REVISED Modeling & Simulation Ph.D. Qualifying Examination

The M&S Ph.D. QE is the first major milestone in a student’s pursuit of the M&S Ph.D. degree, and the student must unconditionally pass the examination before scheduling the candidacy examination, the second major milestone in the M&S Ph.D. program.

I. Overview

The Modeling & Simulation Ph.D. Qualifying Examination (M&S Ph.D. QE) determines if a student has an adequate command of knowledge in the field of study and can organize and convey that knowledge.

Specifically, the M&S Ph.D. QE is a research-based examination that covers the student’s major topic and possible minor topic areas of study. Students are expected to have expertise in their selected area including a solid understanding of the literature in the M&S field before they delve into solving a specific research problem within the field. The examination is designed to assess a student’s ability to synthesize and communicate in writing the theoretical, conceptual and empirical knowledge base of the field. Furthermore, the examination provides faculty with an opportunity to assess a student’s competency, knowledge of the fundamentals, and ultimately their potential for independent scholarly research in modeling and simulation. In addition, the QE will allow faculty to evaluate a student’s presentation and communication skills, and the student’s level of confidence in the mastery of the discipline.

In summary, the M&S QE provides the opportunity for:

- students to demonstrate their preparation to undertake dissertation research in the field of modeling and simulation, and more specifically in their chosen areas of study; and
- faculty to gauge students’ readiness for doctoral study and evaluate their ability to do independent scholarly research.

II. QE Evaluation Committee Chair and Committee Membership

In order to prepare for the M&S Ph.D. QE, a student must assemble a QE Evaluation Committee. The role of the committee is to evaluate the student’s QE performance. The following must be considered when assembling the committee members:

1. The Evaluation Committee is composed of a minimum of 3 UCF faculty members, and all members must be in fields that support the topic, idea or concept being explored by the student;
2. All committee members should hold a doctoral or terminal degree and be in fields related to the topic, idea or concept;
3. Committee members must be approved members of the UCF Graduate Faculty or UCF Graduate Faculty Scholars (www.graduatecatalog.ucf.edu/GradFaculty);
4. The student must identify the Chair of the QE Evaluation Committee who must be UCF Graduate Faculty and should be selected from the student’s major area of study;
5. The other members are chosen by the student in consultation with the Committee Chair;
6. Graduate Faculty members must form the majority of the Evaluation Committee;
7. One member must be from outside the student’s major area of study; and
8. The student must submit the appropriate paperwork that lists the members of the Evaluation Committee to the Program Director for review and approval; the committee membership must be approved by the Director before the student schedules the examination.
III. Format and Structure of the Qualifying Examination

The M&S QE consists of: (1) a written component and (2) an oral component. Under the guidance of the Evaluation Committee Chair, the student must prepare:

1. a technically-written document that consists of the following 3 discussions:
   a) First, the background, motivation and rationale of a topic, idea or concept worthy of a dissertation and in which the student could represent a significant contribution to the M&S field;
   b) Second, a thorough literature review of the state-of-the-art in areas and intersections of areas related to the topic, idea or concept, identifying research gaps that could lead to potential research questions and/or hypotheses;
      • The review must describe, analyze and synthesize previous research on the topic and should not merely string together what other researchers have found; rather, it must discuss and analyze the body of knowledge with the ultimate goal of determining what is known and is not known about the topic, idea or concept.
   c) Third, a summary of a possible approach (or approaches) to address the gaps identified in b) based on the understanding of the detailed review of the literature. The student should describe the rationale for using the approach (or approaches).

2. a formal oral presentation summarizing the written document before the Evaluation Committee.

The written document must be a publication-quality manuscript. In other words, it should be of publishable quality; however, it does not have to be submitted to an archival journal for publication.

The complete document must be submitted to all Evaluation Committee members for their careful review and evaluation at least 2 weeks before the oral presentation takes place.

IV. Scheduling the Qualifying Examination

A student may schedule the QE only after having met the following requirements:

1. A Plan of Study must be on file with the M&S Graduate Program Office and the UCF College of Graduate Studies; and
2. All core coursework requirements must be completed.
3. The exam must take place during an academic term (Fall, Spring, or Summer) in which the student is registered and may not occur during the breaks between terms; and
4. The exam must be scheduled so that all committee members are physically present during the oral component of the examination, and the oral presentation shall be conducted on campus;
   • At most 1 member can attend the oral presentation remotely via web conferencing technology such as Skype™, Adobe® Connect™, GoToMeeting, Cisco WebEx®, Google Hangout, Yahoo! Messenger, etc., so that the remote committee member can actively participate in the discussion and evaluation.

The student must notify the M&S Graduate Program Office when the QE will occur and provide the date of the oral presentation to the Program Office; if the presentation does not take place, the student will immediately inform the Office. The student must bring to the oral examination an updated curriculum vita, including all his or her submitted and accepted conference and journal articles to date.

