

**REQUIREMENTS AND POLICIES GOVERNING THE  
GRADUATE PROGRAM IN MARINE BIOLOGY AND BIOLOGICAL  
OCEANOGRAPHY**

Revised August 2021; Applies to students entering in Fall 2021  
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## **Student Expectations**

The student is ultimately responsible for their graduate career and must be familiar with the Graduate School and Graduate Program in Marine Biology and Biological Oceanography (GPMBBO) requirements and are responsible for their timely completion.

If a student's needs are not being met, they should seek redress, using the following chain of command: advisor, guidance committee (first year, qualifying exam, dissertation), Director of the Program, Marine & Environmental Biology (MEB) Section Head, Department Chair, and Graduate School. The Director of the GPMBBO Program is always available to provide guidance on how to deal with particular situations.

## **Contacts**

**Eric Webb**, MBBO Graduate Program Director, [eawebb@usc.edu](mailto:eawebb@usc.edu) (MBBO graduate program issues)

**Doug Capone**, MEB Section Head, [capone@usc.edu](mailto:capone@usc.edu) (MEB research issues)

**Cameron Thrash**, Chair of MBBO Admissions, [thrash@usc.edu](mailto:thrash@usc.edu) (MBBO admissions issues)

**Don Bingham**, MEB Section Coordinator, [dbingham@usc.edu](mailto:dbingham@usc.edu) (MEB issues, reimbursements, scheduling MBBO interviews and MEB seminars and social events)

**Adolfo Dela Rosa**, Student Services Advisor, [adolfo@usc.edu](mailto:adolfo@usc.edu) (admissions, advice on course schedule/financial support/insurance, tracking student data and progress, website/social media)

**Doug Burlison**, Graduate Programs Manager, [burlison@usc.edu](mailto:burlison@usc.edu) (admissions, advice on course schedule, activation of grad student funding, TA assignments)

**Linda Bazilian**, Director of Academic Programs, [bazilian@usc.edu](mailto:bazilian@usc.edu) (curriculum, course scheduling, oversight of teaching labs, problem solving)

## **Code of Conduct for MEB and GPMBBO**

MEB and GPMBBO are committed to promoting a safe and inclusive working environment free of harassment and discrimination. This is fundamental to promoting an equitable and inclusive environment in which all members have access to resources and feel supported and respected by the department. Our code complements policies described in [USC's Code of Ethics](#), [Faculty Handbook](#) and [Student Conduct Code](#).

All MEB/MBBO members, including students, staff, postdocs and faculty, are expected to:

- **Be Respectful.** Respect the physical, professional and personal boundaries of colleagues. Maintain civil and respectful discourse at all times.
- **Be Inclusive.** Work to establish and maintain an inclusive culture that welcomes people of all backgrounds and identities. Recognize that this work must begin with ourselves by actively seeking out knowledge and understanding of other backgrounds and identities.
- **Be Supportive.** Strive to support the safety and professional development of all members of our community. Speak up when you observe behaviors inconsistent with our Code of Conduct.

Specific violations of this code include:

- Discrimination, harassment or exclusion based on age, ancestry, citizenship, color, physical or mental disability, gender expression, gender identity, genetic information, marital status, medical condition, military status, national origin, pregnancy, race, religion, sex (including pregnancy, childbirth, breastfeeding, and/or a medical condition related to pregnancy or childbirth), gender, sexual orientation, protected veteran status, or any other basis protected by applicable laws or regulations. ([USC Policy](#))
- All forms of harassment including unwanted verbal attention, unwanted touching, intimidation, unwelcome jokes, disparaging remarks, etc. ([USC HR Guidelines](#)). Note that scientific criticism is important and appropriate, but disrespectful or demeaning comments are unacceptable.

How to discuss or report concerns:

A first stop for confidential, informal, independent and impartial assistance with resolving concerns is the [USC Office of the Ombuds](#) (213-821-9556, [upcombuds@usc.edu](mailto:upcombuds@usc.edu)). Within the section, potential violations of the code can always be discussed with the MEB Section Head or MBBO Director of Graduate Studies. Outside of the section, concerns of discrimination or harassment by faculty, staff or students can be brought to [Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) (213-740-5086, [eeotix@usc.edu](mailto:eeotix@usc.edu)). Please note that USC faculty, staff and teaching assistants are mandatory reporters, meaning that they have a duty to report suspected prohibited conduct.

## **The Graduate Program in Marine Biology and Biological Oceanography & its Administration**

### ***Introduction***

Graduate students in the Graduate Program in Marine Biology and Biological Oceanography (referred to subsequently as "GPMBBO" or the "Program") may pursue a Ph.D. degree within the Marine and Environmental Biology section of the Department of Biological Sciences at USC (referred to subsequently as "MEB").

At the University of Southern California, graduate education is the responsibility of the Department, but the University's Graduate School establishes minimum requirements concerning grade point average, number and distribution of units, residency, time limits, etc. that are common to all advanced degrees offered within the Dornsife College of Letters, Arts and Sciences at the University. Specific courses, examinations, skills, and research requirements are established by the student's program of study, in this case the Graduate Program in Marine Environmental Biology. Collectively, both sets of regulations constitute the student's "degree requirements," all of which must be met by the student.

Graduate School regulations are listed in the current [University of Southern California Catalogue](#) in several locations. One part of these regulations is located in the section on "[Academic and University Policies](#)", and the rest are found under "[The Graduate School](#)". Those regulations, which most commonly affect GPMBBO students, are included in this document, but the information in the University of Southern California Catalogue should be considered definitive.

GPMBBO regulations are listed in this document; the major requirements of the GPMBBO are also listed in the *USC Catalogue* under "[Marine Biology and Biological Oceanography](#)".

The GPMBBO adheres to strict standards of academic integrity and invokes disciplinary actions (up to and including expulsion) against violations such as plagiarism, unauthorized collaboration, violation of examinations, fabrication/alteration of data or other cases of dishonesty occurring in theses or dissertations. More information on standards of academic conduct can be found at <https://policy.usc.edu/scampus-part-b/>.

Specific information on university policies surrounding scientific misconduct can be found at <https://policy.usc.edu/research-and-scholarship-misconduct/>.

### ***Program Administration--The Graduate School***

The Graduate School maintains the University's official Permanent Graduate Student File and is ultimately responsible for admission of our graduate students and the awarding of their degrees. As noted above, the Graduate School establishes requirements concerning grade point average, number and distribution of units, residency, and time limits that are common to advanced degree programs in all units under their jurisdiction, including the Department

of Biological Sciences.

Official forms are used to track a student's progress by The Graduate School and completion and submission of these usually are to be at a specified point in the student's tenure. A permanent Department file on each student is maintained in the GPMBBO Office. Timetables for the completion of degree requirements are available at The Graduate School. The schedule for the Ph.D. student's final and penultimate semesters is especially detailed and needs to be adhered to closely.

