WASHINGTON STATE UNIVERSITY
GLOBAL CAMPUS

Engineering and Technology Management
VOILAND COLLEGE OF ENGINEERING AND ARCHITECTURE

General Guidelines for the EM 702 Project

1. Use the EM702 project to extend your knowledge and understanding of the multidisciplinary nature of engineering management. Select a project topic that you are interested in and passionate about and that you strongly believe your work on will make a difference.
2. Use the project to demonstrate your ability to synthesize and apply what you have learned throughout the program. Demonstrate both a depth and breadth of understanding of your courses of study and your project research area(s). Carry out this work over two semesters, enrolling for EM702 for two credits each semester.
3. Specifically, identify a problem, perform research, develop an approach to address the problem or further the research, outline the plan, implement to the extent feasible, gather the findings, synthesize the data, determine the value of the solution (see *Determining Project Value* by James Holt), and document future research needs, next steps, and lessons learned.
4. Start with a project proposal (see *EM702 Project Proposal)* that describes the project (project purpose, intended method, anticipated results) and includes an initial schedule with the required E M 702 project milestones. Provide this information to faculty when requesting faculty to agree to be your Chair or members of your committee. Your full committee of three (minimum) needs to be identified prior to enrolling in the first of two 2-credit E M 702 courses.
5. In the first semester of your EM702 project, complete your planning and research, finalize the problem definition, define and implement the research approach, and gather preliminary findings; document your work as the first three chapters of your project paper (see *Comprehensive Guidelines for the EM702 Project* and the *ETM Masters Template*).
6. Midway through the second semester, be prepared to have completed your project paper and present your project and findings to your committee in a real-time oral presentation where you will present for 20 minutes, respond to questions, and then receive feedback from your committee after deliberations are complete. Update your final paper to meet your committee requirements, by the deadline given.
7. Plagiarism in any form will not be tolerated and the student will be subject to immediate dismissal from the program and the WSU Graduate School.
8. The elements enumerated above are by no means exhaustive. Do your best.

Include the following academic integrity statement on the title page of your presentation and as a separate attachment with your project paper. Sign the statement by typing your name on the space provided. **Note your final paper and presentation will not be accepted without the signed statement.**

I commit myself to Washington State University's high standards to uphold academic honesty and scholarly values as established by the WSU's Standards of Conduct. I affirm that I have not given or received any unauthorized assistance on this assignment/examination, that the work product presented here is the work of the author(s) [myself or all team members listed], and that all materials from other sources (including books, articles, Internet, or other media), whether quoted or paraphrased, have been properly cited.

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Typing or electronically signing my name above serves as my signature

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**Current Job Title* **Employer* **Future email (*optional)*

Comprehensive Guidelines for the EM702 Project (Option 2)

The Project Option for EM702 is completed over the final two semesters of the Masters program under the guidance of a Committee Chair (ETM faculty) and two ETM faculty committee members, and includes a project (action or research focused), a written paper (of publishable quality), and an oral presentation (normally presented via Blackboard Collaborate). Specific deadlines are posted within the Blackboard Learn EM702 course site for the semesters in which students enroll to complete the course requirements for the EM702 project. General EM702 project mechanics, deliverables, milestones and timelines, and grading guidelines are posted in subsequent sections.

The EM702 Project is completed on a topic of interest to the student that demonstrates the breadth and depth of knowledge gained during the Engineering and Technology Management (ETM) Master's program. The EM702 project integrates skills from several different classes and at the same time extends the student's learning as students explore in depth, the topic of choice. In many cases the project is directly work related allowing the student to select meaningful problems from the work environment and integrating the project with day-to-day work duties. However, it is also important to exclude any work related proprietary information from the project paper and presentation.

The project requires advance planning. Students start by identifying a project, discussing the project idea with ETM faculty, developing a detailed project proposal including a project description and schedule with deliverables (see ***EM702 Project Proposal***), and providing the project proposal to faculty along with a request for a committee chair and two committee members who approve the proposal and agree to serve on the student's committee. These activities should be completed mid-way through the Masters program and the initial project proposal and committee selection must be completed before the student can enroll in their first semester of EM702.

