

Graduate Student Handbook[†]

Chemical and Biochemical Engineering Program
Department of Chemical, Biochemical, and Environmental Engineering
University of Maryland Baltimore County
Baltimore, MD 21250

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[†]The most recent version of this document is available on-line at:

<http://www.umbc.edu/cbe/grad/Graduate-Handbook.pdf> .

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1. Application for Admission to the Program

The Program's admission requirements and procedures correspond to the requirements set forth by the UMBC Graduate School. Students who do not have an undergraduate degree in chemical engineering may apply for admission to the Program. However, upon admission, these students should consult with the Program Graduate Program Director (GPD) to determine whether additional courses which are remedial in nature need to be taken, in addition to the required courses listed below.

2. Master of Science Degree Requirements

2.1. Course Requirements

A minimum of 30 credit hours work in technical areas is required for the Master of Science degree. The candidate for the Master of Science degree has the choice of following a plan of study either with or without a thesis. In either case, 12 of the required credit hours of course work are the major core courses ENCH 610, 630, 640, and MATH 404. In addition, for both the thesis and non-thesis options, only two courses taken from the series of courses ENCH 660, 662, 664, and 666 may be used to satisfy the course requirements, and a maximum of 9 credits of 400 level courses taken from other disciplines may count towards the course requirements subject to prior approval. A list of approved 400-level courses is described in Section 6 of this handbook. The Graduate School requires student in the thesis option to take at least 12 course credits at the 600 level or above, and student in the non-thesis option to take at least 18 course credits at the 600 level or above.

2.2. Minimum Course Grade Requirements

A grade average of 3.0 in all courses must be maintained in order to remain in good standing within the Graduate School.

2.3. Transfer of Credit

A maximum of 6 semester hours of graduate course work taken at other regionally accredited institutions may be applied toward the Master's degree. The GPD and the graduate school must agree that the specific courses are appropriate to, and acceptable in, the student's program; and the student is responsible for providing an official transcript of this work to the Graduate School, along with appropriate course descriptions and syllabi. No credit transfer will be allowed for any courses which have been used in fulfillment of the requirements of any other degree. Due to academic and procedural differences between U.S. regionally accredited and foreign institutions, credit from foreign universities is not normally acceptable for transfer. The grades of transfer work do not affect the grade point average of the work taken at UMBC. Transfer work cannot be used to satisfy the requirements for upper level courses in a student's program. The request for transfer of credit should be submitted to the Graduate School for approval at the earliest possible time.

2.4. Master of Science Thesis Option

Under the Master of Science Thesis Option, students can count at most 6 credits of research (ENCH 799) toward their degree. Candidates for the Master of Science Thesis Option are required to pass an oral qualifying examination whose format is identical to the Ph.D. oral qualifying examination described below (see also Appendix A). Upon completion of the research, the student prepares a thesis related to their research and must pass a final oral examination which includes an open seminar on the research project. The time and location of the seminar must be publicized so that it can be attended by all interested persons.

A maximum of 3 credit hours of Special Problems (ENCH 648) may be used to partially fulfill the course requirements under the Master of Science Thesis Option.

2.5. Master of Science Non-Thesis Option

Under the Master of Science Non-Thesis Option, no more than 6 of the required credits can be devoted to Special Problems (ENCH 648).

2.6. BS/MS Degree Program

Undergraduate students in the Department who have an overall cumulative grade point average of at least 3.0, and also a grade point average in the major of at least 3.0, may apply for admission to the BS/MS degree program. Students should normally apply to the Program for pre-admission to the BS/MS program in the spring semester of their junior year by filling out and submitting a pre-admission application, which is available on-line. This application includes a current transcript and one letter of reference from a faculty member in the Department. A delay in the graduation date for the MS degree portion of the BS/MS degree program may result if the pre-admission application is not submitted at the proper time. Students are encouraged to discuss their plans related to the BS/MS degree with their undergraduate academic advisor before they apply to the program to make sure they are informed of all the necessary procedures related to the program. During the senior year, students in the BS/MS program must apply to the UMBC Graduate School for admission and, if they intend to pursue a thesis degree, they must obtain consent from a departmental faculty member who has agreed to be their thesis advisor. Students applying to the BS/MS program are not required to take the GRE examination.