All Graduate School forms prepared by or on behalf of the student must be approved by the Director of the Program (currently Eric Webb) or by the Section Head (currently Doug Capone) before their submission to the Graduate School. All Graduate School forms are available online at <http://graduateschool.usc.edu/current-students/guidelines-forms-requests/> or from Adolfo Dela Rosa or Doug Burleson. *Please turn in all forms to Adolfo Dela Rosa or Doug Burleson who will submit them to the proper office on your behalf.*

### ***Graduate Student Association***

The graduate student body is organized internally as the Marine & Environmental Biology Graduate Student Association (MEB-GSA). The MEB-GSA includes various positions held by students with the purpose of building an enriching, engaging, and supportive environment for MEB PhD students. For the full description of each role as well as timing of elections, please reference the [MEB-GSA Constitution 2021](#) shared with all students. Briefly, the organizational structure and roles of the MEB-GSA are the following:

#### **A. Executive Board**

The Executive Board (E-Board) oversees the MEB-GSA Committees and are re-elected at the end of Fall. The Executive Board for 2020-2021 is:

**President:** Nina Yang

**Vice President:** Delaney Nolin

**Secretary/Treasurer:** Alexis Floback

**Outreach & Engagement Co-Chairs:** Colette Fletcher-Hoppe, Jordan Coelho

**Diversity, Equity, and Inclusion Chair:** Gerid Ollison

#### **B. Committees**

Committees for 2021-2022 (re-elected at the end of Spring, Graduate Admissions Representative is re-elected on the Fall cycle):

*Overseen by the President:*

**Graduate Student Representative (1).** The President also serves as the Graduate Student Representative. The Graduate Student Representative acts as a faculty-student liaison and attends faculty meetings, reports back to students and brings student issues to faculty and works to

resolve issues brought up during student meetings. The Graduate Student Representative has one vote in meetings of the MEB Faculty representing the opinions of the graduate students in academic and governance issues (but not personnel issues). The Graduate Student Representative has no voting power in either the continuation of fellow graduate students or in the Qualifying Examination. To be eligible for this position the student must have passed their Qualifying Examination. In 2020 - 2021, this position will be held by Nina Yang.

**USC Graduate Student Government (GSG) Representative (2).** They are the "go-to" person to help organize events that are funded by the USC GSG. This includes acquiring "umbrella" funds to host events, completing the annual re-recognition process to maintain MEB as a student organization and attending monthly meetings. For a complete list, please reference the Constitution. In 2021- 2022, this position will be held by Melody Aleman and an alternate to be determined.

**USC Graduate Student Government (GSG) Representative Alternate (1):** This student is the alternate to the GSG Representative and helps them with GSG Representative duties. For 2021-2022, this position is currently open.

**Seminar Committee Chairs (2).** This committee collects nominations for possible seminar speakers beginning in the summer for the following academic year. Under normal circumstances, this committee ensures that each speaker has a host and that the host lab carries out their hosting obligations. They also work with MEB Section Coordinator to ensure that travel arrangements are made and to organize lunches after the seminars. This position is advised by two faculty mentors and the format of these seminars can change with consultation and feedback from the faculty mentors (e.g., during a pandemic). To be eligible for this position the student must have passed their Qualifying Examination. In 2021-2022, these positions will be held by Colette Fletcher-Hoppe and Kyla Kelly. The faculty mentors are Naomi Levine and Carly Kenkel.

**Graduate Admissions Student Representative (1).** This student serves on the Graduate Student Admissions Committee to assist faculty in determining the newest cohort of graduate students for the MBBO Graduate Program in MEB. While the student will not have a vote in which prospective students to admit, they have an important role in representing the student perspective in selecting students for the incoming cohort. To be eligible for this position, the student must have passed their Qualifying Examination. In 2020-2021, this position was held by Ben Flanagan.

**Retreat Chairs (2).** This committee plans the annual fall retreat, acting as liaisons between MEB and Wrigley and delegating tasks to other students, as needed. Retreat Chairs are also responsible for organizing the scientific and social programming (e.g. Annual MEB Poster Competition, waterfront activities, talks, etc). Retreat Chairs are expected to reserve and confirm the date of the following year's retreat with Wrigley. The Chairs can appoint an ad-hoc committee to help coordinate logistics and the agenda for the retreat. In 2021-2022, these positions will be held by Samantha Gleich and Cara Schiksnsis.

*Overseen by the Vice President:*

**Alternate Graduate Student Representative (1).** The Alternate Graduate Student Representative represents the graduate students in the Graduate Student Representative's absence or by the latter's appointment. In addition, they work with the Chair to organize student-led meetings and resolve issues raised during these meetings. To be eligible for this position, the student must have passed their Qualifying Examination. The Vice President will hold this position if they have passed their Qualifying Examination. Otherwise, an alternate will be elected from the E-board. If no other E-board members have passed their Qualifying Examinations, an alternate will be elected from the student body. In 2020-2021, this position will be held by Babak Hassanzadeh.

**Recruitment/Interview Chairs (2).** This committee works with the Graduate Admissions Chair and the MEB Section Coordinator to coordinate graduate student candidate interviews and interview weekend activities (2-3 days in January or February). In 2021-2022, these positions will be held by Samantha Gleich and Celeste Lanclos.

**Student Seminar Committee Chairs (2).** This committee plans the MBBO student seminar series for students in their 2nd year and above. The seminar series are typically held in the spring but scheduling and logistics can be flexible and tailored to each year's cohort of students who need to present. In 2021-2022, these positions will be held by Chuankai Cheng and Anna Weiss.

*Overseen by the Outreach & Engagement Chair*

**Science Policy Liaison (1).** This person works with the Science Policy group, an organization that promotes scientific collaboration for policy making (<http://earth.usc.edu/sciencepolicy/>). The Chair works with the Earth Science Department to organize events and to keep MEB students informed and active. In 2021-2022, this position will be held by Kyla Kelly.

**Mentorship Chairs (2).** This committee matches second-year and above MEB PhD students with incoming (first-year) students. The pairs then meet throughout the semester, as needed. In addition, the Chairs organize an activity in August/September to help welcome incoming students. The Mentorship chairs are also responsible for maintaining and updating the "Living Guide" provided to incoming students. In 2021-2022, these positions will be held by Alexis Floback and Anjali Bhatnagar.

**Outdoor Adventure Chairs (2).** This committee coordinates a camping trip for first-year MBBO students. They also plan other outdoors-related adventures and provide resources for students to take advantage of the great outdoors. In 2021-2022, these positions will be held by Samantha Gleich and Cara Schiksnis.

*Overseen by the DEI Chair*

**Graduate student orientation working group.** The purpose of the graduate student orientation is to provide resources, information and training sessions to help incoming students transition to life as graduate students at USC and in MEB, and acquaint incoming students with the culture of MEB as well as the department's ongoing academic, social, and outreach initiatives. The orientation working group assists with all associated planning and logistics.



**Ad hoc DEI working Groups and Committees.** Previous working groups have included increasing diversity in graduate school and STEM pipelines, graduate student orientation, and website development. Working groups may be formed as needed to address any DEI concerns or to launch new initiatives that contribute to MEB's DEI goals and objectives.

## **Requirements for the Ph.D. Degree**

### ***Time Schedule***

All course requirements for the Ph.D. degree are normally completed within three calendar years from the date on which the student took his/her first course at USC and must be completed within eight calendar years from that time.

