



COLLEGE OF
SCIENCE AND
ENGINEERING

SEATTLE UNIVERSITY
Software Engineering Program

MSE Project Guidebook for Faculty and Students

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Preface

The MSE Project Guidebook for Faculty and Students summarizes the various activities, processes, and procedures you need to be aware of as you work on your Master of Software Engineering project. It has been prepared by a group of faculty at the Computer Science and Software Engineering department at Seattle University, and reflects the current policies and procedures related to the final project.

The guidebook is meant to be only a guide. Each team, under the supervision of its faculty advisor, is expected to apply best project management and development processes that may be tailored to individual project needs. Thus, deviations from procedures and policies that are appropriate may be discussed at any time with faculty advisors and/or department chair.

1. Introduction

All students in the Master of Software Engineering (MSE) degree program are required to participate in a capstone project sequence involving a significant software project. The project is embodied in three courses CSSE 585, 586 and 587 (Software Engineering Project 1, 2 and 3). These courses constitute a fall-winter-spring sequence, and are normally among the last courses to be taken in the MSE program. The purpose of this document is to provide detailed information and a practical guide to these courses. The guide is meant as a reference to all participants in the MSE software projects, the project team students, faculty advisors and project sponsors, as described below.

2. Purpose of the MSE Project

The primary purpose of the MSE Project is to provide a practical learning experience and a culmination of their course work for MSE students. Throughout the project activities, the students must clearly demonstrate their mastery of the collective material studied in the MSE program, and directly apply their learning. The project must develop quality software (as applicable), and do so through the use of a disciplined software development process.

In addition to the specific software system to be developed as proposed by the project sponsor, each team in collaboration with their faculty advisor, must identify an additional orthogonal dimension (*research component*) beyond the sponsor expectation.

The techniques learned by the students in previous design, development and management classes must be applied and demonstrated during the project year to obtain the benefits and meet the requirements of the university's software engineering program.

3. Background for Faculty Advisors and Project Sponsors

The purpose of this section is to provide both CSSE Faculty Advisors and Liaisons from the project sponsor with some basic information and guidelines for initiation and conduct of the Software Project activities. Additional information will be provided to both Faculty Advisors and Sponsor Liaisons as the academic year and the MSE Software Project activities proceed.

Early in the calendar year, the CSSE Department solicits proposals for software projects from potential industry/business sponsors. The College Project Director invites proposals for projects and asks that sponsors provide material support for those projects. This support will be in the form of restricted donations to Seattle University, as well as various hardware and software resources that may be required for specific projects. The support received by the CSSE Department is pooled to cover direct costs of projects, and to cover the costs of continuing support and upgrade of computer lab equipment.

Once the software projects for the next academic year have been identified, a team of students is assigned to each project according to the following sequence of steps:

Steps	Time
Solicit student body for those expecting to do project	Late April
Collect and determine qualified students	Early May
Disseminate initial information on projects to selected students	On an as available basis, starting in mid-May
Meet with students to discuss projects and procedures	September
Submission complete (by students) of Project Preferences and Skills Assessments Forms	Summer
Project assignments sent to students	Summer
Students, faculty advisors and sponsors notified of final team assignments	August or Early September
Project Rooms, with computer equipment, ready for use	September

4. General Procedures

The following is a brief outline of general procedures for project activities.

Initial project team activities

Only after signing and returning project forms and documents, project teams may be assigned to a room in the Engineering Building. The room may be assigned to multiple projects at the same time and the students will have access to computing resources required by their project. Access to room and door combinations may be obtained from Department Administrator, in ENGR 526.

Initial Meetings. Project teams and faculty advisors are encouraged to meet soon after the teams have been announced, to get familiar with one another, and to discuss plans and procedures for the project. It is recommended that this meeting, of faculty advisor and student team, precede any initial meeting with the project sponsor. However, the team may want to schedule an initial meeting with the sponsor soon after the teams have been announced. Note that these two meetings would normally occur in late Summer or early in the Fall quarter.

Project teams are encouraged to begin to brainstorm a *research component* related to the project. The requirements development, software design, and software development work of the project activity can be initiated promptly when the fall quarter begins in September.

