SUMMARY OF REQUIREMENTS FOR MOLECULAR AND CELL BIOLOGY PH.D.

The Graduate Committee:
Bruce Goode (Chair)
Michael Marr
Daniela Nicastro

Summary of requirements for advancing to candidacy in the Ph.D. program:
All MCB students must complete 4 lab rotations (9 weeks each), pass 6 lecture courses with a grade of B- or better, pass a qualifying exam (‘Outside’) at the end of the first year, defend a thesis research proposition (‘Inside’) at the end of the second year, TA two courses (usually during the second year), and select a thesis lab by mutual agreement with a faculty member by the end of the first year. In addition, graduate students must register for and attend the following not-for-credit courses/seminars: in the first year, Ethical Practice in Health-Related Sciences (Cont 300b), and every year one Journal Club and the Graduate Student Research Seminar.

Courses: There are three required/mandatory courses for all MCB Ph.D. students: Biol 103 (Mechanisms of Cell Function), Biol 105 (Molecular Biology) and Biol 200 (Proseminar). The remaining 3 courses must have catalogue numbers of 100 or above (signifying advanced), and can be selected from a number of topic areas, including structural biology, cell biology, developmental biology, immunology, molecular biology, neuroscience and genetics. Transfer credits may be applied towards no more than two courses, and are decided on a case-by-case basis upon written petition to the Chair of the Graduate Committee. In no case will transfer credit be applied to the three mandatory courses.

Rotations: All first year students are required to register for the research rotations as Biol 300a,b. Every student is required to complete four rotations of 9 weeks each (in four different laboratories) during the academic year (specific dates below). The choice of laboratory is made jointly by the student and the faculty member in whose lab the rotation is to take place. Students may choose from faculty in the Departments of Biology, Biochemistry, Chemistry and Physics. During orientation week, we will ask you to list your top choices for rotations (after the three-night faculty bazaar). We will then assign students to a first rotation, in doing our best to give everyone their first or second choice. The remaining three rotations are the responsibility of the student to arrange with the appropriate faculty member ahead of time. We recommend that you arrange rotations at least a few weeks prior to the end of the previous rotation to ensure that you can get a spot. By the end of each rotation, the student submits a written rotation report. One copy should be deposited at the Biology Office and one provided to the laboratory head in which the rotation was done.

Rotation Schedule:

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<th>Written Report Due</th>
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Selection of a Thesis lab: Students are not permitted to approach faculty about joining a lab until Monday April 30th. They should then make every attempt to complete the selection process by May 11th, 2012. Students are expected to begin work in their new thesis lab immediately following the end of the 4th rotation. It is critical that the choice of a thesis lab is not discussed with any faculty member until April 30th. This policy protects the rights of all students in the first year MCB class, creates a level playing field independent of the order in which rotations were performed, and is taken very seriously by the graduate committee.

Journal Clubs: Every student is required to register for and attend one Journal Club. Students supported on specific Training Grants must choose from Journal Clubs approved by the Director of that Training Grant. For example, students on the Genetics training grant must attend Molecular Genetics Journal Club. In their first year the students should go to the journal club(s) attended by the labs in which they are rotating. Under these circumstances just pick one to register for and don’t worry about any mismatch between what you register for and what you attend. Students are not required to present an article until their second year.

Journal Clubs: (See course listings for times)

Molecular Genetics       Biol 305d
Neurobiology             Biol 306d
Structural Biology       Biol 310d

Wednesday Colloquia series: All students are required to attend the regular Wednesday Joint Biology/Biochemistry Dept. seminars at 4:00 pm.

Graduate Student Research Seminars: (Biol 350d) All students are required to register for and attend Friday ‘pizza talks’, which are held at 12:30 PM. All MCB (and Neuro) students present their thesis work annually starting their 3rd year.