### ***General Requirements***

A total of 60 units must be completed for the Ph.D. Degree.

### ***Course Requirements--Core courses***

Four core courses are currently required:

1. BISC 582 (Advanced Biological Oceanography)
2. BISC 583 (Evolution and Adaptation of Marine Organisms),
3. BISC 584 (MEB Faculty Lecture Series),
4. BISC 585 (Scientific Writing and Reviewing).

BISC 582, 583, and 584 should be taken during the student's first year; BISC 582 is currently offered in the Fall while 583 and 584 are offered in the Spring. BISC 585 is open to second year students only (Spring semester for 2021-2022).

### ***Other course requirements***

Students are also required to take 4 units of BISC 529 (MEB Tuesday Noon Seminar) and four advanced graduate seminars (more info below). Finally, students are required to take an approved course in statistics (more info below).

## **Advanced Graduate Seminars**

Students must complete a minimum of four 2-unit graduate seminars. 3- or 4-unit seminars can also be used but each counts as only one seminar. Because a critical feature of such seminars is exposure to current literature, all four required seminars must be completed during the student's tenure at USC. With the written permission of the student's committee, a formal course completed at another institution may be counted as one of the four required seminars (the course must have been completed during the student's tenure at USC). A list of options for fulfilling this requirement can be found in the [Appendix](#).

## Statistics Requirement

Proficiency in statistics is a necessary skill for all scientists. Proficiency may be demonstrated by:

- a) completion of a course approved by majority vote of the MEB faculty. Several courses at the University are available and are listed in the [Appendix](#).
- b) acceptance of course work previously completed either at USC or elsewhere. The acceptability of a previously completed course will be assessed by the GPMBBO Program. To request a waiver of this requirement, please work with the Graduate Programs Manager (Doug Burleson).

The Statistics Requirement must be completed before the Qualifying Exam so that sound statistical reasoning can be applied to planned research. If you are unable to complete this prior to taking your Qualifying Exam (e.g., your preferred course isn't available yet or other scheduling conflicts), please work with the Graduate Program Director to request an exemption conditional upon taking an approved course after your Qualifying Exams.

## MEB Noon Seminar Series

Students must regularly attend the Marine & Environmental Biology Noon Seminar series (BISC 529) throughout their tenure at USC (traditionally held on Tuesdays). Students are required to register for BISC 529 for the first four semesters and passing is determined by satisfactory attendance.

## Research Units

BISC 790 Research units are normally taken whenever the student is conducting their doctoral research. Dissertation research will normally take the equivalent of about 2.5-3 years of full time work, but the number of research units taken usually does not reflect this. Typically, advanced graduate students will take 6 units of 790 and possibly a 2-unit seminar each semester. The Student Services Advisor (Adolfo Dela Rosa) or the Graduate Programs Manager (Doug Burleson) can provide guidance on balancing courses and research units.

## *Grade Point Average Requirements*

Students must maintain a grade point average of at least 3.0 out of 4.0 in all courses taken at USC, in conformity with regulations of the university.

If a student's cumulative grade point average falls below 3.0 at any time, the student will be placed on departmental academic probation. The cumulative average must be raised to 3.0 by the completion of the next two semesters of registration at USC in courses approved by the student's guidance committee. Note: this may require that the student take additional formal and/or seminar courses since directed research and dissertation units are on a Pass/No Pass basis and are not computed into the GPA. If the student does not improve his/her overall GPA to 3.0 within

this period, the student will be dismissed from the program. A student who has been removed from probation but subsequently fails to meet the scholarship requirement is subject to immediate termination from the program.

### ***Teaching Assistantship Requirement***

Graduate students pursuing the Ph.D. in the GPMBBO must serve as a Teaching Assistant for at least two semesters; ideally, the student should serve in at least two different courses. Students must enroll in BISC 593 (Practicum in Teaching the Biological Sciences, 2 units) either before or concurrent with their first semester as a Teaching Assistant.

### ***Student Seminar Requirement***

Starting in each student's second year, they are required to give a departmental seminar once per year. Second and third year students are required to give a 20 minute talk (~15 minutes with time for questions) while 4th years and above are required to give a 45 minute talk (remaining time for questions). Students who are planning to defend in the academic year are exempt from this requirement to prepare for their defense. Students will receive anonymous feedback on their presentation from the audience. This requirement can also be met when students give an external talk such as at a conference or at another institution. Presentations at multi-lab group meetings can also help to fulfill this requirement. Those seeking exemption will have to fill out a form and provide it to Doug Burleson.

### ***Other Course and Unit Requirements***

Additional formal course requirements may be established by the Section and/or by the student's First Year or Guidance committees.

A course in scientific ethics is strongly recommended, although not a course requirement for the program. Some aspects of scientific ethics may be covered in BISC 593 (Practicum in Teaching the Biological Sciences).

The minimum number of units required for the Ph.D. by the Graduate School is 60. Units must include 4, but no more than 8, units of BISC 794 credit and may be completed with other formal classes or BISC 790 work.

The student must be registered at USC during the semester that the dissertation is submitted.

### ***Sample Schedule***

Example Program for MBBO students with a TAship during the first semester (required courses highlighted). Please note that each student will have a slightly different TAship schedule or course load depending on their research plan and other circumstances like field work. This is meant as a guide and should not be interpreted as the definitive.

| <b>Year 1, Fall</b>   | <b>Year 1, Spring</b>  |
|---|--|
| Establish 3-person First Year Committee   |  |
| BISC 529 #1 (MEB Seminar, 1 unit)   | BISC 529 #2 (MEB Seminar, 1 unit)                              |
| BISC 582 (Adv. Biol. Oceanography, 4 units)   | BISC 583 (Evol. & Adaptation, 4 units)                         |
| BISC 593 (Teaching Practicum, 2 units) + TAs  | BISC 584 (MEB Faculty Lecture Series, 2 units)                 |
| BISC 790 (1-5 units)  | BISC 790 (1-5 units)   |
| Meet with First Year Committee  | First Year Committee research/coursework talk                  |
|   |  |
| <b>Year 2, Fall</b>   | <b>Year 2, Spring</b>  |
| Establish 5-person Qualifying Exam Committee  | BISC 585 (Scientific Writing, 2 units)                         |
| BISC 585 (Scientific Writing, 2 units)  | BISC 529 #4 (MEB Seminar, 1 unit)                              |
| BISC 529 #3 (MEB Seminar, 1 unit)   | Advanced Graduate Seminar #2 (2 units)                         |
| Advanced Graduate Seminar #1 (2 units)  | Complete Research Proposition (15 pp)                          |
| Late Fall Discuss Research Summary (1-2pp) with Committee (if qualifying in Spring) | Late Spring or Early Fall - Qualifying Exam (written and oral) |
| BISC 790 (1-7 units)  | BISC 790 (1-5 units)   |
|   | <b>Statistics Course (?)</b>                                   |
| <b>Year 3, Fall</b>   | <b>Year 3, Spring</b>  |
| Advanced Graduate Seminar #3 (2 units)  | Advanced Graduate Seminar #4 (2 units)                         |
| BISC 790 (2 units)  | BISC 790 (2 units)   |
| BISC 794a (2 units)   | BISC 794b (2 units)  |
| Establish 4-person Dissertation Committee   |  |
|   |  |
| <b>Year 4, Fall</b>   | <b>Year 4, Spring</b>  |
| BISC 790 (1-4 units, if necessary)  | BISC 790 (1-4 units, if necessary)                             |
| BISC 794c (2 units)   | BISC 794d (2 units)  |
| Meet with Dissertation Committee  |  |
|   |  |
| <b>Year 5, Fall</b>   | <b>Year 5, Spring</b>  |
| BISC 790 (1-6 units, if necessary)  | BISC 790 (1-6 units, if necessary)                             |
| BISC 794z (0 units)   | BISC 794z (0 units)  |
| Meet with Dissertation Committee  | Ph.D. Defense!   |