The EM702 Project should be a workable topic that the student can complete within a two-semester time period. The intent is to encourage the student to ponder the problem, solution, and implementation where feasible within this window. Projects can be a continuation of an in-progress class project with additional effort required to develop, integrate and finalize the report; the beginning phase of a significant study to be completed later; or a succinct project with a start, process, and conclusion. By carefully selecting the project topic, the student is encouraged to work on problems of importance to their current employment, which would mean much of the work could be done as part of normal working hours. This helps the student as well as provides a valuable product to the employer. The student may also propose other types of projects of importance to their personal vision, local community, future plans, or of service around the world. Whatever the topic selected, the student must be able to find ETM faculty that approve his or her project proposal and agree to serve on his or her committee.

EM702 Mechanics

A. Complete the project proposal

Provide a solid project proposal (including a project description and schedule with deliverables) prior to finding a committee chair interested in your project and committee members that can support your topic. See the ***EM702 Project Proposal*** *(separate file)*. The project proposal is a living document that changes over time. The project proposal includes both the project description and the project plan. In the project description, students should provide the purpose of their project along with a brief background, describe how they are going to carry out their project work including what they are going to complete by when, provide a brief description of the method/approach they intend to use, and discuss their anticipated findings. The project plan should include a schedule, which shows all of the key milestones including the required EM702 project deliverables. Students post their initial project proposal in week one for the first semester EM702, and update the submission as feasible throughout the semester, submitting the final complete project proposal by the end of the first semester of EM702. This becomes the basis of the project proposal for enrolling in the second semester of the EM702 project.

B. Select a committee

Discuss your proposed project with several faculty members. Typically, this will be mid-way through the program or shortly after finishing the fourth course in the program. Use these discussions to probe the project topic dimensions and to identify faculty interest. The *EM702 Project Proposal* emailed to the faculty is required (initially the Chair and committee members will be pending). The proposal states the intention of your project and provides an initial plan of what you will do and why you will do it, and the email requests a Chair and two committee members. At this point you should be aware that the Chair is quite interested in your project. The Chair should have talents that can contribute to your expected needs and have the time to communicate with you in a timely manner. A clearly written proposal will contribute to a timely and successful completion of your project. Submit the completed *EM702 Project Proposal* to the ETM academic coordinator once you have your committee, and you and your committee have agreed on the chosen project.

C. Communicate project status

Establish standards for communicating with your Chair and committee members. The recommendation is to communicate bi-weekly with your project committee chair and send progress updates to your committee monthly during your two EM702 semesters. You may choose to meet with your Chair bi-weekly through BB Collaborate or talk on the phone periodically during the semester. Remember, the Chair may be following several projects at once; it's up to you to

make the communication happen. The Chair is your major focus and director for the project. You will do the work, not the Chair, but the chair must be kept up to date on progress, and presented with deliverables according to deadlines posted. Keep the whole committee apprised of your progress and plans as you go; a brief, monthly written summary of progress the previous month, plans for the next month and a statement of elements learned to date. Student success is enhanced with an informed committee and involved Chair.

D. Choose a Mentor (Optional)

It is often nice to have a Mentor (strongly suggested for students supported by their company whose project is to be an application project implemented by the company). A mentor is a person with a master's degree or better who has completed a thesis or significant research project. The mentor is ideally from near the same area where your project efforts focus. The mentor is not the Chair, nor is s/he part of the Committee. ETM does not provide the mentor. The mentor gives encouragement, helps find leads, maintains topic validity, assists in finding resources, etc. Add your mentor to the monthly written report distribution list.

E. Enroll in and complete 1st and 2nd semester EM702 / Complete the Project

Complete a substantial amount of the needed work – including detailed up-front planning, research and problem definition, research approach, and preliminary findings – in the first semester. Having already completed the bulk of the legwork for the actual project or research to be completed, use the second/final semester to focus on completing the writing of the paper (documenting and analyzing the findings) and preparing the presentation for and presenting the project. See '**EM702 Project Deliverables**' and '**EM702 Project Timeline**' in this document, for more detail.