Team Meetings

Past experience has very clearly demonstrated the need to have weekly meetings of team members in the team project room. Modern software development processes sometimes use collaborative design procedures via the Internet, and such methods are encouraged. However, just as in industry, it is essential that team members meet face-to-face regularly to discuss their collective work, to share information on tools and progress, and to jointly plan the collective work needed to complete their tasks. Failure to meet regularly has been a clear indicator in the past for project difficulties, schedule slippage, and misunderstanding regarding software design, development and demonstration.

Project teams are advised to meet together a minimum of once per week for review of work accomplished, difficulties overcome, planning for the coming week's work, and general project status assessment and planning.

Meeting Minutes: All team meetings should have brief minutes prepared and sent to team members, the project advisor and the project sponsor. Minutes should contain: members present, brief description of work items accomplished, list of action items and responsible team members for clearing the items, and a preview of the coming week. Although this discipline may seem onerous at first, it is a part of work required in any successful industrial software development activity.

Progress Reports

Each team is required to submit a monthly project status report to the faculty advisor. Timely submissions of these forms are essential for grading your course. The progress report form may be found at the end of this document. A faculty advisor may require more frequent progress report (weekly or bi-weekly) as appropriate. Each team must ensure meeting the expectations of the faculty advisor.

Documentation and Review Board Presentations

Each team is expected to follow best Software Engineering practices and provide documentation on project planning and management, requirements, architecture and design, and implementation. A complete list of expected quarterly deliverables, sample templates, and grading rubrics can be found on

the capstone project web site. Your work will be graded by a panel of faculty at the end of each quarter using the provided rubrics. Sometimes teams want to do something different than what is provided on the web site. If you clear your changes with your advisor IN ADVANCE and provide a clear rationale to the faculty of why you are making your changes (i.e. sponsor requires other templates) this is acceptable.

At the end of the Fall and Winter quarter, there will be a Review Board Presentation by each team to a group of faculty, and project sponsor(s). This presentation should cover the progress of the team in the preceding quarter, their assessment of the current status of the project, as well as an updated plan of completion. You will receive instructions about this presentation during the quarter. Students must also submit their documentation to the review board at this point.

Final Presentations

Project teams are required to prepare a Final Presentation late in the final quarter, in June. The presentation must include a demonstration of the software, together with a description of the project work. The Final Presentation is a **formal** one; audience will include other project teams, their sponsors, next-year potential industry sponsors, university faculty, and other interested community members.

Research Component Report / Experience Report

As mentioned, each team with the help of the faculty advisor, must identify a *research component* relevant to the specific project or produce an experience report that carefully describes the team software development experience. The experience report typically details challenges that can be generalized to any software development experience and solutions discovered by the team. At the end of the spring quarter, you are required to report your results in a publication quality article. Examples include specific quality attributes of interest, proposing processes and techniques to model, measure, track, and manage that property throughout the project life cycle. Below is a non-exhaustive list of possible dimensions:

Dependability Modeling: Modeling, measuring, and tracking software performance (security, availability, reliability, ...) issues starting from the requirement phase and continuing throughout the life cycle.

Architecture: Specific focus on architectural modeling and analysis. Ensuring that the detailed architecture and design artifacts live along with the implementation in a consistent state.

Architecture Recovery: When legacy systems exist, use existing approaches to recover the architecture of the existing system, and use that to build the architecture of the proposed new system:

Product-lines: Take a produce-line (product-family) approach to the development of the software system.

Maintenance: Track bugs and defects in a systematic way and use the obtained data and statistic to draw conclusion about the quality of the product and the process.

These are only a few possible scenarios. Students are expected to design their own project-specific *Research Component* as it applies to the project. Please keep in mind that this component is required for the successful completion of the project sequence and graduation. This will require the students to perform a literature review to become familiar with the state of the art in the specific selected dimension. The process and results must be documented and a publication quality paper (10-15 pages) must be produced in the Spring quarter. Upon consultation with the faculty advisor, the paper may be submitted to workshops and conferences, or may be published on the department website as a technical report.