## Clarifying Major Ph.D. Milestones

### *A. First Year Advisement and Guidance*

#### Initial Advisement and Evaluation by Student's Advisor

Most students have an advisor who is identified in the acceptance letter. If the advisor-student relationship is not suitable for either or both parties, the student may switch advisors and labs altogether with whom the student has closer research affiliations and a positive working relationship at the request of the student and with the approval of the GPMBBO Program Director and the new advisor. That request can be made by the student to Doug Burleson or to the GPMBBO Program Director. Another consideration is to add on a co-advisor, with the approval of the co-advisor, the current advisor, and the GPMBBO Program Director. If an

incoming student has not chosen an advisor or has not been appointed one, this should be a priority during the first semester.

The Program provides an initial orientation for all incoming students. Before or during registration week of a graduate student's first semester, the student's advisor meets with the student to review his/her previous course work and experiences and to discuss career objectives. A primary purpose of this early discussion is to identify major deficiencies in a student's preparation and to suggest means of remedying any such deficiencies.

## First Year Committee

This committee is responsible for providing advice and evaluating the student's progress in their first year. This includes progress in research as well as coursework and any TA duties. In consultation with their advisor, each student should choose a three-person First Year Committee (the advisor plus two others). Co-advisors count as one, so if a student has co-advisors they will need an additional (fourth) committee member. As early as possible (before classes begin or early in the first semester) the student should meet with each committee member (either individually or as a group) and have them sign the **First Year Committee Form. Once filled out, the student should send the form to the Student Services Advisor (Adolfo Dela Rosa)**, who will file it in the GPMBBO Program Office.

At the end of the first semester (November/early December) the student should schedule a meeting with their First Year Committee to discuss progress in their first semester and plans for the coming semester. At the end of the second semester (April/early May) the student should submit a progress report and convene another meeting in which they give a short presentation (~30 min) on their research and coursework progress to date and outline plans for the future, followed by discussion. The goal of the committee is to assess whether the student is making good progress and to advise the student on how to move forward. The committee will be looking to see if the student:

- 1) Has any academic deficiencies
- 2) Has been getting lab experience and is developing the necessary skills to progress in their research
- 3) Has started to generate data and ideas for their thesis work or has plans to in the near future

At the end of the academic year the committee will send a report (**First-Year Committee Report Form**) to the student, their advisor, and the GPMBBO student progress committee, and the report will also be filed in the GPMBBO Program Office. This committee meeting and presentation serves as the First Year Screening Examination. This report is separate from the **Annual Progress Report** (see Student Progress Committee section for more information). These forms will be emailed to students in the Spring semester.

## ***B. After the First Year -- Ph.D Candidate Committees***

### Qualifying Exam Committee

A five-person Qualifying Exam Committee should be established soon after the Spring First Year Committee meeting, but no later than the third semester of enrollment for a student seeking a Ph.D. degree. After the student passes the Qualifying Examination, the Ph.D. Qualifying Exam Committee is dissolved, and a new Dissertation Committee is formed. More information below: [Qualifying Exam Committee.](#)

### BISC 794 Doctoral Dissertation

After a student successfully completes the Qualifying Examination and is therefore a formal candidate for the Ph.D., they must register for BISC 794 Doctoral Dissertation each semester except summer. The student would sequentially register for BISC 794a, 794b, 794c, 794d in the first four semesters after completing the Qualifying Examination, and then BISC 794z each subsequent semester as needed. Students must have at least 4 units of 794 credit, but can receive no more than 8, hence BISC 794a-794d are valued at 2 units and BISC 794z at 0 units. Graduate Programs Manager (Douglas Burleson) can provide guidance on balancing course and research units. More information below: [Dissertation Committee.](#)

### Student Progress Committee

Every year, student progress will be evaluated annually by a standing committee of MEB faculty (the GPMBBO Student Progress Committee). Each student and their advisor will complete an annual evaluation form (Annual Student Progress Report Form by student, Faculty Evaluation Form by advisor; forms available from the **Student Services Advisor (Adolfo Dela Rosa)**). The information contained in these reports will be used to judge the progress of each student toward degree, including course preparation and grades achieved, research training, manuscript preparation, seminars presented, and the level and type of student support. Each student (and his/her advisor) will receive a report of his/her progress following a formal committee meeting and review. These forms and evaluation will be sent out via email.

## ***C. Qualifying Exam Committee***

### Composition of the Qualifying Exam Committee

After the first year, the student's program of study is placed under the direction of the student's advisor and Qualifying Exam Committee (5 people, excluding the advisor). The Qualifying Exam Committee must be established at least one semester before the student takes their Qualifying Examination. Members of the Qualifying Exam Committee and its Chair are proposed to the Graduate School via the student's submission of the [Appointment of Committee form](#), with the advice and consent of the student's advisor. Therefore, the student

should request appointment of the committee as soon as possible after the spring meeting with their First Year Committee, but certainly before the end of their third semester of enrollment in the Ph.D. program.

The composition of the Qualifying Exam Committee must meet the following guidelines:

- a) The Chair of the committee must be a tenured member of the Marine & Environmental Biology section. Co-Chairs are normally not permitted unless required by the Vice Dean of the College, Office of Graduate Programs (see next paragraph).
- b) One member of the committee must be a tenured or tenure-track USC professor who is not in MEB. This “outside member” serves as the representative of the Vice Provost for Graduate Programs, as required by Dornsife.
- c) Normally, the other four members of the committee are tenure-track faculty of the Marine & Environmental Biology Section of the Department of Biological Sciences, but members may also be from other Sections in Biological Sciences. USC (Research, Teaching, Practitioner, and Clinical) RTPC faculty may also serve on the committee.
- d) The student’s advisor cannot be a member of the Qualifying Exam Committee but may attend and observe the Qualifying Examination and the subsequent executive session, in which the student’s performance is evaluated. **Note:** faculty from BISC sections other than MEB may serve as either inside or outside members, but they cannot switch roles between the Qualifying Exam and Dissertation Committees.

In exceptional cases of academic merit, a person not meeting the above guidelines may be approved by the Graduate School to serve on a Qualifying Exam Committee. To request such an exception, the student must submit to the Graduate School a current Curriculum Vitae of the proposed member and a letter from the chair of the committee citing the particular expertise of the person and the relevance of the requested appointment along with the [Appointment of Committee](#) form. A specially approved member may not serve as the outside member (see below) or as sole chair of the committee, but may serve as a co-chair with a regular, tenured faculty member of the Marine and Environmental Biology section. A Qualifying Exam Committee may include no more than one specially approved member unless the size of the committee is enlarged past five.