EM702 Project Deliverables

1st and Final Semester Project Proposal

See the **EM702 Project Proposal** (separate file). The EM702 Project Proposal is a living document that changes over time. The project proposal includes both the project description and the project plan. In the project description, students provide the purpose of their project along with a brief background, describe how they are going to carry out their project work including what they are going to complete by when, provide a brief description of the method/approach they intend to use, and discuss their anticipated findings. The project plan includes a schedule that shows all of the key milestones including the required EM702 project deliverables. Students post their initial project proposal used to form their committee in week one of the first semester of EM702 and update as feasible throughout the semester, submitting the final complete project proposal by the end of the first semester that will be the basis of the project proposal for enrolling in the second/final semester of the EM702 project.

1st Semester Initial Project Paper*

See the **ETM Masters Project Template** (separate file). The 1st semester project paper contains initial work on the problem definition, background, research and implementation approach (first three chapters of the 'ETM Masters Project Template'), and preliminary findings. A majority of these sections as agreed to with the Committee Chair are completed according to the approval project plan, by the end of the 1st semester.

Final Semester Project Paper*

The EM702 project paper (not a thesis) is a professionally presented, clear, understandable document completely free of all grammatical, spelling and other errors. Abstracts under 350 **words (counting everything) are required and may be posted to an ETM website.** The EM702 project paper is completed according to specific formatting standards provided in the **ETM Masters Project Template**. The template contains the recommended sections for the project paper. Modifications may be made as agreed upon between the student and their committee Chair. In some cases, students may opt to use a format for submission to a professional journal of your choice. Confer with your committee chair regarding formatting variations. Submit one loose, unbound final copy of project paper on high-quality white paper to the ETM department in Pullman, WA. Be sure to include a signature page with the Mentor's signature, if applicable. The academic coordinator will gather the committee signatures. This copy will be bound and kept in the program office. Also provide an electronic version of your project to the academic coordinator at etm@wsu.edu early enough so that formatting can be corrected prior to printing. Provide one copy of final document to your committee chair. Your mentor or manager may also want a final copy.

Final Semester Project Presentation*

An oral report of the EM702 project is presented midway through the final EM702 semester. The Committee grades the oral presentation and is required to attend the oral presentation. The best possible audience would include, in addition to the full committee, the mentor (if applicable), appropriate individuals representing the student's firm, and peer students. Arrangements should be made early; see posted deadlines. Please note that the final semester of EM701 for the project option may not be taken during the summer session; the final term must be in the Spring or Fall semester.

*Be sure to include your academic integrity statement (below) in a separate file for the papers, and on the title page for the presentation.

I commit myself to Washington State University's high standards to uphold academic honesty and scholarly values as established by the WSU's Standards of Conduct. I affirm that I have not given or received any unauthorized assistance on this assignment/examination, that the work product presented here is the work of the author(s) [myself or all team members listed], and that all materials from other sources (including books, articles, Internet, or other media), whether quoted or paraphrased, have been properly cited.

_____

Typing or electronically signing my name above serves as my signature

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**Current Job Title* **Employer* **Future email (*optional)*

EM702 Timeline

Prior to initial enrollment:

- Complete initial project proposal (see **EM702 Project Proposal**)
- Faculty agree to be Chair or members of your committee
- Committee approves project topic and proposal

First Semester EM702:

- Meet periodically with Chair; provide committee a monthly summary
- Solidify project scope and direction
- Complete detailed project plan and update in project proposal
- Chair approves detailed project plan (1st and 2nd semesters)
- Collect and analyze preliminary data
- Execute plan and documentation of 1st semester project paper
- Provide updated project proposal, 1st semester project paper, and preliminary results to Committee

Second Semester EM702:

- Please note that the final semester of EM702 for the project option may NOT be taken during the summer session. The final term must be spring or fall semester.
- Complete execution of project plan
- Document efforts, including success, and failures
- Prepare draft paper early in semester and send to Committee for feedback
- Incorporate Committee comments
- Prepare final written project document at least two weeks before final presentation
- Prepare and present oral presentation midway through final semester

Buffer your efforts. Pay attention to deadlines. Remember you are working with an oversight committee who need time to adequately review your submittals; allow adequate time for comments.

