When MBSE was first created, there was no approved Policies and Procedures document. The following guidance was posted on the website and is archived here for reference by those using the original guidance for their degree completion.

### **Doctoral Degree**

The Doctor of Philosophy degree is granted to students who demonstrate a thorough knowledge of a broad field of learning and have given evidence of distinguished accomplishment in that field. The degree also signifies that the recipient has critical ability and powers of imaginative synthesis as demonstrated by a doctoral dissertation containing an original contribution to knowledge in his or her chosen field of study.

The MBSE graduate group has established the following requirements for the Ph.D. degree.

- Complete at least six semesters of full-time academic residence at UC Merced.
- Complete a minimum of 24 semester units in approved courses, at least 20 of which must be earned in 200-series graduate-level courses exclusive of credit given for thesis research and preparation (see Section 2.3.5).
- Maintain a cumulative GPA of at least 3.0.
- Register for and obtain a satisfactory grade in at least one 3-4 unit 200level course in each of the 4 MBSE core requirement areas of thermodynamics/kinetics, structure and bonding, processing and kinetics, and properties. Students earning an M.S., either Plan I or Plan II, in MBSE along the way at UC Merced are considered to have completed this degree requirement.
- Register for and obtain a satisfactory grade in MBSE 291: Research Seminar Series at least once each year of academic residence.
- Register for and obtain a satisfactory grade in MBSE 294: Responsible Conduct of Research.
- Complete at least 16 units of MBSE 295: Graduate Research.
- Serve as a Teaching Assistant for at least one semester.

- Give two open technical seminars: either on campus or at a professional conference.
- Before the end of year 2, present a written dissertation project proposal for approval, and pass an oral qualifying exam on specific competence to pursue the proposed dissertation topic and general preparedness in the discipline, administered by the Qualifying Examination Committee.
- Present a doctoral dissertation containing an original contribution to knowledge in the field for approval, and successfully defend it during a final oral examination, administered by the Doctoral Committee.

### Master's Degree

Students may be admitted to the MBSE graduate program to work toward an M.S. degree. The recipient of an M.S. degree will possess knowledge of a broad field of learning that extends well beyond that attained at the undergraduate level, but is not necessarily expected to have made a significant original contribution to knowledge in that field.

The MBSE group has established the following requirements for the M.S. degree. Each M.S. student must have a faculty advisor responsible for designing and approving a plan of study detailing all classes to be taken. Two different tracks are recognized as described below. Students may switch from one M.S. plan to another with the consent of an appropriate faculty advisor.

#### PLAN I (Thesis option)

- Complete at least two semesters of full-time academic residence at UC Merced.
- Complete a minimum of 24 semester units in approved courses, at least 20 of which must be earned in 200-series graduate-level courses exclusive of credit given for thesis research and preparation (see Section 2.3.5).
- Maintain a cumulative GPA of at least 3.0.
- Register for and obtain a satisfactory grade in at least one 3-4 unit 200level course in each of the 4 MBSE core requirement areas of thermodynamics/kinetics, structure and bonding, processing and kinetics, and properties. Students earning an M.S., either Plan I or Plan II, in MBSE

along the way at UC Merced are considered to have completed this degree requirement.

- Register for and obtain a satisfactory grade in MBSE 291: Research Seminar Series at least once for each year of academic residence.
- Register for and obtain a satisfactory grade in MBSE 294: Responsible Conduct of Research.
- Complete at least 8 units of MBSE 295: Graduate Research.
- Prepare a written thesis describing relevant research in the field that is read and accepted by the Thesis Committee.
- Defend the M.S. thesis via oral examination, attended and approved by the Thesis Committee.

#### M.S. Plan I Thesis and Defense

The student will prepare a written thesis under supervision of his or her faculty advisor until the work is judged ready for review by his or her Faculty Committee, which is also the Thesis Committee. It shall be composed of the primary advisor and at least 2 additional faculty; the majority of the committee must be MBSE members). The student must provide a copy of the thesis to each member of the Thesis Committee and allow each committee member at least four weeks to read and comment on it. If one or more committee members believe that there are significant errors or shortcomings in the thesis or that the scope or nature of the work are not adequate, the student must address these shortcomings before scheduling the thesis defense. Once the committee members are in agreement that the thesis is ready for oral examination, the thesis defense may be scheduled by the student in consultation with the committee. Once the date of the thesis defense is determined, this information must be reported to the Graduate Dean, and one copy of the thesis must be filed with the Graduate Division no later than two weeks before the scheduled date of the thesis defense.

The thesis defense consists of an open seminar followed by a closed-door examination by the Thesis Committee. During the examination, the student is expected to explain the significance of the research, justify the methods employed, defend the conclusions reached, and be assessed favorably on general preparation in the discipline.

At the conclusion of the examination, the committee shall vote on whether the thesis and the student's performance on the exam are of satisfactory quality to earn a University of California M.S. degree. A unanimous vote on the outcome is required.