Requests for changes in the composition of the Qualifying Exam Committee must be made in writing by the student to the Program. If approved, the committee is officially changed using the Graduate School's [Request for Change of Committee](#) form.

If the chair of the Qualifying Exam Committee will be absent from campus for any extended period of time (e.g., on leave) they must appoint a temporary chair. The permanent chair will continue as a member of the Committee during their absence and will be in communication with the Qualifying Exam Committee. If the permanent chair must be absent at the time of the Qualifying Examination or the defense of the dissertation, a petition for formal appointment of a temporary chair must be submitted to the Graduate School.

## Responsibilities of the Qualifying Exam Committee

The Committee is responsible, in consultation with the student’s advisor, for preparing the

student and evaluation of the student's performance on the Qualifying Examination. Specific responsibilities include:

- a. Meeting with the student and the student's advisor to evaluate progress towards satisfying the recommendations of the First Year Committee and preparedness to take the Qualifying Examination.
- b. Monitoring the student's compliance with deadlines leading to the Qualifying Examination.
- c. Approval of the 1-2 page [Research Summary](#) and full, 15-page [Research Proposition](#).
- d. Administration and evaluation of the written and oral parts of the Qualifying Examination.

### *D. Qualifying Examination*

#### Prerequisites for the Qualifying Examination

During the semester the exam is taken, the student must be enrolled in a departmental graduate course or GRSC 800. Permission to enroll in GRSC 800 is needed from the Graduate School. Students may register for GRSC-800 up to three times without having to petition. However, students are strongly encouraged to complete the qualifying examination during the first semester of GRSC 800. The GPMBBO requires that students have:

- a) completed all required core courses.
- b) a GPA of at least 3.0 on all USC course work available for graduate credit.
- c) completed at least one advanced graduate seminar.
- d) satisfied the statistics research tool requirement.
- e) removed any inadequacies noted by the First Year Committee evaluation/progress reports
- f) completed the **Request to Take Ph.D. Qualifying Examination** form. Once your Qualifying Exam Committee has been appointed and approved, you will be emailed this form by the Graduate Programs Manager (Doug Burleson).

Depending on how the above requirements were met, the student may have to take additional course work to satisfy the Graduate School requirements that students have completed at least 24 units of course work applicable to the degree while in residence and with a minimum cumulative GPA of 3.0. Exemptions can also be made by the GPMBBO Program Director in consultation with the Qualifying Exam Committee. Therefore, students can take the Qualifying exam without completing all the prerequisites conditional upon their completion shortly after taking the Qualifying Exam.

#### Timing of the Qualifying Examination

The Qualifying Examination **is normally taken during the student's Fifth semester in the Ph.D. Program** and must be taken before completion of his/her Sixth semester. As an added incentive towards timely completion of the exam, students who have advanced to candidacy receive a \$2K bonus in their annual salary as a summer top-off.



## Components of the Qualifying Examination

The Qualifying Examination consists of a written part followed by an oral part. The student's Qualifying Exam Committee conducts and evaluates both parts.

### The Research Summary and its Preliminary Approval

At least two months prior to the written part of the Qualifying Exam, the student must provide their Qualifying Exam Committee with a written Summary of their anticipated research program (1-2 page Research Summary). We recommend that students complete this in the 2nd year Fall ahead of BISC 585 in the Spring. The body of this Summary should be a maximum of two pages, with up to an additional page of references. The student should then schedule a meeting of the Qualifying Exam Committee where the student presents a short (~20 min) summary of proposed research followed by discussion. The purpose of this meeting is to ascertain whether the anticipated research constitutes a defensible dissertation topic so that the student does not develop a detailed plan for a research program that has serious flaws and probably cannot be successfully defended in the oral examination. It is also to evaluate the student's academic preparedness for the Qualifying Exam. If the committee has reservations, modifications that are mutually satisfactory to the student and the committee can be worked out during this meeting or the student can be asked to submit a revised or new Summary.

### The Research Proposition (The Fifteen Pager)

Upon approval of the Research Summary by the Qualifying Exam Committee, the student will develop it into a formal Research Proposition. The details of proposal components, formatting and content will be discussed in BISC 585. Furthermore, this class is intended to provide the student with a vetted draft that, with advisor approval, can be submitted to their Qualifying Exam Committee at the end of their fourth semester (Spring).

At least two weeks before the date of the oral examination, the student must submit one copy of the Research Proposition to each member of the Qualifying Exam Committee and one copy to Adolfo Dela Rosa (Student Services Advisor) for the student's permanent file. The Research Proposition is to be in the form of a grant proposal and should include a short historical introduction, a statement of the problem and its significance, one or more hypotheses (if appropriate), the research design, anticipated results, methods to be used in interpretation of the results, and pertinent references. The treatment should be concise and should not exceed 15 single-spaced pages, including tables and figures but not references (i.e., [NSF Style](#)). The Written Proposition must have 1-inch margins all around, use an approved typeface (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; or Computer Modern family of fonts at a font size of 11 points or larger), with no more than 6 lines of text per inch.

### The Written Examination

The Written Examination will consist of two sets of questions each day continuing over

consecutive days until all sets of questions are complete. This examination is taken on a laptop computer supplied by the MEB department administrator (i.e., the student cannot use their own computer). Each Qualifying Exam Committee member (with the possible exception of the "outside member" whose participation is optional here) submits three questions; the student must answer two of this set, spending about equal time on each and having a maximum of two hours per set. The order in which the sets of questions are taken is at the student's option.

Questions will be comprehensive in scope with respect to the student's chosen area of specialization and will be designed to test the student's conceptual, analytical and integrative ability and preparation.

Each member of the Qualifying Exam Committee will grade each of their assigned questions on a scale of 1.0-5.0 using 0.5 unit steps if necessary (1.0 as poor and 5.0 as exceptional). The examination result will be calculated by averaging all the grades. Scores are tallied by the Chair of the Qualifying Exam Committee at the time of the Oral Exam, just prior to conducting the Oral Examination. A mean score of 3.3 or above for all questions is passing; below 3.0 is failing. Cases where the mean is between 3.0 and 3.3 or where two or more questions are graded below 3.0 are evaluated by the Qualifying Exam Committee followed by a vote, using a secret ballot. More than one negative vote of the Qualifying Exam Committee will result in failure of the student to pass the written examination.

The written part of the Qualifying Examination is normally taken 2 weeks before the oral examination described below. *The results of the Written Examination and the Oral Examination are given only at the completion of the oral examination.*

## The Oral Examination

The Oral Examination will be in the area of the student's intended research and will be based on a research project selected and developed by the student into a Research Proposition.

The Oral Examination is usually taken two weeks after and must be taken within one month of the written examination.