Both thesis and non-thesis options are available to students in the BS/MS program. Course requirements in the BS/MS program are the same as those listed above for the thesis and non-thesis options of the regular MS program. However, students in the BS/MS program are allowed to count 9 credits of elective courses taken to fulfill their BS degree requirements toward the course requirements for the MS degree, provided that these courses are dual level 400/600 level courses and were taken at the 600-level. One of these elective courses taken during the senior year should be ENCH 648 (Independent Research). Students in the BS/MS program may also choose to take some of the core required courses for their MS degree in their senior year. **In**

all cases, the credits, but not the grades, are counted toward the MS degree for any courses taken during the undergraduate senior year that are to be applied toward the MS degree.

Students in the thesis option should select a research advisor during the junior year and begin their research no later than the summer between the junior and senior years. A delay in starting the thesis research project may result in a corresponding delay in finishing the MS portion of the BS/MS degree program.

2.7. Time-Line for Completion of the Master of Science Degree

Students in the BS/MS program who are pursuing the thesis option are expected to complete their MS degree after no more than 3 semesters in residence as a graduate student, while students in the regular MS degree program who are pursuing the thesis option are expected to complete their MS degrees after no more than 4 semesters in residence as a graduate student. For BS/MS students who are pursuing the thesis option, the oral qualifying examination should be taken within 12 months of completion of ENCH 446 (Design II). For students in the regular MS degree program who are pursuing the thesis option, the oral qualifying examination should be completed within four months after being assigned a thesis advisor. For all thesis MS degree students, the MS thesis must be defended within 12 months after passing the oral qualifying examination. Failure to meet these time guidelines may affect the funding status of a student. Requests for postponement of the MS thesis defense beyond the 12 month time limit must be made in a written petition to the Program Graduate Program Committee during the eleventh month following the passing of the oral qualifying examination.

Students in the BS/MS program who are pursuing the non-thesis option are expected to complete their MS degree after no more than two semesters, and students in the regular MS program who are pursuing the non-thesis option are expected to complete their MS degree after no more than 3 semesters. Students who do not meet these time guidelines should discuss their situation with the Graduate Program Director so that they can determine how to finish their course of study in a timely manner.

2.8. Change in Degree Status from MS Degree to Doctoral Degree.

Upon completion of the MS degree, students may petition to be allowed to continue for a PhD degree provided they have not already attempted twice to pass the oral qualifier examination at the Ph.D. level and failed in their two attempts. In the case of a student who is in the MS degree program because they failed previously to pass the Ph.D. written qualifier examination, the past performance on the written qualifier examination will be considered in the decision concerning whether or not the petition to enter the Ph.D. degree program is accepted.

Petitioning to be allowed to continue for a PhD is essentially equivalent to applying for readmission to the program. As such, the student must have demonstrated exceptional progress during their MS work, as evidenced by timely progress through the degree and publications and/or presentations that demonstrate the quality, quantity and creativity of the student's work.

Simply passing the MS thesis defense is not by itself sufficient evidence that a student will be allowed to continue for a Ph.D. degree.

Students wishing to continue with a PhD should submit to the Graduate Program Director the following documents one month before the final MS exam:

- A letter requesting that the student be reconsidered for the PhD program.
- A statement of purpose, that highlights the significant progress the student has made during the MS degree, along with any other salient information.
- A transcript from UMBC
- A strong letter of endorsement from the research advisor.
- Two other letters of recommendation from people familiar with the student's work.

The Graduate Program Committee in consultation with the thesis advisor of the student will consider the petition soon after the MS thesis defense, and a decision will be returned to the student at that time. If the Graduate Program Director returns a favorable response to the student, PhD seeking status along with change of funding to the PhD level will be put in effect immediately. If the Graduate Program Director returns a negative decision, the student will be allowed to request a 3 month continuation of salary and status such that they can make appropriate arrangements concerning employment and/or visa status.