5. Expectations of the MSE Project Teams

All MSE Software Project team members should have years of software development experience plus extensive coursework in Software Engineering. They are expected to utilize all of that knowledge and background in the execution of the Software Project. The actual work required for the project is expected to be done by the students. The role of Faculty Advisors is primarily to advise the team when necessary, and to evaluate the work for academic credit. Sponsor Liaisons are expected to work with the student team, providing information about the project and technical assistance as necessary.

In view of the background and experience of the MSE students, it is expected that they will apply sound Software Engineering principles throughout the execution of the project. Teams can choose to use any development methodology they (and their sponsor) wish to use. However, in all cases, there is a set of deliverables expected by the department at the end of each quarter. Sponsors may require additional deliverables. Unless a team can provide a clear rationale for why they will not use the standard set of deliverables, these are expected to follow the departmental recommendation every quarter. The following table lists the deliverables and the percentage of the grade for each quarter. It is assumed that deliverables will be started in one quarter and added to as the project progresses. All templates, grading rubrics, etc. can be found on the capstone website under Project Guidelines.

Project Deliverables and Grading Criteria

Please find the report guideline, grading criteria, and the grade breakdown of various assignments in the table below.

Guidelines	Grading Criteria	Fall	Winter	Spring
Status Report	Criteria	5%	5%	5%
Project Planning	Criteria	10%	15%	15%
Requirements, Vision, Use cases	Criteria	30%	5%	5%
Design, Architecture, Rationale	Criteria	10%	25%	5%
Presentation	Criteria	20%	20%	20%
Test Plans	Criteria	5%	10%	10%
Delivery Documentation	Criteria	0%	0%	10%
Peer and Self Evaluation	N/A	5%	5%	5%
Research Plans/Experience Report	Criteria	0%	0%	10%
Advisor Evaluation	Criteria	15%	15%	15%
Total		100%	100%	100%

Typically, teams act as business analysts in the first quarter and complete the first quarter with a good understanding of requirements, architecture, and development environment. Starting in the second quarter, teams typically use 2-3 week iterations (sprints) with deliverables to the client at the end of each

sprint. These iterative cycles continue until early to mid-May. May is generally used for project completion and creating the final presentation.

It is the team's responsibility to ensure continuous, responsive, and cooperative communications with the Project Sponsor and the Faculty Advisor. Any and all difficulties that may be encountered by either the team or the sponsor should be discussed and rectified without delay by the faculty advisor or, if need be, by the Department Chairman.

Finally, it is the team's responsibility to gain a clear and complete understanding of the grading policy, criteria, and process that the Faculty will use in assigning grades.

Important note: The comments and issues raised as part of the grading process must be mitigated in the subsequent quarter. Failure to do so will result in a deduction of a percentage of the grade (as decided by the faculty) in the subsequent quarter(s).

6. Expectations of the Faculty Advisor

The faculty advisor is expected to:

- meet with the students as a team at the start of the project year
- make clear the purpose of the Project
- provide clear and complete information as to grading policy, criteria, and process
- advise as appropriate in the preparation of the Software Development Plan
- meet initially with the project team and the project sponsor
- assure good communication of project objectives and procedures
- monitor project software development progress and process
- advise as appropriate in that development
- assess whether or not the development is proceeding in a professional manner
- assess whether or not the project is communicating the results of the work with the sponsor and with the university in an acceptable manner
- assess the quality of the software
- advise if and when the project encounters difficulties

The advisor also assigns grades to the students each quarter based on these assessments as well as the quality of the submitted documentation and source code and the project review presentations. This important function is described in more detail in a following section.

The faculty advisor must ensure that good communications are maintained between the team and the program sponsor, and between the team and the faculty advisor. Past experience indicates that this is a critical faculty advisor requirement – regular and continuous team communication sometimes breaks down with either the sponsor or the advisor. Deterioration of communication is a sure sign of later disappointment with one or more project participants. So, advisors are cautioned to exercise special attention to the communications issues.