The Oral Examination will be conducted and evaluated by the student's full 5-member Qualifying Exam Committee. Typically, the Committee meets briefly without the student to review the student's course work, other preparation and progress; to review the student's performance based on the student's Progress Reports and First Year Committee feedback (copies of the student's transcript and Annual Progress reports should be obtained for each committee member from the Graduate Student Administrator by the Chair); and to agree on the exact format and order of questioning during the Oral Examination. Subsequently, the student typically presents the highlights of the research proposition [*15 minutes or less*]. Then members of the committee ask two or more rounds of questions. The questions are largely focused on the student's ability to conceive, conduct, and evaluate independent research as well as communicating the results of such work. However, the Oral Examination is not limited to the context of the Written Proposition; as specific examples, questions are often asked a) from the Written Examination and b) concerning the removal of deficiencies identified by the First Year

or Student Progress Committees.

On completion of the examination, the Qualifying Exam Committee meets in executive session (without the student) to evaluate the student's performance on the Oral Examination. Each member has one vote, pass or fail. More than one negative vote will result in failure of the student to pass the examination.

At the end of the executive session, the student is notified of the results on the two portions of the Qualifying Examination. The student passes the Qualifying Examination (as a whole) only if their performances on both the Written and Oral portions are satisfactory. If the student passes both the Oral and Written examinations, they are indicated to have passed the Qualifying Examination on the Graduate School form **Report on Ph.D. Qualifying Examination**.

If the student fails the Written Examination or the Oral Examination or both, the committee must indicate that the student failed the Qualifying Examination on the Graduate School form **Report on Ph.D. Qualifying Examination**. The committee must make recommendations concerning the student's continuation in the graduate program and will usually grant the student a second chance to pass the failed portions (either part satisfactorily completed in the first examination does not have to be retaken). However, the committee may recommend that the student not repeat the exam or even deny a second chance (the latter action could be appealed to the Graduate School). The second attempt is a final one and can be taken after one month and within 6 months of the initial failure.

## Admission to Candidacy

After the student passes the Qualifying Examination, the Qualifying Exam Committee recommends to the Graduate School that the student be admitted to candidacy for the Ph.D. Degree. Following admission to candidacy the student must register for BISC 794 Dissertation every semester, except summers, until the degree is awarded.

After the Qualifying Examination has been passed, the Qualifying Exam Committee will be dissolved, and a Dissertation Committee will be formed via an Appointment of Committee form.

The Dissertation Committee will be comprised as follows:

1. the student's advisor, serving as Chair,
2. an outside member as required by Dornsife College, and
3. two members of the GPMBBO faculty.

Service on the Qualifying Exam Committee does not preclude or necessitate service on the Dissertation Committee. The GPMBBO does not allow the reduction of the Qualifying Exam Committee to a three-member Dissertation Committee as permitted by the USC Catalogue, except under special circumstances. If these circumstances are met, at least 2 members must be from the GPMBBO faculty. As with the Qualifying Exam Committee, if the chair of the Dissertation Committee (i.e., the student's advisor) will be absent from campus for any extended period of time (e.g., on leave), a temporary chair must be appointed. Guidelines for the composition of the Dissertation Committee are similar to the Qualifying Exam Committee.

## ***E. Ph.D. Research & Dissertation***

A student must undertake original investigation of a selected problem in marine biology or biological oceanography. This is normally based on the Written Proposition as presented in the Qualifying Examination, subject to acceptance by the student's committee. Subsequent changes of research direction or content must have advance approval by the student's advisor and Dissertation Committee.

### **Research Prior to Admission to Candidacy**

Students in the GPMBBO are encouraged to conduct research at their earliest opportunity. Credit may be obtained for this research by registering for BISC 790. Early exposure to research will benefit the student as they begin envisaging and developing their Ph.D. Research Proposition. Research topics and activity should be based on a plan prepared by the student and approved by their advisor.

### **Research Subsequent to Admission to Candidacy and its Relationship to the Research Proposition**

As noted above, dissertation research is normally based on the Research Proposition as presented in the Qualifying Examination, subject to its acceptance by the student's committee. Difficulties frequently force revision of the planned study. The student's Dissertation Committee must approve in advance any such changes of research direction or content. *It is the student's responsibility to keep their Dissertation Committee members apprised of progress and/or changes. At least annual meetings between the student and the Dissertation Committee will be held, preferably shortly after the student's annual presentation in the weekly seminar series (if applicable).*

### **Publication Prior to Submittal of the Dissertation**

Prompt publication of research results is strongly encouraged in the GPMBBO. Students, with guidance from their advisors, should organize their research efforts into blocks that a) can be completed in sequence, and b) represent topics for separate future papers so that submission of one or more papers can be completed during their graduate tenure. Advisors often require students to submit two papers before completing their dissertation.

Authorship of such papers is significant. If the student is the sole author or if the student is the first author with the advisor as the only additional author, it implies that the student did most, if not all, of the research and hence the entire contents of the paper may be acceptable for incorporation into the dissertation. If the advisor contributed significantly to the research or if other individuals (other graduate students, faculty, post docs, research technicians, etc.) are co-authors, only that part of the paper which represents the student's work may be incorporated into the student's dissertation.

The format of the entire dissertation must be consistent, excluding published reprints which may

be incorporated in their published form. Publisher's permission should be obtained to include the published work in order to avoid any plagiarism issues.

## Preparation and Defense of the Dissertation

A dissertation represents a significant contribution to science that is based on an original research program completed by the student. Determination of the adequacy of the research program is the sole responsibility of the student's Dissertation Committee. Approval of the dissertation itself is primarily the responsibility of the student's Dissertation Committee, but the completed dissertation must also be examined by the Thesis Editor of the Graduate School to determine if it meets the grammatical standards and other requirements described in *Guidelines for the Format and Presentation of Theses and Dissertations* published by the University of Southern California and available online at: <https://graduateschool.usc.edu/current-students/thesis-dissertation-submission/guidelines-for-format-and-presentation/>.

GPMBBO students defend an advanced draft of the dissertation rather than a "final" copy. The advanced draft should be complete, including all text, figures, tables, references, etc. and should use the format intended for the final copy. Before assembly of a complete draft is initiated, the student should confer with their full committee to determine whether adequate research has been completed.

The student's advisor is the individual responsible for determining whether or not a draft is sufficiently refined for distribution to the full Dissertation Committee. Portions or all of earlier drafts may be submitted to some or all of the committee members for suggestions and evaluation at any time. The thesis draft to be defended must be given to the Dissertation Committee at least one month prior to the thesis defense date.

Presentation and oral defenses of the dissertation are achieved in a formal seminar open to all members of the academic community and in a closed meeting of the student and the Dissertation Committee.

Since the final copy of the dissertation must be uploaded to the Graduate School and Library at least three weeks prior to the end of the term (EOT) in which the degree is to be granted, the defense should be scheduled at least six weeks before the EOT. This allows adequate time after the defense for corrections and final typing. Please consult with the Graduate Programs Manager in order to ensure that all requirements and deadlines are met. Dissertation checklist and manuscript submission deadlines can be found on the Graduate School website: <http://graduateschool.usc.edu/current-students/thesis-dissertation-submission/submission-deadlines/>.

Before undertaking the Dissertation Defense, the student must have completed (or be in progress of completing) all other degree requirements.