Courses to register for:

FIRST YEAR: Students in their first semester (Fall 2011) need to register for Rotations (Biol 300a), a Journal Club (Biol 305d to 310d), Research Seminar (Biol 350d), and two lecture courses – Biol 105 (Molecular Biology) and Biol 200a (Proseminar)

Students in their second semester (Spring 2012) need to register as above (first semester) except that one lecture course will be replaced by Biol 103b (Mechanisms of Cell Function) and the second by an elective that the student chooses (see above). In addition, the student must register for and attend the seminar in Ethical Practice in Health-Related Sciences (Cont 300b) usually offered in Spring term, which is a not for credit course.

Outside Research Proposition: MCB students will submit and defend a research proposition at the end of the first year in the program. The length and formatting requirements of the outside proposition are similar to an NIH grant proposal (R21/R01), and will be explained in detail in BIOL 200a/ Proseminar.
The subject is not allowed to be directly related to projects a student has worked on during the rotations or in Proseminar. Again, details of what constitutes “directly related” will be discussed in Proseminar. One page with an abstract and ‘specific aims’ of the proposal is due to the Graduate Committee by 5 pm on Friday, March 30, 2012. Following approval by the Graduate Committee (by April 2, 2012) completed papers are due by April 20, 2012. The Committee will evaluate the choice of subject and will assign a committee of three faculty members who will evaluate the written proposal and oral defense. The defenses will be held during the week of May 14-25, 2012. Reasons for exceptions should be submitted in writing to the Graduate Committee and are only granted under extraordinary circumstances. Please contact Michael Marr with further questions about the Outside exam (mmarr@brandeis.edu).

Choice of thesis lab:
Students will choose their thesis lab by mutual agreement with a faculty member at the end of the first year between April 30th and May 11th, and are expected to begin work on their thesis projects immediately following the end of the 4th rotation. 5th rotations are considered when needed, but must be discussed with and approved by the Graduate Committee.

SECOND YEAR
Courses: Generally students take one lecture course in the fall and one in the spring semester.

Teaching: Each student is required to serve as a teaching assistant (TA) for two semesters, typically each semester of their second year in the program. Teaching assignments are made in the summer preceding the second year and will be emailed to students (usually in July).
Second year PhD students are expected to attend the Teaching Practicum for teaching fellows, which will be held in August 2012 (more details to be announced in July 2012).

The additional details are as follows:

Thesis Research:
Students will choose their thesis lab by mutual agreement with a faculty member at the end of the first year between April 30th and May 11th. Students begin work on their thesis projects from that point onward.

Graduate Student Research Seminars: (Biol 350d) All students are required to register for and attend these seminars which are held each Friday at 12:30 PM. Students do not present until their 3rd year.

Journal Clubs:
Every student is required to register for and attend one Journal Club. Students on the training grants must choose from Journal Clubs approved by the Director of the Training Grant. Students typically make their first presentations in their 2nd year.

Wednesday Seminar series:
All students are required to attend the regular seminars at 4:00 pm.

Thesis Research Proposition (“Inside exam”):
Each second year student must defend a thesis research proposition (or “Inside exam”) in the period of May 14-25, 2012. Written proposals should be handed in to the committee
members a minimum of one week before the defense date. Petitions for extensions should be submitted in writing to the Graduate Committee and are only granted under exceptional circumstances. The examining committee is composed of three faculty members, and does not include the thesis supervisor. The thesis advisor is allowed to be present in the room during the exam, but only as a witness, i.e. they must remain silent during the process and their input is strictly prohibited. Faculty for the examining committee should be selected by the student in consultation with their thesis advisor. Two members of the examining committee plus the thesis advisor and a faculty member from a University other than Brandeis will compose the student’s final thesis committee. Please contact Bruce Goode with questions regarding the Inside exam (goode@brandeis.edu).

THIRD and Continuing Years

Thesis Research:
Students by this time should be well into their thesis research projects.

Graduate Student Research Seminars:
Each student from their third year on must present a Friday research seminar (Biol 350d). The student should make sure that her/his committee attends the talk and meets with the student very soon afterwards (usually the same afternoon or the following week). All students must register and attend these seminars, which are held on Fridays at 12:30 PM.