7. Expectation of the Project Sponsor

The Project Sponsor is expected to provide the general project requirements to the team, monitor and review all team development activity, provide supporting information as needed for development, related software libraries or databases if appropriate to the project, and otherwise provide constructive comment as the year progresses.

In addition, the Project Sponsor is expected to participate in formal Project Status Reviews (Interim Presentation and Final Presentation), as a minimum, and to provide feedback to the Faculty Advisor, and the Department Chairman if appropriate, on his or her assessment as to project progress. Finally, the Project Sponsor is expected to confer with the Faculty Advisor at the end of each quarter to discuss project progress during the quarter, and grading of students.

8. Final Presentation

The Final Presentation is the team's opportunity to show to the sponsor, other potential sponsors, the university faculty, fellow students, and the community the results of the team's fine work. The presentation is scheduled early in June, and is the culmination of an entire year's work. As such, the presentation should be professionally prepared and rehearsed.

The Presentation should include a demonstration of the software that has been developed and tested during the project. A main focus of the presentation should be a team reflection on their development process. This should include presentation of quantifiable information on problems, solutions, and quantifiable results based on these solution. The material should briefly describe the project, the research component and results, and must highlight what is new or advanced in the software and application. Although teams will have presented these projects multiple times during the year, assume a fresh audience for this final presentation and gear the presentation accordingly.

It is important for students and advisors to know that opportunities for future sponsorship are dependent on favorable reviews by sponsors of the current projects. So, advisors and students should use this Final Presentation process to help insure that future students will have the same opportunities as the current students have to work on industry-sponsored MSE Projects.

9.

10. MSE Project Team Budgets

A project budget will be established for each team by the Department. This budget is for covering the cost of office supplies; document copying, software, hardware, manuals, texts, and phone calls necessary to carry out the project. It may also be used for teambuilding activities such as ordering food in, and meetings with sponsors & liaisons.

For the current academic year, each MSE project will be provided with a nominal budget of \$1,500. Of this total, an amount equal to $\$50 \times N$, where N is the number of students on the project team, may be spent on teambuilding activities, as described above. For example, a project team with 5 members may spend up to \$250 on teambuilding activities. All requests for purchases or reimbursement must be signed and delivered by the project team member currently serving as the Project Manager.

Software, Hardware, Manuals & Books

As the department may already have copies of texts, software, and hardware, or be able to get discounts on such purchases, all procurements of the above require approval of the department.

Office Supplies, Copying, Teambuilding

These items may be ordered through the department or purchased and reimbursed. The limit for reimbursement purchases is \$200.00 per purchase. All reimbursements require the original receipt and a filled and signed Purchase Requisition/Reimbursement Form.

Procedure

The following pages detail the procedure for purchasing and reimbursements and contain a reproducible purchase requisition/reimbursement form. Please read and follow the instructions. Requisitions and reimbursement requests are to be delivered to Michael Smith in ERGN 526. They may be slid under the door.

Questions:

If you have any questions please contact Michael Smith at 206-296-5510 or mikesme@seattleu.edu.

PURCHASING & REIMBURSEMENT INSTRUCTIONS

PLEASE READ THESE INSTRUCTIONS THOROUGHLY. Mistakes could cost your design team unnecessary loss of time and/or expenses.

Design teams may obtain supplies from three different sources: the Seattle University Bookstore, the campus Purchasing Department, or an outside vendor. The steps to follow in each case are listed below.

From the Bookstore (Note: Following the steps below can save your design team up to 20% on supplies.)

Complete a Purchase Requisition/Reimbursement form and have your faculty advisor sign it.

Check the box marked "Please Pick Up Items at the Bookstore" at the top of the Purchase Requisition/Reimbursement form and fill out the appropriate budget category.

Bring the original Purchase Requisition/Reimbursement form to the Department Admin in E-526 at least one day before the items are needed.

Go to the Bookstore and select the requested items.

Leave the supplies in a basket behind the Customer Service desk with one of the cashiers. Make sure you tell them the CSSE Department Admin will pick up the supplies.

The Department Admin will call your team after he has picked up your supplies and will put them in your project room.