The Chair of the Dissertation Committee is required to notify the Student Affairs Administrator of the GPMBBO (Don Bingham) of the date, time, and place of the defense of the dissertation,

so that a notice of the Dissertation Seminar and Defense may be distributed to all faculty and graduate students of the Department at least **two weeks** in advance. The date selected for this defense cannot be on an official University holiday (e.g., Labor Day, President's Day, etc.).

The open oral defense of the dissertation is achieved in a formal 50-minute research seminar such as would be given by a visiting scholar. The presentation is open to the public and the student should be prepared to answer all questions from members of the audience, excluding those on the Dissertation Committee. The period of questioning is not to be limited in time.

The dissertation is also subject to a detailed defense made before the full Dissertation Committee in a meeting that is usually held shortly after the conclusion of the seminar. At this meeting, which can be two-three hours in length, the Dissertation Committee must critically evaluate the dissertation and determine whether or not it is to be accepted. To be acceptable, the dissertation must represent a major, original contribution to science.

Only members of the Dissertation Committee may vote whether to pass or fail the student (accept or reject the dissertation and its open defense in the seminar). A vote to pass the student must be unanimous and such a vote does not preclude that the committee may require modifications of the dissertation. Reasons for failure of the defense should be clearly identified by the committee and may include a) a flawed research plan, b) non-conclusive or inadequate research results, c) major deficiencies in the dissertation, etc. A student who fails the defense the first time is normally given a second opportunity, but any decision on re-examination is at the discretion of the Dissertation Committee.

If the defense is satisfactory and no major revisions of the dissertation are required, all members of the Dissertation Committee approve the dissertation through the electronic **Approval to Submit form**, administered by the Graduate School. If significant revisions of the manuscript are required, the **Approval** form is not accepted until such revisions are completed. The Chair of the Dissertation Committee may be assigned full responsibility for determining that the required revisions have been made, but some or all other members of the committee may request that they also be involved in the final approval. The endorsed **Approval** form signifies approval of the dissertation and defense by the committee.

**If the Approval form is signed and dated by the drop/add deadline for FALL or SPRING, no further registration is required.**

Once the student has successfully defended the dissertation, a dissertation profile should be created on the Graduate School web site <https://grad.usc.edu/ThesisCenter> and the document checklist process must be completed. Required documents are described at <http://graduateschool.usc.edu/current-students/thesis-dissertation-submission/required-documents/>. When approved, the manuscript can be uploaded in PDF format for review by the editing staff.

The student must pay a Publication and Processing Fee in the University's Cashier's office and submit a receipt of payment to the Graduate School upon submitting the dissertation.

The **SURVEY OF EARNED DOCTORATES**, found within Thesis Center when you begin the defense and dissertation upload process, must be completed and returned to the Graduate School for approval.

## **APPENDIX**

### ***Overview of Student/Advisor Responsibilities and Recommended Timeline***

#### **Late Summer, before classes begin**

Each student consults with their advisor to discuss background and courses to be taken in the first semester to develop the student's training in marine science as well as their specific area of interest. Also, the student and their advisor should discuss the plan for financial support for the first year (fellowships, TAs, RAs). Students will be asked to fill out a support form to indicate their funding source for the Fall semester. Students will also have to register for courses. Communication to the incoming cohort will be handled by either the Student Services Advisor (Adolfo Dela Rosa) and the Graduate Programs Manager (Doug Burleson).

#### **Year 1, Fall**

Each student establishes a 3-person First Year Committee. The student should meet with each committee member (either separately or all together) and have them sign the "*First Year Committee Form*", which should be filed by September. At the end of the semester (Nov/early Dec), the student meets with the full committee to discuss progress and plans for the coming semester.

#### **Year 1, Spring**

Students meet with their First-Year Committee at the end of the semester (April/early May) to discuss progress (including a research presentation) and future plans. Before the meeting, the student should submit a "*First Year Committee Report Form*" to the committee. The student will receive written comments from the committee. Students will also submit an "*Annual Student Progress Report Form*" to the GPMBBO Student Progress Committee.

#### **Year 2, Late Fall or Spring**

Student and advisor compose and request appointment of a 5-person Ph.D. Qualifying Exam Committee (form available at the [Graduate school website](#)), which meets with the student in the Spring semester. Two months prior to the meeting, the student submits a 1-2 page Research Summary to committee members outlining proposed research. Following a brief presentation by the student, the committee provides feedback, including a second review of the student's coursework and training, and any appropriate recommendations for further course work or directed study.

#### **Year 2, Spring**

Students take BISC585 with the goal of working on their 15-page research proposal. Ideally, students would start to initiate taking their Qualifying Exam the summer before their third year or the fall of their third year upon completion of BIC585. Also, the student must file the "*Request to Take Ph.D. Qualifying Examination*" form at least one month prior to the Qualifying Exam.



### **Year 3, Fall**

The student should complete both the written and oral parts of their Qualifying Examination this semester. The 15-page Research Proposition must be submitted at least 2 weeks prior to the Oral Exam. The Chair of the Qualifying Exam Committee should obtain the student's file for the Qualifying Examination. A "Report on Ph.D. Qualifying Examination" form will be in the file for all committee members to sign.

### **Years 3-5**

Following successful completion of the Qualifying Examination, the Qualifying Exam Committee is dissolved, and a new 4-person Dissertation Committee is requested (form available at the Graduate school website). The student meets *at least* annually with the committee. A short memo describing the students' progress is submitted to the Section office as part of the annual review.

### **Additional Annual Requirements:**

Yearly Seminar: Each student must present a departmental seminar once each academic year beginning in their second year. 2nd-3rd years present for 20 minutes while 4th-5th years present for 45 minutes. Students defending during the academic year are exempt.

Yearly Progress Reports: Every Spring, each student will complete and submit to the Section office a brief progress report detailing their activities during the previous 12 months (courses taken, research undertaken, seminars given at USC and elsewhere, participation in cruises, etc.). Forms for these reports will be emailed to students as a reminder.

### ***Helpful Information for New Students***

#### **My USC Portal**

[my.usc.edu](http://my.usc.edu) is a USC specific portal to access workday, class registration, TrojanLearn, OASIS and e.Pay (Pay My Bill). OASIS gives you access to check your grades, your history of classes, and a STARS report, which details what degree requirements you have fulfilled and what remains before you can graduate.

#### **Obtaining Your W2**

To sign up to receive your electronic W2, please follow the instructions to register for the third party hosting site, ADP:

<https://workdayhelp.usc.edu/userguides/signing-up-for-electronic-w2-delivery-2/>

## Student Health Fee

Incoming first year students must pay a one-time new student health fee. Health and dental insurance is otherwise covered by the department (or whoever covers it). If you have questions about a charge, please contact Adolfo Dela Rosa and Doug Burleson).

## Payroll/Pay Schedule

Students are paid on a 9-month basis as either a Teaching Assistant (TA) or Research Assistant (RA). Fellowships pay out over a 12-month period. During orientation, a pay schedule and a detailed overview of payroll and the pay schedule will be covered. If you have questions about payroll, please contact Doug Burleson or Adolfo Dela Rosa.