Journal Clubs:
Every student is required to register for and attend one Journal Club. Students on the training grants must choose from Journal Clubs approved by the Director of the Training Grant.

Wednesday Seminar series:
All students are required to attend the regular Wednesday seminars at 4:00 pm.

Thesis Committee:
Once thesis work has begun, each student is required to meet at least once per year with his/her thesis committee. These meetings should be arranged in advance by the student soon after the student’s presentation at the Friday Research Seminar series. After the meeting, the committee will submit a report summarizing the student’s progress, identifying possible problems, and any recommendations. Graduating students are required to have these yearly reports in their files. It is the student’s responsibility to make sure that the report is signed by committee members and hand-delivered to Marcia Cabral in the Biology office right after the annual thesis committee meeting.

Thesis requirements:
Specific Ph.D. thesis requirements are set by the student’s advisor and the thesis Committee. As a rough guideline, a Ph.D. student should have two first-author papers accepted or published in quality journals at the time of their thesis defense.

Thesis Seminar:
Each student is required to give a thesis seminar upon completion of their dissertation. It is usual to give this prior to the thesis defense.
QUESTIONS:

If you have questions you can contact a member of the graduate committee.

Bruce Goode  goode@brandeis.edu
Michael Marr  mmarr@brandeis.edu
Daniele Nicastro nicastro@brandeis.edu

The following senior graduate students have also agreed to answer questions:

Alexander Ferrazzoli  aferrazzoli@brandeis.edu
EVALUATION OF GRADUATE STUDENT PERFORMANCE
IN THE MOLECULAR AND CELL BIOLOGY PROGRAM

YEAR 1:
The students must complete their formal courses with a grade of B- or better. Each of four required lab rotations is evaluated by the supervising faculty member, who then submits a brief written report on the student’s performance to be included in the student’s permanent file. The written lab reports are reviewed by the rotation adviser and by the graduate committee. Students must also successfully write and defend the Outside Proposition at the end of the first year, and have secured a thesis lab by mutual agreement with the faculty mentor. Progress made in the 1st year is evaluated by the Grad Committee. If students perform below the minimum expectations outlined above, the Graduate Committee will meet to decide whether that student will be re-admitted for the second year.

YEAR 2:
Grades in formal courses must be B- or better. Students submit their thesis research proposal (inside proposal) in writing. A panel of three faculty members (not to include the thesis adviser) are selected by the student for the oral defense of the inside proposal. Those committee members evaluate the student’s performance and submit a written evaluation to the Biology office using a form provided by Marcia Cabral. Two of those faculty members are retained for subsequent service, and along with the thesis advisor comprise the thesis committee for year 3 and beyond until the student graduates. Progress made in the 2nd year is evaluated by the Grad Committee. Continuation in the program is decided based on successful defenses in the Outside and Inside exams, passing all 6 courses with grades of B- or better and satisfactory progress in thesis research. Students are expected to have all course and teaching requirements fulfilled before the start of their 3rd year; exceptions should be discussed with the Graduate Committee.

YEAR 3 and beyond:
Each student presents a research talk in the Friday research seminar sometime during the year. The student’s thesis committee meets following the talk to evaluate the student’s progress and submits a brief written report. Students are required to hold at least one thesis committee meeting per year, but meetings can be held more frequently at the discretion of the student and thesis committee.

THESIS:
The student submits the completed thesis, gives a seminar, and is examined by a panel consisting of at least three faculty members, including one from outside the university and the thesis advisor.
ASSIGNMENTS

Over the course of the graduate program, and usually in the 2nd year, each Ph.D. student is required to teach TWO undergraduate sections, courses, or labs.

Teaching assistant (TA) assignments are decided on by an interdepartmental graduate committee based on faculty request/enrollment and graduate student experience.