From the Purchasing Department

Complete a Purchase Requisition/Reimbursement form, listing all supplies needed, and have your faculty advisor sign it.

Check the box marked "Please Order the Item(s) Listed Below" at the top of the Purchase Requisition/Reimbursement form and fill out the appropriate budget category or categories.

Make a copy of the signed form and any needed documentation for the purchase.

Bring the copies and the original Purchase Requisition/Reimbursement form plus any supporting documentation to the Department Admin in E-526 at least two weeks before the supplies are needed.

The Department Admin will send your Purchase Requisition/Reimbursement form, along with a departmental Purchase Requisition form, to the Purchasing Department.

After the Purchasing Department places the order with the vendor, it can take from two days to two weeks for the supplies to arrive (depending on how many orders the vendor may have to fill and whether the item is in stock). **THIS IS WHY IT IS IMPORTANT TO ORDER IN ADVANCE.**

When the supplies arrive, the Department Admin will notify you and place them in your project room.

From an Outside Vendor (Note: This is only for purchases totaling under \$200.)**

Please note that while we encourage teams to purchase items through Seattle University for reasons of convenience (i.e., no initial out-of-pocket expenses), your team may at times prefer to purchase items from an outside vendor. If so, this is the process:

After the purchase has been made, complete a Purchase Requisition/Reimbursement form, listing all items purchased, and have your faculty advisor sign it.

Check the box marked "Please Prepare a Reimbursement Check" at the top of the Purchase Requisition/Reimbursement form.

Make one copy each of the Purchase Requisition/Reimbursement form and the receipts. You cannot be reimbursed for supplies for which you have no proof of purchase.

Paper clip ALL receipts to the Purchase Requisition/Reimbursement form.

Bring the copies and the originals to the Department Admin in EGRN 526.

The Department Admin will send it to the Controller's Office, where your reimbursement check will be processed. Reimbursement usually takes the Controller's Office a minimum of 5 working days to process.

When the Controller's Office sends the check to the Department we will notify you and put it in your project room.

****IMPORTANT:** If you make purchases over \$200 independently of the Purchasing Department, the Controller's Office may not be willing or able to reimburse you, regardless of whether the CSSE Department has approved it. It is therefore required that all large purchases are made through the CSSE Department.

NOTE: If you need computer hardware or software, you **MUST** order it through the CSSE Tech who will submit the appropriate forms to Information Services, thereby ensuring that the material(s) will be supported by Seattle University. If you do not follow this step, you will not be reimbursed for your purchase(s).

PURCHASE REQUISITION/REIMBURSEMENT FORM

- Please Prepare a Reimbursement Check
- Please Order the Item(s) Listed Below
- Please Pick Up Items at the Bookstore

Requestor/Reimbursed Name _____ Project Manager Signature _____

ID# or Social Security #: _____ Project _____

Date: _____ Faculty Advisor Signature _____

Budget Category*	DESCRIPTION of Item (and item #) or Service (if Rental Vehicle - indicate names of registered drivers and ages)	Quantity	Unit Cost	Total Price

*Budget Categories R-Reference Material A-Administrative Supplies E-Expendable Supplies C-Capital Equipment

ORDER FROM:

Name of Company: _____ SUB TOTAL: \$ _____

Contact Person: _____ SHIPPING: \$ _____

Address: _____ TAX: \$ _____

City, State, Zip: _____

Phone #:() _____ TOTAL:\$ _____

(MAKE TWO COPIES OF THIS FORM AND ANY SUPPORTING DOCUMENTATION. SUBMIT ORIGINAL AND ONE COPY TO THE Department SECRETARY AND KEEP ONE COPY FOR YOUR TEAM)INSTRUCTIONS: Refer to Purchasing & Reimbursement Instructions. Complete the above. Have this form signed by your project faculty advisor. The signed form is your record that the anticipated order has been approved. Reimbursement Checks- Submit requests for no less than \$25.00 and no more than \$200.00. Items costing more than \$200.00 must be purchased through Seattle University. Requests will take approximately 5-10 working days to process. Purchasing Dept . - Submit requests ten days before items are needed. Bookstore Items - Submit requests one day before items are needed. ALL REQUESTS FOR REIMBURSEMENTS OR PURCHASES ARE SUBJECT TO PRIOR APPROVAL
CSSE DEPARTMENT