3. Doctor of Philosophy Requirements.

3.1. General Policies

The Chemical and Biochemical Engineering Program requirements for the Doctor of Philosophy degree are summarized below. Additional requirements are imposed by the UMBC Graduate School, and are documented in its catalog.

It is the responsibility of the student to ensure that all Graduate School and Chemical and Biochemical Engineering Program requirements are met. Questions regarding the requirements may be directed to the Chemical and Biochemical Engineering Graduate Program Director.

The Doctor of Philosophy Degree is awarded only upon sufficient evidence of high attainment in scholarship and the ability to engage in independent research in the field of Chemical Engineering. It is not awarded for the completion of course and seminar requirements, no matter how successfully completed.

3.2. Course Requirements

A minimum of 27 credit hours of approved courses are required. Appropriate courses taken while earning the Master of Science degree from the Department may be used in partial fulfillment of this requirement. Sixteen of these 27 credits are obtained from the major core courses ENCH 610, 620, 630, CHEM 437, and MATH 404. A maximum of 9 credits of 400-

level courses taken from other disciplines may count towards the course requirements subject to prior approval. A list of approved courses is described in Appendix B of this handbook.

Candidates for the Doctor of Philosophy degree must receive a B average in course work and must receive at least a B grade in each of the courses ENCH 610, 620, 630, CHEM 437, and MATH 404. A minimum of 18 credit hours of Thesis Research (ENCH 899) is required. Course credits obtained from Thesis Research (ENCH 899) do not count toward the required 27 credit hours of course work. Only two courses taken from the series of courses ENCH 660, 662, 664, and 666, or from any of the Professional Masters Programs, may be used to satisfy the requirement for 27 credit hours of course work.

Students whose native language is not English are required to pass the TA spoken English examination administered by the UMBC Graduate School at the level of 3 or higher. Students who are not able to meet this standard are required to take an appropriate remedial English language speaking and listening comprehension course as recommended by the Graduate School.

3.3. Transfer of Credit

A maximum of 21 semester hours of graduate course work taken at other accredited institutions may be applied to the Ph.D degree. The GPD must agree that the specific courses are appropriate to, and acceptable in, the student's program; and the student is responsible for providing an official transcript of this work to the Graduate School along with appropriate course descriptions and syllabi. Due to academic and procedural differences between U.S. regionally accredited and foreign institutions, credit from foreign universities will be considered on a case to case basis. The grades of transfer work do not affect the grade point average of the work taken at UMBC. A grade of A from another institution cannot balance a grade of C earned at UMBC. No credit transfer will be allowed for any courses which have been used in fulfillment of the BS degree. The request for transfer of credit shall be submitted to the Graduate Program Director for approval at the earliest possible time.

3.4. Transfer of Qualifying Examination

Transfer of a passing grade on a qualifying exam is rare, however, a petition for considering transfer of the qualifying examination can be made.

3.5. Selection of Thesis Advisor

All graduate students, other than BS/MS students, who enter the Program are required to submit a ranked list of three choices for thesis advisor in order to be assigned a thesis advisor by the department. This ranked list is part of the Departmental Advisor Selection Form which doctoral students must submit prior to being allowed to take the written qualifying examination. The Departmental Advisor Selection Form contains the names of the faculty members who are offering projects to students, and each of these faculty members must sign the form to verify that students are fully informed about the all of the research projects that are available in the

Department. An example of this form is provided in Appendix E. **Student who do not properly submit the Departmental Advisor Selection Form will not be permitted to take the written qualifier examination and will not be assigned to a thesis advisor.** Consequently students are encouraged to turn this form in well before the date of the examination so the contents can be verified by the Department as being acceptable. This form also provides a means for the Department to verify that a student is fully informed about all the available research projects. The ranked list from the Advisor Selection Form will be used by the Department when determining who the graduate advisor will be for a particular student. Doctoral students will be assigned an advisor only after passing the written qualifying examination. The assignment of students to thesis advisors will be based on the students ranked list, faculty needs, and the availability of external funding.