EM702 Project Grading

The Chair is responsible for grading the EM 702 project. The Committee as a whole accepts or rejects the final project.

If the student has made progress and met published deadlines during the first semester of the project, s/he will be given an "S" grade' if not, it is within the purview of the committee to require the student to switch to the exam the following semester, or to award a "U" grade for the current semester. (S-Satisfactory or U-Unsatisfactory). Two semesters of "U" grades will be the basis for removing a student from the Graduate School and program.

Grading criteria include (as a minimum):

- Effective planning and execution
- Quality of process development
  - Demonstration of depth and breadth criteria
  - Completeness of research/application/academics applied
  - Appropriateness of effort in relation to topic
- Quality of written project document
- Quality of oral presentation
- Consideration of comments by mentor and committee members

Final Comments: The EM702 project demonstrates your ability to integrate and blend many different management skills from a variety of courses towards a significant problem. This is a test of management skills that will be of value to you and your employer. In many cases, it will be possible to document the value of the project to the employer. The student should try to identify the significant contribution of this work. Contributions may include: elimination of costly problems, increased value of the firm, improved processes, easier management, better quality, reduced flow time, increased profits, improved management control, or other matters of importance to the firm, the local or regional community, or the world.

James R. Holt, Ph.D., PE
Professor Emeritus

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How to Determine the Value of an Academic Project?

Here are some basic guidelines for students to estimate the value of the projects completed as part of their academic curriculum. Students actively employed should relate the value/cost savings directly to their employment. Projects done for 'academic use only' can also be estimated using the method 5, 'consultant cost' approach.

1. Direct Throughput Value

   - Did your project produce any more product? If you produced one more at negligible increase in resources, the value is the sales price less truly variable costs.

   - Did your project protect any sales? (Prevented lateness, Retained customers, Maintained relationships). The value of retained sales is the gross profit margin value of the product times the number of products used per your influence time (say your influence extended three months and you use three per month then multiply the gross margin by 9).

2. Inventory Value

   - Did your project reduce any inventory (physical items or queued paperwork)? Inventory is valued at its raw material purchase price. Reducing variability 10% on a system can reduce the need for inventory significantly. Inventory values are huge.

3. Speed

   - Did your project speed up any process? Speeding any process is the same effect as adding additional capacity. Reducing time 10% increases production capability 10% times the total productive capacity of the function. Reducing time also reduces the time inventory is held.

4. Cost Reduction

   - Did your project reduce actual money paid to perform a task? Transferring people from one area to another (to avoid hiring in the other area) can be counted. Material reduction, process simplification, process understanding all reduce waste, speed up delivery and increase output.

   - Did your project defer any costs (cost avoidance)? Often cost savings are not actual dollars in your pocket but money you didn't have to pay as a result of your work. Prevented penalty. Eliminated need for consultant work.

5. Estimating Value of Intangibles

- Often a project is of extreme value because it: Resolves problems, provides answers, eliminates conflict, provides a plan, reduces stress, satisfies concerns, etc. The value of such project depends upon the **scope of the problem**, the **level in the organization** and the **breadth of its nature**. The best model to choose to estimate the value is 'equivalent consultant cost'. How much would it have cost if a consultant had provided the answer. For a simple project, a single consultant charges $1000 per day minimum, takes three days to find out what is going on, solves the problem in about the same number of days you solved the problem and then takes three to prepare the solution in some presentable form. If you spend four days doing a project, that's worth $10,000 in simple terms. For extensive or far reaching projects, multiply the estimate by a factor of 2 for each layer of supervision and for each additional organization involved. If you spend 20 days solving your boss' boss' most serious problem (that is up two levels above you) and the problem relates to dealings with another organization, a rough estimate in consultant value would be ($3000 plus $20,000 plus $3000)*2*2*2=$208,000. Please adjust your numbers in a conservative fashion following your common sense opinion of the value of the work.

- Some projects are reports, analyses or summaries. Again, the value of the report (while not tangible) can be determined using the consultant model. How much would it have cost for a consultant to provide the same material? If you feel the study you performed had value but your organization probably wouldn't have paid for the study, you can cut the estimated value of the study in half.