11. Forms to be signed and returned to the CSSE Department

A copy of the following forms must be signed and returned to the CSSE Department (ENGR 526) by every member of the Project Team before access is given to the project room or project funds may be reimbursed The forms may be faxed to 206-296-5518

POLICY - CSSE Project Room

The Department of Computer Science and Software Engineering (CSSE) has set aside certain rooms on the east wing of the fourth floor of the Engineering Building for the exclusive use of students engaged in their CS or MSE project. The rooms are intended to provide a working environment in which students have resources dedicated to their education.

The following policy statement is a means of defining expectations students may have of the department in terms of providing services, and of outlining what behavior the department expects in return for use of the rooms. This policy supplements the *Seattle University Computer Acceptable Use Policy* (see <http://www.seattleu.edu/it/policies>). Contradictions between policies shall be resolved in favor of this policy.

Questions about this policy should be directed to the CSSE department chair.

Facility Administration

Use of a CSSE project room is conditional upon being enrolled in the CSSE 487-488-489 undergraduate or the CSSE 585-586-587 graduate project course sequence.

The only people granted access to each room are the students assigned to the room, the student's project faculty advisor, the CSSE department chair, and CSSE technical support personnel. Keys/combinations will be issued only to these people. No other people shall have unescorted access to the room without permission of the project team.

Equipment shall not be removed from the rooms without explicit permission of the CSSE department chair.

Non-SU equipment may be used provided permission of the project faculty advisor is first received.

Use of tobacco products is prohibited in the rooms.

When not in use, the rooms shall be locked and the windows shut and latched.

Configuration Management

No one other than the student team shall be permitted to change software/hardware configuration without first notifying the team or advisor.

The department shall be allowed access to all equipment in project rooms. CSSE technical support personnel shall be given administrator passwords, where applicable.

Project teams are free to install software needed to support their projects. All software must be properly licensed.

Project teams are responsible for backup and recovery of their computers.

The contents of the room shall be inventoried at the beginning and ending of each project. Final project grades shall not be issued until all keys and equipment have been property checked in with CSSE technical support personnel.

Misc

Departmental laser printers are not provided to serve as photocopy machines; only one copy of a document may be printed.

I have read and fully understand the policies stated for use of the CSSE Project Rooms.

Signed: _____ Printed Name: _____

Date: _____

Project Status Report

Executive Summary		
Project Status Summary The status of the project is		Trend Color <div style="text-align: center;">○</div>
Major Achievements Since Last Report		
Meetings Summary Include members presents, date, and a bulleted summary of action items and decisions		
Milestones Progress		
Development Effort	Status Information	Trend
Pre-Project Request Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <div style="text-align: center;">○</div>
Initiate Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <div style="text-align: center;">○</div>
Requirements Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <div style="text-align: center;">○</div>
Analysis & Design Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <div style="text-align: center;">○</div>
Build Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <div style="text-align: center;">○</div>
Test Start Date <04/11/06>		Color <div style="text-align: center;">○</div>

Finish Date <05/01/06>		
Implement Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <input type="radio"/>
Support Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <input type="radio"/>
Project Management Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <input type="radio"/>
Configuration Management Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <input type="radio"/>
Business Readiness Start Date <MM/DD/YY> Finish Date <MM/DD/YY>		Color <input type="radio"/>
Estimated Hours Worked by Team Members (This Month) ▪ ▪		
Estimated Hours to Be Worked by Team Members (Next Month) ▪ ▪		
Risk/Issue Management ▪ ▪		
Plans for Next Month ▪ ▪		

Color Definition	Green 	Yellow 	Red 
	All goals for the week are achieved or exceeded No outstanding risk items	Some of the goals are not achieved, but the project is on track Outstanding risk items may be present	Major concerns regarding the project exist

Important Note: If there is a change in colors from one week to the next, there has to be an explanation for it.