3.6. Requirements for Achieving Doctor of Philosophy Candidacy Status.

3.6.1. The comprehensive written examination. The written qualifying examination is intended to test the student's expertise in chemical engineering at the undergraduate level and may be taken no more than twice. This examination is taken during the student's first year, and is offered on two dates each year: the first usually being in late January and the second usually being in late May or early June. In the case of failure for the first attempt of this examination, written feedback will be provided by the Department which can be used by the student as guidance in their second attempt at this examination. A further description of this examination is given in Section 9.

3.6.2. The oral qualifying examination that covers the student's intended thesis work. The oral qualifying examination is required of both Master of Science Thesis Option and Doctor of Philosophy students. This examination is taken after a student has had a reasonable opportunity to initiate their research, which is generally 3-4 months after a thesis advisor has been assigned to a student. The oral qualifier examination is generally offered on two dates each year, the first date being in September or October of a given academic year. Students who do not pass this examination on their first attempt may be permitted a second attempt. This second attempt generally takes place in December or January of the same academic year. Other dates for this examination may also be offered in special situations. Specific dates for the examination for a particular upcoming academic year will be posted by the first day of the fall term on the Departmental website and other publicly available locations. Students taking this examination will be given a detailed set of instructions to follow as they prepare for it (see Appendix A). Requests for postponing the oral qualifier must be made by written petition to the Departmental Graduate Program Committee at least one month prior to the scheduled oral qualifying exam date. Whether or not they pass, students taking this examination will be given a written assessment of their performance.

The oral examination is intended to be a test of critical thinking. **If the student fails the oral examination after exhausting all of their allowed chances, the student status will change from Ph.D. seeking to MS degree seeking, and there are no cases where a petition to reconsider change of status will be considered.**

3.6.3. Consequences of not Passing the Oral or Written Qualifying Examinations.

Students are given two chances to pass the written qualifying examination and up to two chances to pass the oral qualifying examination. If a student is not able to pass either of these examinations after exhausting all of their allowed chances, they are automatically transferred to the MS degree program. **Along with the change in degree status, a change in funding status to the MS level automatically occurs at the beginning of the next semester.**

3.6.4. The proposal examination on the research topic selected by the student. The examining committee for the proposal examination consists of at least five persons. At least three of these five persons must be tenure-track or tenured faculty members in the department who have full-time appointments. This definition includes full-time faculty members in the department who have joint appointments, even if their tenure resides outside the department. Following the seminar, the examining committee conducts an oral examination of the student on the area of the proposed research. Students should take this examination within 3 semesters after passing the oral qualifying examination. If a student does not pass the proposal examination on their first attempt, a second and final attempt shall occur within one additional semester.

As part of the proposal examination, students are required to submit a written document that describes the research project. The format for this document is the same as described in Appendix A for the written document associated with the oral qualifier examination, except that it may be up to 15 pages in length instead of 7 pages. The document should contain enough introductory material to inform the proposal examination committee about the underlying background of the project. The document should also contain additional logically arranged sections, such as sections on objectives, experimental and theoretical methods, results, conclusions, and plans for finishing the dissertation.

Students who pass the qualifying and research proposal examinations are considered to be Ph.D. candidates. A student must be admitted to candidacy within three semesters after passing the oral qualifier examination. Admission to candidacy normally is associated with an increase in stipend. A student must be admitted to candidacy at least two full sequential semesters before the date on which the doctorate degree will be conferred.

3.7. Final Oral Defense of the Ph. D. Dissertation.

The oral defense is conducted by a committee of at least five members recommended by the graduate faculty advisor and approved by the Vice President for Graduate Studies and Research. This committee should consist of the same examining committee of four persons which constituted the proposal examination with one person added. In the event that not all of the persons who served on the proposal examination are available to serve on the dissertation defense committee, substitutions may be made. However, the final makeup of the dissertation defense committee must in all cases consist of at least three faculty members from the department (as defined in point 3 above) and at least one person from outside the department. The candidate may only take the final oral defense twice, and students who are not able to pass the defense in two attempts are not allowed to obtain their degree. The time and location of the

defense must be publicized so that the defense can be attended by all interested persons. Students must complete all of their program for the degree, including the dissertation and final oral examination, within four years after admission to candidacy.

