specify the topic(s) that was covered in that course and how it will apply to the project. Work or military related experience should also be included, but in narrative form.

| Courses | Topics Covered | Skills Application |
|---------|----------------|--------------------|
| | | |

Table 2 Summary of Relevant Educational Background

FACILITIES, EQUIPMENT and MATERIALS Describe the equipment, computer hardware/software, and human resources needed to complete the project. Specify the parts and equipment that will be used, and people who will assist in implementation. **Update parts list for final project. Compare actual cost to that in your proposal and explain any significant difference.**

| Part Name | Part Number | Company | Quantity | Price | Availability Shipping Time/Cost | Cost to Student | Supplied by U of M or Company |
|-----------|-------------|---------|----------|-------|---------------------------------------|-----------------|-------------------------------|
| | | | | | | | |

Table 3 Summary of Cost Expenditures

| Name | Position | Company | Task |
|------|----------|---------|------|
| | | | |

Table 4 Summary of Human Resource Requirements

EVALUATION What measure(s) will you and I employ to evaluate your success at reaching the objectives of the project? How will you document your success? Each project must be demonstrated in person to the instructor of record or his/her designee. The success must also be documented on paper to be included in the final written project report.

| Objective | Measure of Success | Documentation of Success |
|--|--|---|
| This should match the bullet list in the introduction. | How will you determine if that objective has been met? | What evidence will be provided in the final technical report? |

Table 5 Summary of Criteria Defining Success

EVALUATION ANALYSIS using what you proposed, evaluate the project based on the criterial from TECH 4943. Show test results, and other data to back up the evaluation of your project.

LIMITATIONS These include both limitations on the scope of your project, (i.e. you are building a better wheel, not a better car) and, on the limitations of the equipment, software, computers, capital, and expertise available to you. Give this section serious consideration. Consider all the things that are project related that can go wrong. Do not include the potential problems for you personally such as illness, accident, job relocation, etc. (Remember equipment can break, assigned duties at work can change, and a faculty member can take ill...) What is your back-up plan? **Update to add any unexpected limitations not predicted in TECH 4943 and discuss how they could have been anticipated and planned for.**

CONCLUSION Was the project a success and to what degree. Did it meet the objectives stated in TECH 4943? If not draw conclusions and state lessons learned.

APPENDICES This section contains supplementary material that is too lengthy to include in the main body of the proposal or that is of interest to only a few readers. It also contains your completed survey. **This should be updated to include final diagrams, code listings, etc.**

BIBLIOGRAPHY – Use the MLA format for documenting references. There must be at least **five** references. They must be less than five years old. You may include Journal articles, web postings, reference books, textbooks, and interviews. *You may not use web postings and/or interviews exclusively.* Computer projects require references less than **two** years old except where related to a specific piece of hardware. You will be graded on format, quantity and quality of the references. Points will be deducted if references are cited that do not relate to the project.

Note:

- a) The inclusion of photographs, diagrams, screen captures, etc. is encouraged. But, if used, each figure must have a number, caption, and the source cited.
- b) One of the grading criteria includes a demonstration of the use of technology. This includes the ability to use word processing software efficiently, (use of proper formatting including tabs, page breaks, section breaks, headers/footers, page numbers etc.) This includes the proper insertion of files that contain photos, diagrams etc.
- c) Grading criteria includes but is not limited to, spelling, grammar and flow

The complete proposal document is to be included in a single MS Word file. You will submit a hardcopy of your proposal as well as an electronic copy.

The hardcopy should be in a view binder (of appropriate size – for BOTH TECH 4943 and 4945) with appropriate cover and spine, labeled section dividers etc (make it look professional). It should include a cd/dvd in 3 ring binder sleeve. The disk should include the report, all drawings (in original file format), Parts lists, Microsoft Project file, supporting PDF's and other support documentation for the project.