These numbers are just estimates. They will be treated as estimates. However, it is very easy to create large benefits, so be conservative. It is much better to have conservative estimates that are easily defendable (if challenged) than large estimates that can't be substantiated by one of the five steps above.

Preparing for the EM702 Project Presentation

Here are some suggestions for preparing to present your final EM702 project:

- Give yourself a strong foundation by following the E M 702 requirements throughout the process (see E M 702 General Guidelines file).
- Demonstrate your mastery of engineering and technology management and the ability to effectively apply the concepts learned throughout the program to the problem at hand that you addressed in your E M 702 project. Review your courses and integrate content and ideas and apply to your project research.
- Provide your final project paper to your committee (and posted in BB Learn) at least two weeks before your final presentation (also posted to BB Learn). Follow up with committee members to close on questions or concerns.
- Review your completed project paper and make note of key points that you want to emphasize in your project presentation.
- Ask your committee members if they have any tips for your presentation.
- Consider taking off from work to concentrate on the presentation. That is, put a plan in place to take off from work and then implement on an as needed basis.
- Practice, practice, practice, record, and review your recorded presentation. A BB Collaborate session is created for each student in the final semester for practice; and a general open room is available for first semester students.
- Be sure you can present your project within the twenty-minute time limit.
- If feasible, practice your presentation with your committee chair one week before the formal presentation.
- While students need to be very selective to keep within the timeframe of the presentation, include one or two specific examples in the presentation that show the depth of the effort that you have put into your project. These detailed examples are also helpful when responding to questions after the presentation.
- Leave detailed explanations, and include backup slides not to be used during the regular presentation, for the question and answer period.
- Make sure your presentation has a professional look and feel.
- Note that BB Learn cannot run slides with animation. If animation is required, your presentation will have to be shared from your desktop.
- Remember to cite references.

Suggestions when delivering your presentation:

- Relax! You have completed all of the legwork and put in the time and effort, now is the time to sit back and demonstrate what you have done and how you applied the engineering and management concepts learned throughout the program.
- Make sure you are in a quiet place and dress professionally as you will be completing your presentation with both video and audio enabled.
- Listen carefully to the questions asked (do not assume you know what is or will be asked) and make sure you actually answer the questions asked. Take notes on what is being asked as the question is being asked. Repeat the question back to the person in your own words to make sure you are preparing to answer the right question. Good luck!

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EM702 Project Proposal

(Initial proposal required prior to EM702 1st semester enrollment; finalized during 1st semester.)

Student name: _____

Chair of committee: _____

Committee member 1: _____

Committee member 2: _____

(Optional) mentor & contact info: _____

Tentative graduation date: _____

Proposed topic or title: _____

Provide a description of the project by answering each the following questions in one or two sentences each. These are your initial thoughts on the project topic:

1. What is the problem you want to address; why is it a tough problem and why is it important?
2. What has been tried before to address this problem (or similar problems) and what was the outcome?
3. What do you propose to do for your project to address the problem and how is what you are doing any different than what was tried before, or is currently being used, to address or solve this problem?
4. What will be the impact of your completed project; what is your vision of the future based on project success?
5. Which Engineering and Technology Management knowledge areas or topics apply to your proposed work and how do they apply?

List the primary activities you plan to perform to complete your project, and include a target completion date as feasible. This will be a work in progress. A starting example list is below (replace with your list).

- Activity 1: Refine project plan based on feedback from the stakeholders. Target: 9/1/xx.
- Activity 2: Initiate the first step in the plan and monitor the impact. Target: 9/15/xx.
- Activity 3: Provide monthly status reports to my ETM committee.
- Activity 4: Complete a full description of the problem background, stakeholders involved, and research performed. Target Completion: 9/30/xx
- Activity m: Document the preliminary findings. Target: 12/1/xx.
- Activity n: Submit the 1st semester project status report. Target: 12/5/xx.
- Activity w: Provide final paper to committee two weeks before presentation.
- Activity x: Present project to the ETM committee. Target: Midway second semester.
- Activity y: Update paper based on faculty/committee feedback, by the deadlines given.

Develop up to a one-page Gantt chart that shows the primary work and major milestones.