Note that, if the written document is not sent to the Evaluation Committee members at least 2 weeks before the oral presentation, then the presentation cannot take place and must be rescheduled.
V. Evaluation of the Qualifying Examination

The Evaluation Committee administers the QE for the student. During the oral presentation, the committee members will question the student about the information presented in both the written document and the oral presentation. The questions may address the following topics:

1. the fundamentals of M&S;
2. the student’s major and minor topic area(s);
3. global research awareness and understanding as it relates to the M&S field;
4. analytical thinking and research potential; and
5. communication skills (oral and written).

After the oral presentation, each committee member will complete an M&S Program QE internal assessment form to provide an individual assessment of the written component and the oral component. Then, the committee will deliberate and arrive at a consensus regarding the student’s readiness for doctoral study and the student’s ability to do independent scholarly research. The grading outcome of the QE will be one of the following three outcomes:

- Pass;
- Fail; or
- Conditional Pass. This requires the student to complete additional tasks prior to passing, as recommended by the Evaluation Committee. Examples include taking additional courses or preparing additional documents.

VI. Next Steps for Student after the QE Evaluation Outcome

1. If a student passes the exam, then that student is allowed to continue in the M&S Ph.D. program and prepare for the second milestone in the M&S doctoral program – the candidacy examination.
2. If a student conditionally passes the exam, then that student is allowed to retake the exam addressing the concerns of the committee; however, the Conditional Pass outcome counts as a full attempt of taking the exam.
3. If a student fails the exam, then that student is allowed to retake the exam. A student is limited to 2 attempts (i.e., the original attempt and 1 retake) to pass the M&S Ph.D. QE.

VII. Reporting of the Qualifying Examination Outcome

The Evaluation Committee Chair will ensure that the results are discussed with the M&S Program Director.

Shortly after, the Committee Chair will send a memo summarizing the qualifying exam results to the Program Director with a copy being sent to the student and to the other committee members. The memo will be placed in the academic file of the student.
Alternative Qualifying Examination Option – A Qualifying M&S Research Paper

In lieu of the writing component of the qualifying examination as described above, a student can submit a sole-authored, or lead-authored journal publication or peer-reviewed conference publication as evidence of their scholarly and professional competence in the modeling and simulation field and preparation to do independent scholarly research. The topic of the paper must describe research that is related to the M&S field, and the student must be a significant contributor to the work and the paper.

A student choosing this QE option must then follow the same guidelines and requirements described above, with the exception that the paper submitted for evaluation may be an existing publication; an oral presentation of the material to the committee is still required. Note that the qualifying M&S research paper serves as the QE written component described in Section III.1.
Modeling & Simulation Ph.D. Candidacy Examination

(Only the wording has been revised and reordered, not the Candidacy Examination requirements, so that it is fairly consistent with that of the M&S Qualifying Examination)

Overview

The Candidacy Examination evaluates a student’s preparation to undertake the research in the student’s specific dissertation topic area. A student may sit for the Candidacy Examination upon:

1. passing the Qualifying Examination;
2. completing all conditions placed as a result thereof; and
3. completing all but 6 credit hours or fewer of the courses prescribed in the student’s Graduate Plan of Study.

The M&S Ph.D. Candidacy Examination cannot occur in the same academic term as the Qualifying Examination.

Dissertation Advisor and Dissertation Advisory Committee

Students have the responsibility to select a Dissertation Advisor from the list of faculty authorized to direct dissertations. The student and the Dissertation Advisor, then, must identify and select the other members of the student’s Dissertation Advisory Committee. The Dissertation Advisory Committee consists of a minimum of 4 members.

All committee members should hold a doctoral or terminal degree and be in fields related to the dissertation topic, and at least three members must be regular Modeling and Simulation graduate faculty (one to serve as chair) from at least two UCF colleges or units. At least one member of the committee must have served as a committee member on a prior M&S Thesis or Dissertation Advisory Committee. In some cases, with approval from the Program Director, a committee member may serve as co-chair of the committee. The M&S Program Director can assist students with selection of their Advisor as well as with committee formation, additions, and deletions. The M&S Program Director and UCF College of Graduate Studies have the right to review appointments to advisory committees, place a representative on any advisory committee, or appoint a co-advisor.

Note that the student’s Dissertation Advisory Committee, which will oversee and approve both the student’s dissertation proposal/advancement to candidacy and the student’s final dissertation after the student successfully passes the QE, can be drawn from the student’s QE Evaluation Committee, but it does not have to be.