Possible outcomes are

- 1. Pass
- 2. Fail with an option to retake the examination a second time
- 3. Partial Pass with an option to retake the parts failed a second time

A third examination is not allowed.

Members of the committee may vote to make passing the exam contingent on corrections and/or revisions to the thesis. In this case, the committee will select one member, normally the graduate research advisor, who will be responsible for approving the final version of the thesis that is submitted to the Graduate Division. All members of the Thesis Committee must sign the final thesis.

#### PLAN II (Non-thesis option)

- Complete at least two semesters of full-time academic residence at UC Merced.
- Complete a minimum of 30 semester units in approved courses, at least 24 of which must be earned in 200-series graduate-level courses exclusive of credit given for thesis research and preparation (see Section 2.3.5).
- Maintain a cumulative GPA of at least 3.0.
- Register for and obtain a satisfactory grade in at least one 3-4 unit 200level course in each of the 4 MBSE core requirement areas of thermodynamics/kinetics, structure and bonding, processing and kinetics, and properties. Students earning an M.S., either Plan I or Plan II, in MBSE along the way at UC Merced are considered to have completed this degree requirement.
- Register for and obtain a satisfactory grade in MBSE 291: Research Seminar Series at least once for each year of academic residence.
- Pass an oral comprehensive examination on general preparation in the discipline that is administered by a faculty committee.

#### M.S. Plan II Comprehensive Examination

The M.S. comprehensive examination is a 2-hour oral test that assesses general preparedness in the discipline and the content of the exam represents a capstone requirement that integrates the intellectual substance of the program. The test will be given by three members of the MBSE faculty who will jointly determine the outcome. A unanimous vote is required.

Possible outcomes are

- 1. Pass
- 2. Fail with an option to retake the examination a second time
- 3. Partial Pass with an option to retake the parts failed a second time

A third examination is not allowed.

# **Qualifying Exam**

### **Research Proposal**

One month before the qualifying exam, the student will provide to the qualifying exam (QE) committee a written document (typically 15-20 pages of a research proposal written in NIH or NSF format) that describes his or her research topic, summarizes progress to date, and outlines what he or she proposes to do, why it is relevant, and what will be learned. The committee will review this document with the student and determine if the student has outlined a project that is appropriate for a Ph.D. If not, the student is required to rewrite the research plan. Once the research plan is approved, the student may take the oral portion of the qualifying examination.

## **Ph.D. Qualifying Examination**

All students in the Materials and Biomaterials Science and Engineering (MBSE) Ph.D. program are required to pass an oral qualifying examination for advancement to candidacy for the Ph.D. degree. Students are expected to take and pass the qualifying examination within the first two years of graduate study unless they successfully petition the graduate group chair to take it at a specific later date. The examination committee is the same as the student's faculty committee except that the graduate research advisor is replaced by another member of the group, selected by the chair of the graduate group, in consultation with other committee members. The members of each student's examination committee will select one member to chair the examination committee. The dates for the examination are arranged between the student, their graduate research advisor, and the examination committee chair. The graduate research advisor may attend the qualifying exam if he/she wishes, but is a non-speaking and nonvoting attendant and must leave the room when the committee discusses and votes.

The qualifying exam may be taken only after the student's written research proposal has been approved by the student's QE committee. The exam will focus on the student's research proposal, but may cover any related field of science or engineering (including biology, chemistry, physics, fluid mechanics, thermodynamics, behavior of materials, electronics, and kinetics), and will typically last three hours. The committee conducts the examination, and immediately thereafter submits the results of the examination to Graduate Studies. Possible outcomes are:

- Pass
- Retake, fail with the option to retake the examination once within a specified time period only one retake is allowed.
- Fail

The committee members should include in their evaluations of the student such factors as relevant portions of the previous academic record, performance on the examination, and an overall evaluation of the student's performance and potential for scholarly research as indicated during the examination. The committee should strive to reach a unanimous decision. If a unanimous decision is reached, the committee shall inform the student of its decision in one of the forms listed above. If the decision is "Retake" or "Fail," the chairperson of the committee must include in a report a specific statement, which may include a minority report, explaining its decision and must inform the student of its decision. In those cases when it is not possible for the members to resolve their differences, the student should be informed of the nature of those differences and each member should submit a detailed assessment of the student's performance to the chair of the graduate group. The chair, in consultation with other members of the graduate group, will use these individual reports to adjudicate the result. Upon recommendation of the examination committee, a student who has not passed the examination may repeat the qualifying examination after a preparation time of no more than six months. The examination must be held by the same committee except that members may be replaced, with the approval of the graduate advisor, for cause such as extended absence from the campus. Failure to pass the examination on the second attempt means that the student is subject to disqualification from further study for the doctoral degree.

## **Advancement to Candidacy**

Upon successful completion of the examinations and approval of a research plan, the student is given an application for advancement to candidacy by the examining committee chair. When it is filled out and signed by the graduate research advisor, the student pays a candidacy fee and submits the form to the Graduate Division. Upon advancement to candidacy for the degree, the faculty committee is then charged to guide the student in research and in the preparation of the dissertation.