In all cases, an attempt will be made to inform graduate teaching assistants of their assignments during the summer prior to the commencement of teaching responsibilities. In cases of unexpected enrollment shifts, cancellation or addition of courses, or inequities in work loads, assignments may be changed with short notice. If there is a likelihood that such a change will be made, the graduate committee will notify those teaching assistants as soon as possible to permit ample preparation time.

Only in exceptional circumstances do graduate students teach their own courses.

RESPONSIBILITIES

When the assignment is made, or at the beginning of the term, graduate teaching assistants and faculty members will discuss course requirements, attendance policies and the range of graduate responsibilities (in class, outside the classroom, administrative duties, technical assistance, e.g., running a projector, etc.).

In order to encourage an open, cooperative relationship between the graduate teaching assistant and faculty member, meetings will be held on a regular basis to discuss the progress of the course.

The TA and faculty member will consult each other on any problem arising in the course as soon as possible so that the faculty member and graduate student can cooperate in addressing it.

If TAs are to grade undergraduate papers or exams, the faculty member and TA will discuss the number of assignments, grading procedures and standards (letter grade/pass, fail/comments only, grading in pencil, and expectations for student writing ability) and an expected range of grades.

TAs are required to hold at least 2 weekly office hours, usually in the evenings.

TAs are seldom asked to tutor students requiring additional help. If tutoring is expected and 1 hour/week is insufficient to address difficulties in the course, the graduate student will refer the problem to the professor and if necessary (and agreed upon) to the appropriate agency on campus for additional assistance.

Faculty members will advise TAs on policies for academic honesty and sexual harassment at the beginning of the term at which time procedures for alerting the proper university officers and dealing with such matters will be agreed upon.
EVALUATION/OVERSIGHT/PROFESSIONAL DEVELOPMENT

TAs are encouraged to discuss teaching with the professor or with a member of the graduate committee.

TAs are expected to consult teaching materials available at the Office of the Dean of Arts and Sciences and to attend teaching seminars sponsored by the Graduate School.

Faculty should evaluate the TA’s performance and provide written comments documenting the teaching experience and teaching fellows development over the course of the semester.

Every attempt should be made to resolve any difficulties experienced between a TA and faculty member. If such resolution is impossible, official grievances should be made per the stated procedures in the student handbook.

TAs are encouraged to document teaching experiences for future job searches. Faculty members should agree to provide letters of reference for teaching which will be included in the student’s departmental file.
SUMMARY OF REQUIREMENTS FOR CANDIDACY TO THE Ph.D. PROGRAM:

All MCB Masters students must complete and pass 6 graduate level courses with a grade of B- or better, including a research-based course. In addition, students must register for and attend the following not-for-credit courses/seminars: Ethical Practice in Health-Related Sciences (Cont 300b) usually offered in Spring term, and appropriate Journal Clubs and seminar series.

COURSES: A total of six graduate-level courses, passed with a grade of B- or better, are required for the degree. These must include the following required courses: Biol 101a (Molecular Biotechnology), Biol 100b (Advanced Cell Biology), and one laboratory or research based course. The balance of courses has to be agreed upon by the chair of the MS program. With the permission of the chair, Biol 105b (Molecular Biology) may be taken in lieu of Biol 101a, and Biol 103b (Mechanisms of Cell Functions) maybe taken in lieu of Biol 100b. The laboratory or research component can be met by Biol 300a or b (one semester Biological Research Rotations), a Project Laboratory (e.g. Biol 155a - Project Laboratory in Genetics and Genomics, Biol 156a - Project Laboratory in Biotechnology, Biochem 155b - Biochemistry Laboratory, Nbio 157a - Project Laboratory in Neurobiology and Behavior), Biol 298a (Readings in Molecular and Cell Biology), or Biol 299a (Master’s Research Project). All students are required to take Cont 300b (Ethical Practice in Health-Related Sciences), usually offered in the spring. In general, transfer credit is not accepted for the Master’s Program. Please note that Project Laboratories are offered only in the fall.

