MCS Project Guidelines

The Masters of Computer Science (MCS) project has three (3) deliverables[i] a student must complete. These deliverables, and the criteria for judging them, have been chosen to mesh with and support the outcomes of the MCS (students will design large-scale systems, students will implement large-scale systems, students will exhibit professional maturity, students will develop a broad base of competency).

1. Creation of an original software artifact, of enough size and complexity to demonstrate the mastery of designing and developing a large system. A project must demonstrate in-depth knowledge of one or more areas of computer science and go well beyond the material covered by the required graduate and undergraduate courses. The MCS is particularly interested in projects that work like end products rather than incidental pieces of experimental research (e.g., just an algorithm) given our focus on practical and applied education.

   While the number of lines of source code in a project is but one measure of complexity, students should expect to produce a project with at least 5,000 lines of code. Projects of a smaller size can be acceptable but only if the overall complexity of the project is of sufficient depth and breadth to warrant a smaller project.

   Creativity is the most straightforward way to add to the perceived complexity of a project. Creativity is highly desirable on the part of students, and can be demonstrated by the design and implementation of new algorithms, data structures, or in the novel concept of the application. The creative elements of a project need not be of the quality to be publishable in a tier 1 journal, but it must represent original elements conceived by the student and/or mentor. When in doubt, go **BIG**!

   It is completely acceptable to produce "yet another" implementation of a type of software that has been done before. However, when replicating others' work it is essential that the student clearly demonstrate their knowledge of prior work and document this knowledge with references and an analysis of how they have incorporated lessons learned from prior work into their project. Simply implementing the project will not be sufficient to show the depth and breadth of knowledge necessary to receive an MCS degree.

   Combining an MCS project with something from work is acceptable, but what a student does for the MCS must represent their individual effort, not the combined efforts of a larger group at work. Additionally, students should be intimately aware of UVU's policies and procedures on intellectual property before engaging in a work-related project.

2. Writing of an original paper, which clearly demonstrates mastery of technical writing and of the subject matter. The MCS will provide students with a MS Word .docx template or LaTeX template to follow for creating their original paper. Finished papers will be published online as a record of the student's accomplishment and to provide insight and ideas to future MCS students of what they can and should accomplish. Students should expect a project with sufficient size and complexity to take ten (10) to twenty (20) pages to adequately document. Students should consider taking advantage of the UVU Writing Center to ensure their paper is of professional quality. While the technical content of the paper is of utmost importance, spelling and grammatical errors cannot be tolerated. The basic format of the template will include the following sections:

   • a title, which contains the name of the project, the name of the student, the name of the Faculty Mentor, the names of the MCS committee members who reviewed the project, and the MCS Director's name,

   • an abstract, which contains a concise (250 words or less) summation of the entire paper,

   • an introduction, which contains a detailed overview of the problem solved by the project,

   • the body, which contains a comprehensive explanation of the design and implementation for the project. This should include, but is not limited to, subsections showing structural diagrams and behavioral diagrams for critical sections of the project, screen shots, example output, a detailed explanation of the results, and an analysis of prior work when replicating others' work,

   • user's manual, which contains instructions for installing and running the project of sufficient detail that someone other than the student could install and use the software if they had prior knowledge of the domain,

   • a conclusion, which contains the student's personal views on the success and/or failure of the project, what specific things were learned in creating the project, what knowledge would have been helpful to have before starting the project, and a summary of the important results detailed in the body,

   • a reference section, which contains citations to books, articles, papers, websites, or other material used in creating the project,

- and copyright notices and authorizations that will allow the Computer Science Department/UVU to distribute the paper.
3. Presentation of an oral report on the project, which demonstrates mastery of presenting technical material. Students are strongly encouraged to use PowerPoint or a similar tool to create visual material for their oral report. The oral report should include the structural and behavioral diagrams from the original paper as well as a live demonstration of the project. Immediately after their oral report, the student will be notified if their project has been accepted or rejected, and what if any changes must be made to the project before final acceptance. Once all suggested modifications are made and documented, an updated version of the written report must be submitted to the MCS Director for publication on the MCS website.

Starting an MCS Graduate Project:

A student cannot register for CS 6600 Graduate Project I until they are in the last semester of taking MCS classes other than CS 6600 Graduate Project I and CS 6610 Graduate Project II. However, prior to registering for CS 6600 Graduate Project I, students are strongly encouraged to meet with multiple faculty members to find the right Faculty Mentor. Once a Faculty Mentor has been found, students can have as many informal meetings with their mentor as time allows.

Key Players in an MCS Graduate Project:

You – You are by far the single most important player in having a successful MCS Graduate Project.

Faculty Mentor – Students must select a Faculty Mentor for their MCS Project. The Faculty Mentor must be a member of the Graduate Faculty and is responsible for guiding a student through the process of completing their project as well as ensuring that a project meets the size and complexity requirements of the MCS. Students are strongly encouraged to meet with multiple faculty members to find the right faculty member to be their mentor. Common interests, knowledge of the subject matter, temperament, and interpersonal dynamics should play a role in picking a mentor.

Graduate Project Committee Members – Students must select two (2) additional faculty members who will review the original paper and attend the oral presentation. Graduate Project Committee Members can be selected from any full-time members of the UVU Computer Science Department. Unofficial committee members from other departments, universities, and/or industry are welcome, but their feedback and input to the acceptance of the MCS project will be limited.

MCS Director – The MCS Director or designated representative will attend the oral presentation and review the original paper. The Director plays a key role in soliciting feedback and input from the Faculty Mentor and Graduate Project Committee Members to determine if a project will be accepted or if modifications are to be required. When the MCS Director is also the Faculty Mentor, then the Computer Science Department Chair will fill this role or designate a representative to fulfill this role.

Criteria for judging the acceptability of an MCS Graduate Project:

The Faculty Mentor, committee members, and Director shall be given two (2) weeks to review the written report prior to the presentation of the oral report to allow feedback to be given and changes to be made. While the software artifact represents the largest commitment of time and will be weighted the heaviest, poor or even moderate quality in the written or oral report will result in a rejection. If a rejection occurs, specific, written guidelines will be provided which outline the steps the student must take to remedy the rejection. In judging whether a project is acceptable, the Faculty Mentor, committee members, and MCS Director shall consider:
- the size of the project,
- the novel or creative elements of the project,
- the depth and breadth of technical knowledge needed to complete the project,
- the level of skill and mastery of the material demonstrated in the written paper,
- the level of skill and mastery of the material demonstrated in the oral presentation,

- and if all of the deliverables are consistent with the expectations of the MCS as well as the student being ready for employment as a senior developer/tech leader/chief architect who can design, implement, document, and present a large-scale system.

ⁱ The MCS wants to acknowledge that these guidelines are in part based upon the guidelines from the University of Florida's CS department.