The Candidacy Examination includes all of the following:
The Dissertation Research Proposal

The research proposal is a written exposition of an academic or scientific topic and specific research question(s)/hypothesis(es) that is/are developed by the student; the research proposal identifies the chosen area(s) of research and offers convincing support of the need for the research investigation being proposed. Specifically, the research proposal includes at least the following components:

- **Motivation of the research investigation.** Background and the motivation for the pursuit of the dissertation topic should be clearly and thoroughly explained including the historical and modern view of the topic and the rationale and need for the proposed research. The specific research questions(s)/hypothesis(es) that is/are being addressed and the research objectives must be described;
- **Literature review on the topic of the dissertation.** A good literature review expands upon the reasons behind selecting the research question(s)/hypothesis(es). The review is an extensive summary and synopsis of the area(s) of research, and it provides a critical and in-depth evaluation of previous related research on the topic. It is an abstracting and synthesis of previous research, and the review explains how it integrates into the proposed research investigation. All sides of an argument must be clearly explained, to avoid bias, and areas of agreement and disagreement should be highlighted; and
- **A detailed description of the proposed methods for conducting the research.** This methodology must be consistent with the requirements of the field.
  - It is customary to include any preliminary modeling, validation, experimentation and results in this discussion to show the potential of strengths and weaknesses of the methodology.

Note that the student’s Dissertation Research Proposal can build on or be related to the student’s QE written document or qualifying paper, but this is not required

The complete research proposal document must be a publication-quality manuscript. In other words, it should be of publishable quality; however, it does not have to be submitted to an archival journal for publication.

A refereed published or accepted for publication manuscript

To advance to candidacy, students must have at least one refereed published or accepted for publication manuscript related to the dissertation research topic, and the student must be the sole author or lead author and be a significant contributor to the work and the paper. If the refereed manuscript is not published, it should be fully accepted, and not conditionally-accepted. This manuscript may be a journal or a proceedings publication from a reputable peer-reviewed research conference.

Note that, if a student chooses the alternative Qualifying Examination Option described above and successfully passes the M&S Qualifying Examination, then that student may use the qualifying paper to meet this requirement.
An oral defense of the Dissertation Research Proposal

This defense includes a formal, oral presentation of the written Dissertation Research Proposal before the Dissertation Advisory Committee.

1. The complete research proposal document must be submitted to all Dissertation Advisory Committee members for their careful review and evaluation at least 2 weeks before the oral presentation takes place.
2. The exam must take place during an active academic term (Fall, Spring, or Summer) in which the student is registered and may not occur during the breaks between terms; and
3. The exam must be scheduled so that all committee members are physically present during the oral component of the examination, and the oral presentation shall be conducted on campus;
   • At most 1 member can attend the oral presentation remotely via web conferencing technology such as Skype™, Adobe® Connect™, GoToMeeting, Cisco WebEx®, Google Hangout, Yahoo! Messenger, etc., so that the remote committee member can actively participate in the discussion and evaluation.

Note that, if the proposal document is not sent to the Dissertation Advisory Committee members at least 2 weeks before the oral presentation, then the presentation cannot take place and must be rescheduled.

All members vote on acceptance or rejection of the Dissertation Research Proposal and the Dissertation Proposal must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the Dissertation Research Proposal, but the M&S Program Director, upon the recommendation of the student’s Dissertation Advisory Committee, may approve at most 1 additional attempt.

Admission to Candidacy

In summary, the following are required for a student to be admitted to candidacy and subsequently enroll in dissertation hours:

- Completion of all coursework, except for dissertation hours;
- The Dissertation Advisory Committee is formed, consisting of approved UCF Graduate Faculty and Graduate Faculty Scholars;
- Submission of an approved Graduate Plan of Study; and
- Successful completion of the Candidacy Examination including successful fulfillment of the publication requirement (see Candidacy Examination section above for details).
Modeling & Simulation Ph.D. Dissertation Defense

Sabrina, the dissertation defense write-up should include wording consistent with that of the M&S QE and M&S Candidacy Examination. Here are a few points to add to the Dissertation Defense section on the CGS website so that this section will be fairly consistent with the QE and Candidacy Examination sections.

1. The M&S Ph.D. Final Dissertation Defense cannot occur in the same academic term as the Candidacy Examination.
2. The written document must be a publication-quality manuscript. In other words, it should be of publishable quality; however, it does not have to be submitted to an archival journal for publication.
3. The complete document must be submitted to all Dissertation Advisory Committee members for their careful review and evaluation at least 2 weeks before the oral presentation takes place.
   - If the written document is not sent to the Evaluation Committee members at least 2 weeks before the oral presentation, then the presentation cannot take place and must be rescheduled.
4. The exam must take place during an active academic term (Fall, Spring, or Summer) in which the student is registered and may not occur during the breaks between terms; and
5. The exam must be scheduled so that all committee members are physically present during the oral component of the examination, and the oral presentation shall be conducted on campus;
   - At most 1 member can attend the oral presentation remotely via web conferencing technology such as Skype™, Adobe® Connect™, GoToMeeting, Cisco WebEx®, Google Hangout, Yahoo! Messenger, etc., so that the remote committee member can actively participate in the discussion and evaluation.