ROTATIONS: Two 9 week rotations, usually taken in the spring semester, are one option to fulfill the research requirement of the Masters degree. Students who choose to do rotations should register for Biol 300a or b. The choice of laboratory is made jointly by the student and the faculty member in whose lab the rotation is to take place. Students may choose from faculty in the Departments of Biology, Biochemistry, Chemistry and Physics. It is the responsibility of the student to arrange the rotation with the appropriate faculty member. We recommend that you arrange for these rotations at least a few weeks before the start date to ensure that you can get a spot.

The student submits a written rotation report at the end of each rotation. One copy should be deposited at the Biology Office and one provided to the laboratory head in which the rotation was done.

**Rotation Schedule:**

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**Journal Clubs:** Students should register for and attend one Journal Club. Masters students are not required to present an article for Journal Club.

**The Journal Clubs are:** *(See course listings for times)*
- Molecular Genetics  Biol 305d
- Neurobiology  Biol 306d
- Immunology  Biol 307d
- Structural Biology  Biol 310d

**Wednesday Colloquia series:** All students are required to attend the regular Wednesday seminars at 4:00 pm.

**Graduate Student Research Seminars:** *(Biol 350d)* All students are required to register for and attend these seminars which are held on Friday at 12:30 PM. Masters students are not required to present their research.

**Courses to register for:**

Students in their **first semester** (Fall 2011) will register for a Journal Club (Biol 305d to 310d), Research Seminar (Biol 350d), and three lecture courses – Biol 101a (Molecular Biotechnology) and two courses to be agreed upon by the program chair.

Students in their **second semester** (Spring 2012) should register for Biol 100b (Advanced Cell Biology), a second lecture course of your choosing and a research-based course as described above. In addition, the student must register for and attend the seminar in Ethical Practice in Health-Related Sciences (Cont 300b) usually offered in Spring term, which is a not-for-credit course.

**Progress:** Students’ progress will be reviewed by the graduate committee and the chair of the program, Dr. Nicastro, at the end of the first semester. Students must complete all courses with a grade of B- or better and may be terminated at the end of the first semester if the student’s record is unsatisfactory. Students wishing to be admitted to a second year of study must demonstrate adequate progress.
SIX LIFE SCIENCES GRADUATE COURSES

When the degree is to be completed in one year, this will be done at a rate of three courses per semester for each of two semesters. However, some students instead elect to finish the degree in two years (e.g. when they introduce a heavy research component into the program, and write a thesis). Courses outside of the life sciences will be considered on a case-by-case basis by the program chair. Students must receive a grade of B- or better in each of the six courses.

RESEARCH REQUIREMENT:

There are three options for completion of the research requirement: 1) Two 9 week rotations (see rotation schedule on page 1 of handbook). A written report will be submitted after each rotation. 2) Master’s Thesis (Biol 299a). The student carries out a research project (lasting a minimum of one semester, but usually the entire year) in a single lab and submits a thesis. 3) Completion of a permitted Project Laboratory with a grade of B- or better.

Students should find a research advisor for the thesis work as soon as possible after starting the program. The best way of doing this is to define a list of potential advisors using the graduate bulletin as a starting point, then calling or emailing and speaking with the professors. The graduate bulletins are online (http://www.brandeis.edu) under Registrar, LINKS, UNIVERSITY BULLETIN, Provisional Bulletin (2011-2012), to look through or print out. Dr. Daniela Nicastro is available to speak with you if you are having trouble defining your area of interest at nicastro@brandeis.edu.

PARTICIPATION IN DEPARTMENTAL EVENTS:

Master’s students should attend a journal club, preferably the one most closely related to the student’s research area. In addition, students should attend the Friday noon graduate student talks and the Wednesday joint seminar.

PROGRESS

Students’ progress will be reviewed by the graduate committee and chair of the program, Dr. Nicastro. Students must demonstrate adequate progress to be admitted to a second year of study should that be necessary.