3.8. Time-Line for Completion of the Doctoral Degree

It is expected that students will complete the doctoral degree within five years of admission. After a student has had six years of residency in the doctoral program, thesis advisors are no longer allowed to provide stipend or tuition support for students. However, if there are extenuating circumstances, a student may petition the Graduate Program Committee for an extension of this time limit.

4. Annual Review of Student Progress.

In November of each year, all students in the Ph.D. and M.S. degree programs will fill out an annual student progress self-assessment form provided to them by the Department and will give these completed forms to their thesis advisor, or to the Graduate Program Director in the case of coursework MS students, by December 1 of that same year. The thesis advisor and co-advisor (if applicable) or the Graduate Program Director will then fill out an annual student progress evaluation form for each student using the information in the student progress self-assessment form together with any other appropriate additional information available. The completed annual student progress evaluation form will then be given to each student on January 15 of the subsequent calendar year. The thesis advisor, together with any thesis co-advisors that may be involved in the thesis project, will then discuss together the contents of the completed annual student progress evaluation form. The overall objective of this discussion is to make sure students are on track for finishing their degree in a timely manner.

5. Good Standing Status

Students are considered to be in good standing with the UMBC Graduate School if they maintain a grade point average of 3.0. Students not in good standing with the Graduate School are considered to be on probation and must, in consultation with the GPD, agree to a time frame and procedure to re-establish good standing status. Performance of the student as a teaching assistance may also be considered by the Department in the determination of a student's status. Students must also make every effort to conform to the time limits for various activities described elsewhere in this handbook.

6. Seminar Course (ENCH 609)

All students in the department, with the exception of certain self-supported students, are required to attend the seminar course (ENCH 609), which meets each week on Monday at noon. M.S. and Ph.D. students who have full financial support are required to register for credit for this course for both the fall and spring semesters of their first year at UMBC. Students are permitted to miss at most two Monday seminar sessions each semester, but they then must make up these absences by attending other seminars, as described in the Black Board site of this course.

Students who miss more than two seminar sessions in a semester and do not make them up will be required to register for the seminar course in the subsequent semester at their own expense.

7. Special Problems in Chemical Engineering Course (ENCH 648)

Students in the Master of Science Non-thesis Option program are permitted to count up to 6 credits of ENCH 648 toward their degree. Students in either the Master of Science Thesis Option program or the Ph.D. program are permitted to count up to 3 credits of ENCH 648 toward their degree. For students in a thesis program, the research conducted for an ENCH 648 course should not overlap significantly with their thesis project, and the results obtained for an ENCH 648 course should not appear in the final thesis of a student. An exception to this rule occurs for students in the BS/MS program who are pursuing the thesis option. These students typically take 3 credits of ENCH 648 in their senior undergraduate year with the research topic for this course being directly related to their thesis project.

8. Courses at the 400-level which can be Used to Satisfy Course Requirements

The majority of courses that are taught at the 400 level in the Departments of Chemistry, Biology, Mathematics, Physics, Mechanical Engineering, Computer Science, and similar types of departments can be used as electives to satisfy the course requirements in the M.S. and Ph.D. programs. Students must confirm with the Graduate Program Director that a particular course can be applied to their graduate program before they take that course for credit. Appendix B contains a list of courses that have previously been approved for use in satisfying elective course requirements for graduate degrees.

9. Regulatory Engineering and Professional Masters Courses

Only two courses from the sequence ENCH 660-666 or from the Professional Masters Program can be counted toward the elective courses for the MS or Ph.D. degrees. Students must confirm with the Graduate Program Director that a particular course from the Professional Masters Program can be applied to their graduate program before they take that course for credit.