## Summer Expectations

Students should consult with their advisors about the amount of time that should be dedicated to research during the summer. To continue as a full-time student and keep your health insurance during the summer, students must register for research credits, based on what their summer support is. If you are a summer TA/RA, you will register for 3 units of BISC790, section 13790. Fellows will register for GRSC 802 (0 units).

There are various opportunities to secure funding for the summer including fellowships through Wrigley, and departmental TAships. These opportunities will be announced over email and students should consult with their advisors about the best option for them during the summer.

## *Courses Available in Marine & Environmental Biology*

### Core Courses

- |                       |   |
|-----------------------|---|
| BISC 582<br>(4 units) | Biological Oceanography, offered each Fall                                    |
| BISC 583<br>(4 units) | Evolution and Adaptation of Marine Organisms, currently offered in Spring     |
| BISC 584<br>(2 units) | Faculty Lecture Series, offered each Spring (MEB Faculty)                     |
| BISC 585<br>(2 units) | Scientific Writing and Reviewing, currently offered in Spring                 |
| BISC 529              | Marine Environmental Biology Seminar, Tuesdays at noon, offered each semester |

(1 unit; 4 units required, maximum)

## Statistics Courses

**BISC 305 Introduction to Statistics for Biologists (4, Fa/Sp).** Statistical methods in biological sciences and medicine, including populations and samples, random sampling, confidence intervals, paired samples and regression.

**BISC 444 Practical Analysis of Biological Data in R (2, Fa)** Instruction in the open-source statistical program environment R to analyze biological data; manipulation of large datasets and customization of statistical tests using simulations.

**BISC 545 Modeling and Numerical Techniques for Marine Scientists (4, Sp)** Statistical analyses of data sets, development of modeling frameworks, numerical models of varying complexity, and techniques for analyzing model results.

**PSYC 501 Classic and Modern Statistical Methods (4, Fa)** An introduction to classic statistical techniques as well as modern robust methods for dealing with violations of standard assumptions. (Wilcox)

**PSYC 502L Analysis of Variance and Experimental Design (4, Sp)** ANOVA, including three-way and within groups designs, multiple comparisons, ANCOVA, plus related methods based on robust smoothers and multivariate techniques. *Prerequisite:* PSYC 501.

**PSYC 503L Regression and the General Linear Model (4, Fa/Sp)** Multiple regression as a tool in experimental and non-experimental data; analysis of variance and covariance as regression on coded variables. Computer applications Laboratory exercises. *Prerequisite:* PSYC 501.

**PM 340L Health Behavior Statistical Methods (4, Fa/Sp)** Intermediate statistics for health behavior studies; topics include descriptive statistics, hypothesis testing, correlation and regression, and use of computer software in data analysis.

**PM 510L Principles of Biostatistics (4, Fa)** Concepts of biostatistics; appropriate uses and common misuses of health statistics; practice in the application of statistical procedures; introduction to statistical software including EXCEL, SPSS, nQuery. Laboratory.

**PM 511abL Data Analysis (4-4, a: Fa, b: Sp)** *a:* Major parametric and nonparametric statistical tools used in biomedical research, computer packages including SAS. Includes laboratory. Lecture, 2 hours; laboratory, 2 hours. *Prerequisite:* PM 510L. *b:* Statistical methods for analysis of categorical data including dichotomous, multinomial and count data, using Strata package. Includes laboratory. *Prerequisite:* PM 511aL.

## Advanced Graduate Seminars

Advanced Graduate Seminars, offered on a rotating basis; check current Schedule of Classes (2 units each; 4 seminars required). Other advanced seminars can be used to fulfill this requirement with approval of the MBBO Program director. MBBO Students can also take two 400 level classes and receive credit.

BISC 530 Plankton Biology (Caron & K. Heidelberg)

BISC 531 Physiology of Marine Organisms (Gracey & Edmands)

BISC 532 Molecular and Microbial Ecology (Fuhrman & Capone)

BISC 533 Remote Sensing and Modeling (Kiefer)

BISC 534 Population Genetics of Marine Organisms (Edmands & Hedgecock)

BISC 536 Marine Biogeochemistry & Microbial Ecology (Capone & Ziebis)

BISC 538 Metals and Biology in Oceanic Regimes (Moffett & Hutchins)

BISC 545 Modeling and Numerical Techniques for Marine Scientists (4 units, Levine)

BISC 586 Biological Oceanographic Instrumentation (Ziebis, Moffett, & Kiefer)

BISC 587 Communicating Ocean Science (Jacobsen, Parr & Sullivan)

BISC 588 Introduction to Bioinformatics (Kenkel & Thrash)

BISC 599 Phylogenetics and Evolution (Sigurdson)

BISC 599 Race and Racism in Evolutionary Biology (Edmands)

## Other MEB Relevant Courses

### **BISC Courses offered on the UPC**

403 Advanced Molecular Biology (4 units)  
419 Environmental Microbiology (4 units)  
427 The Global Environment  
434 Introduction to Genome Science  
435 Advanced Biochemistry (4 units)  
450 Principles of Immunology (4 units)  
460 Seminar in Marine and Environmental Biology (2 units)  
469L Marine Biology (4 units)  
478 Computational Genome Analysis (4 units)  
483 Geobiology and Astrobiology (4 units)  
502ab Molecular Genetics and Biochemistry (4, 4 units)  
510 Integrative and Evolutionary Biology (4 units)  
545 Modeling and Numerical Techniques for Marine Scientists (4 units)  
549 Seminar in Integrative and Evolutionary Biology (2 units)

### **Related Advanced Courses in Other Departments that can be used to meet course requirements**

ENE 443 Environmental Chemistry (3 units)  
ENE 463L Water Chemistry and Analysis (3 units)  
ENE 503 Microbiology in Environmental Engineering (3 units)  
ENE 513L Instrumental Analysis (3 units)  
ENE 562 Aquatic Chemistry (3 units)

GEOG 587 GPS/GIS Field Techniques (Catalina Island Summer Source) (4 units)

GEOL 412 Oceans, Climate and Environment (4 units)  
GEOL 460L Geochemistry and Hydrogeology (4 units)  
GEOL 500 Paleoecology (3 units)  
GEOL 501 Paleobiology (3 units)  
GEOL 512 Introduction to Physical and Chemical Oceanography (4 units)  
GEOL 514 Marine Geology (3 units)  
GEOL 555 Paleooceanography (3 units)  
GEOL 560 Marine Geochemistry (3 units)  
GEOL 564 Isotope Geochemistry (3 units)  
GEOL 567 Stable Isotope Geochemistry (3 units)  
GEOL 577 Micropaleontology (3 units)

OS 512 Introduction to Chemical and Physical Oceanography (4 units)

PPD 694 Coastal Policy and Planning (4 units)

### **Catalina Semester and Maymester Courses**

BISC 352 Conservation Biology (4, Sp)

BISC 431L Aquatic Microbiology (4, May)

BISC 469L Marine Biology (4, Sp)

BISC 457L Methods in Marine Biology and Biological Oceanography (4, May)

ENST 310 Sustainable Fisheries Management (4, Sp)

ENST 320a Water and Soil Sustainability (4, Sp)