10. Comprehensive Written Qualifying Examination.

The written qualifying examination consists of 3 parts, each given separately, over a two to three day period. Each part of the exam takes 3-4 hours to complete, and the exam parts cover the areas of Thermodynamics, Kinetics and Reaction Engineering, and Transport Phenomena. The exams cover undergraduate material as taught at UMBC and are intended to cover the broad area of the subject matter. Students uncertain of their ability in any of the exam areas are advised to sit in on the undergraduate class in that area during their first year at UMBC. This is especially true of thermodynamics, where graduate and undergraduate material are particularly different.

Each part of the written qualifying exam is written by a committee of 3 to 4 faculty members in the department. Faculty members participating in the exam can, at their discretion,

provide relevant course material to students. However, no old files of written qualifying exams are given out.

Textbooks for each of the courses that make good references include "Introduction to Chemical Engineering Thermodynamics" by Smith, Van Ness, and Abbott (for Chemical Engineering Thermodynamics), "Elements of Chemical Reaction Engineering " by Fogler and Gurman (for Kinetics and Chemical Reaction Engineering), and "Transport Phenomena" by Bird, Stewart and Lightfoot; "Introduction to Fluid Mechanics," by Fox, McDonald and Pritchard; and "Fundamentals of Momentum, Heat, and Mass Transfer," by Wicks, Wilson and Rorrer (for Transport Phenomena).

If a student fails part of the exam, they only need to retake the part that was failed. If a student fails to pass the exam on the second taking, that student will be transferred into the MS degree program. Along with the change in degree typically comes a change in funding status. A complete description of the requirements that apply for obtaining the MS degree after a student is transferred to the MS degree program is given in Section 2.

11. Oral Qualifying Exam

The oral examination has two parts: a written report and an oral presentation followed by an oral examination. Detailed instructions concerning these two parts are provided in Appendix A.

A major focus of the oral examination is on understanding of the importance of the problem to be addressed and understanding the methods and analysis used, especially as they relate to chemical engineering principles. For example, if a student chooses to talk about a kinetic analysis of their data, they should know what kind of reactor model (batch, plug flow, semibatch, or other flow reactor) is the proper one to use, and how to appropriately describe reacting systems within that reactor. Similarly, if a student chooses to talk about the measurement of equilibrium binding constants, they should know how those constants are related to enthalpy, temperature, and other relevant kinetic and thermodynamic parameters. Generally, the easiest way to fail the oral qualifying exam is to lose sight of how the experiments or modeling being performed is related to fundamental principles that all chemical engineers should know.

Appendix A

Oral Qualifying Examination Guidelines

These guidelines have been adapted from the National Science Foundation proposal guide. You can find the original document at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg

1. Written Report Maximum Length and Pagination Instructions

The Oral Qualifier written report can be no more than 7 pages in length and each page of the report must be paginated. Do not number the Title Page if included, and begin numbering your pages with 1. Appendices are not allowed.

2. Written Report Margin and Spacing Requirements

The written report must be clear, readily legible, and conform to the following requirements:

a. One of the following typefaces identified below must be used:

- Arial, Courier New, or Palatino Linotype at a font size of 10 points or larger
- Times New Roman at a font size of 11 points or larger
- Computer Modern family of fonts at a font size of 11 points or larger

A font size of less than 10 points may be used for mathematical formulas or equations, Figure, Table or diagram captions and when using a symbol font to insert Greek letters or special characters. Students are cautioned, however, that the text must still be readable;

b. No more than 6 lines of text can be within a vertical space of 1 inch; and

c. Margins, in all directions, must be at least one inch.

3. Page Formatting

Since ALL faculty members in the department will be reviewing the written report, students should only use a standard, single-column format for the text.

While line spacing (single-spaced, double-spaced, etc.) is at the discretion of the student, established page limits must be followed.

The guidelines specified above establish the **minimum** font size requirements; however, students are advised that readability is of paramount importance and should take proper care in selection of an appropriate font for use in the written report. **Small font size makes it difficult for faculty members to read the written report; consequently, the use of a small font not in compliance with the above guidelines may result in a failing grade.** Adherence to font size and line spacing requirements also is necessary to ensure that no student will have an unfair advantage by using a smaller font or line spacing to provide more text in the written report.

4. References Cited

Reference information is required. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. If the document is available electronically, the pubmed id and website address should be identified. Students must be especially careful to follow accepted scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal. While there is no established limitation for the number of references, the reference section must include bibliographic citations only and must not be used to provide parenthetical information outside of the 7 page limit.

5.1 Students Will Work Independently on the Written Report

The CBE Graduate Program Committee will provide three examples of previous oral qualifier written reports to every student taking the examination. Students should not ask for any other examples from older classmates, research group members or their advisor. Note that these provided documents may have been written before the guidelines described in this document were instated so that they may not conform precisely to these guidelines.

Students will prepare the written report and oral presentation independently. Advisors/Mentors are available to discuss ideas and answer questions, but will not read or comment on the written report. Students are encouraged to use the writing center at UMBC. Senior graduate students will also be available for discussions or for sharing ideas but should not read or critique the written report of students being examined.

5.2 Oral Presentation

Students should work independently on the first draft of their oral presentation.

Students should not request assistance from any Faculty member at UMBC while preparing their oral presentation. Therefore students will not be evaluated or receive any kind of critique from Faculty members on their oral presentation before the exam takes place. Additionally, students presenting the exam cannot practice in a formal research group setting, *ie* students should not present their oral qualifier at a group meeting. However, we encourage a couple of activities for preparing a successful presentation: i) Students presenting the exam are encouraged to recruit seniors students in the Department (same or different groups) to participate in a practice session and/or ii) Students can request to present during biolunch and practice parts or the complete qualifier (this will be determined by ENCH 609 class guidelines constraints). The request to present in seminar is on a first come first serve basis. When students present their oral qualifier during ENCH 609 Faculty will not participate in writing feedback.

Oral presentations do not have a required format, and students may use any software of their choice to create the visual aides for their presentation. The maximum time limit for the oral presentation is 20 minutes. Questions from the Departmental Faculty will follow the oral presentation.

All students are required to sign a written pledge that they will follow the guidelines described above when preparing for the oral qualifier examination.

6. Delivery of Written Document

The written document is due to the Faculty members a week before the scheduled exam date, *ie*. If your exam is scheduled on Friday your paper is due on the previous Friday at noon.

Students should save their file as: LAST NAME_ FIRST NAME Oral Qualifier DATE.

Students should convert their file into a pdf document. If you do not have a pdf converter in your computer there are several options that can be found online and can be used for free.

Students should send their pdf document to ALL faculty members, please use the following list of emails:

jross@umbc.edu, blaney@umbc.edu, tgood@umbc.edu, mariajose@umbc.edu, jleach@umbc.edu, marten@umbc.edu, moreira@umbc.edu, grao@umbc.edu, dfrey1@umbc.edu

Additionally each student should print a copy of their exam and place it in the mailboxes of each Faculty Member in the Business office (ECS 314). Dr. Rao does not have a mailbox so please put the copy in a yellow envelope (available in the business office) and send it through campus mail or take it to TRC. If you need any help with this Denise can fill you out on the details.

7. Content Ideas

To help you think about your document here are some ideas of the topics you should include. You do not need to follow the exact sequence of topics or include all of them. This is just a list of ideas that you might consider when putting your paper together.

- I. Aim/Hypothesis/Objective of study: What are you going to do?
- II. Background: What has already been done? Place your work/ideas in context of the field of study.
- III. Materials & Methods: What did you do? What are you planning to do?
- IV. Experimental design and expected outcomes: Experiments/Modeling you planned but might not have done yet? What do you expect the results to look like (if they have not taken place)? What equations/measurements you propose to use?
- V. Preliminary Work/Results to date: What data have you gathered, what equipment/s have you learned to use? What programs have you written?
- VI. Discussion/Conclusions: What does it all mean? If you have results that are unexpected, can you explain them? Can you make any conclusions of the work you put together in context of the advancement of your field.
- VII. Future Work: Ideas you want to pursue next?
- VIII. References

Tip for document: Make sure each section of document has a title, include an index and title page (will not count as part of the seven pages). The more explicit you make your titles the easier it is for the person reading your document to think about what you are reading.

Tip for references: if you have not used a *reference* software we recommend you start as soon as possible. *EndNote Web* is a *reference* software available at no charge for current UMBC students, staff, and faculty. You can find instructions and access using the following link:

<http://aok.lib.umbc.edu/reference/Endnote/>

8. Agreement by Students

I have read, received a copy and agree to follow the **Oral Qualifier Guidelines for the CBE Department at UMBC**. I am aware that the consequence of breaking this agreement is failing the exam.
DATE

Student 1 Name _____
Student 2 Name _____
Student 3 Name _____
Student 4 Name _____

9. Checklist:

A list has been provided that you should go through as a final check before submitting your qualifier.

- 1) Title page is included
- 2) Numbering of pages started at 1 on first text page
- 3) I have 7 pages with text, figures, tables and no appendices
- 4) I have references page/s that is not part of the 7 pages
- 5) The font I choose follow the rules
- 6) The spacing and font I choose follow the rules (6 lines of text per inch)
- 7) I have read all the instructions and if I had questions I asked a Faculty Member
- 8) If I am still in doubt I can turn in my paper earlier than the due date and _____? has helped me verify that I am following the rules

Appendix B

Example List of 400-Level Courses Approved as Electives

The following are examples of courses that have previously been approved for use in satisfying elective course requirements for graduate degrees:

Biol 414 (Eukaryotic Genetics and Molecular Biology)

Biol 422L (Microscopy in the Biological Sciences)

Biol 434 (Microbial Molecular Genetics)

Biol 456 (Plant Molecular Biology)

Chem 431 (Chemistry of Proteins)

Chem 432 (Advanced Biochemistry)

Chem 433 (Biochemistry of Nucleic Acids)

Chem 435 (Biochemistry of Complex Carbohydrates)

Chem 441 (Physical Chemistry of Macromolecules)

Chem 442 (Physical Biochemistry)

Chem 443 (Molecular Spectroscopy and Biomacromolecules)

Chem 444 (Molecular Modeling)

Math 441 (Numerical Modeling)

Math 481 (Mathematical Modeling)

Appendix C

Safety Guidelines for the CBEE Department at UMBC

Appendix D

Guidelines for International Students

Appendix E

Example Departmental Advisor Selection Form

Date: 2/14/11

To: Madhubanti Chatterjee
Helena Gaifem
Priyanka Gupta
Sasan Sharee
Virendra Singh
Natasha Wilson

From: Dr. Douglas Frey
Graduate Program Director

Cc: CBE Faculty

Re: Research Advisor Selection

In order for research advisor assignments to be made, we require that you interview all the faculty members in our department who have positions available for new students in their laboratories. You will need to get the faculty members specified below to sign this form in the appropriate location to verify that you are fully informed about the positions available in their laboratories. You are certainly welcome to talk with other faculty members, but your research advisor selection is limited to the faculty members specified below since they are the only ones taking new students.

AFTER you have interviewed the faculty members specified below and have obtained their signatures, then write a number ranking (1, 2, or 3) on the line indicated to identify your first, second, and third choices for a research project. Please write each number only once. For example, do not list two faculty members as your first choice (your number 1 choice). Also, for any projects offered jointly by more than one faculty member, you will need the signatures of all the faculty members involved in that project.

THEN, after you have obtained all the needed signatures and after you have completed your numerical rankings, scan the form and email it to Dr. Frey (dfrey1@umbc.edu) by 5 pm on Friday, March 4, 2011. You can use the copy machine in Engineering 314 to do this. Ask Denise if you need help.

Your name: _____

Faculty (in alphabetical order) with available research positions:

Dr. Mariajose Castellanos: _____ Rank: _____

Drs. Castellanos/Good (joint project): _____ Rank: _____

Dr. Jennie Leach: _____ Rank: _____

Dr. Govind Rao: _____ Rank: _____

Appendix F

Document History

Version

January 2, 2012

Changes from previous version

This version was a major update of the previous version of the handbook which was last revised in August, 2007.