Ph.D. PROGRAM

1) Admissions Requirements
Applicants for admission to Biophysics must complete the Office of Graduate Studies online application, and submit the application fee. Other requirements for admission include:

- Hold a Bachelor’s or Master’s degree: An undergraduate major or masters degree in a biological or physical science or certain engineering disciplines such as Chemical Engineering and Biomedical Engineering.
- Meet the University of California minimum GPA requirement for admission (3.0 overall).
- Graduate Record Examination (General Test) is required; a GRE subject test (in physics, chemistry, biochemistry, biology, or a related subject area) is not required but is highly recommended.
- English proficiency examination for international applicants who have not studied at an English speaking University: TOEFL or other University approved examination. International applicants must meet the Office of Graduate Studies minimum TOEFL score requirement (or equivalent for other University-approved examination).
- Three academic letters of recommendation.

a) Prerequisites:
Because the Biophysics Graduate Program admits students from a variety of backgrounds, the courses listed below are a guide to the preparation needed for entering students rather than strict admissions requirements. It is expected that if a student has missing coursework in some area that can be made up by taking suitable courses after joining the graduate program.

Math 21 ABCD [4 units each] and 22 AB [3 units each]
Physics 9 ABCD [A-C 5 units each; D 4 units] or the 9H sequence [5 units each]
Statistics 32 [3 units]
Chemistry: 2ABC or (2H)ABC [5 units each]
Physical and Organic Chemistry:
Chem 118 ABC [4 units each] or 128 ABC [3 units each]
Chem 107 AB and 108 [3 units each] or 110 ABC [4 units each]
Biochemistry: BIS 102 and 103 [3 units each] or MCB 143 [3 units]
Genetics: BIS 101 [4 units] or MCB 121 [3 units]
Introductory Biology: BIS 104 [3 units] or MCB 150 [4 units]

b) Deficiencies:
If there are deficiencies in background, appropriate remedial undergraduate courses will be recommended; they must be completed with a grade of B or better prior to the Qualifying exam either by (1) taking courses as approved by the Graduate Adviser, or (2) by being a Teaching Assistant in the appropriate courses, and by attending the course lectures.
• If the undergraduate background is Physics or Engineering::
  o Biological Sciences 102 (Structure and function of biomolecules);
  o Chemistry 118A or 128A (Organic chemistry);
  o Biological Sciences 101 (Genes and gene expression) or
  o Neurobiology, Physiology and Behavior 101 (Systemic physiology) or
  o Biological Sciences 104 (Regulation of cell function)
• If the undergraduate background is Chemistry:
  o Biological Sciences 102 (Structure and function of biomolecules);
  o Biological Sciences 101 (Genes and gene expression) or
  o Physics 110 A (Electricity and magnetism);
  o Neurobiology, Physiology and Behavior 101 (Systemic physiology) or
  o Biological Sciences 104 (Regulation of cell function)
• If the undergraduate background is Biological Sciences:
  o Chemistry 107 AB (Physical chemistry);
  o Math 22B (Differential equations);
  o Math 22A (Linear algebra) or
  o 22C (Vector analysis);
  o Physics 110 A (Electricity and magnetism)

2) Dissertation Plan B
   This plan requires a three member (minimum) dissertation committee, an optional final oral
   examination (decision made on an individual student basis by the dissertation committee),
   and an exit seminar.

3) Course Requirements (34 units)
   a) Core Courses (14 units):
      • Molecular and Cellular Biology 221A (Physical and chemical biochemistry) (4 units)
      • Biophysics 200, A and B (Biophysics techniques) (6 units)
      • Statistics 130A, 131A, or 100 (4 units)
   b) Required Lab Rotation courses (12 units):
      • BPH 200LA– (3 units each, taken four times for a total of 12 units) Biophysics
        Laboratory Rotations. Two 5-week rotations per quarter, taken in both the fall and
        winter for a total of 6 units per quarter. At the end of each rotation, students give
        short presentations on their rotation projects to other first-year students, the instructor
        in charge and any other faculty and students who wish to attend. In addition, each
        student prepares a short written report.
   c) Elective Courses (minimum 8 units):
      • Two additional graduate courses in the area of specialization such as structural
        biology, membrane dynamics, electron transfer, computational biology, theory,
        cellular regulation, and imaging.
   d) Total Minimum Unit Requirement:
      A minimum of 34 units are required: 14 core coursework units, 12 units of laboratory
      rotations, and 8 units of electives.
Students will enroll for 12 units per quarter including research, academic and seminar units. Courses that fulfill any of the course requirements may not be taken S/U unless the course is normally graded S/U.

Students must maintain a GPA of 3.0. If the GPA falls below 3.0, the student is placed on academic probation. If a student is on academic probation for more than three consecutive quarters, the student is subject to disqualification upon recommendation of the Biophysics Executive Committee to the Dean of Graduate Studies.

4) **Teaching Assistantship (TA) requirement:**
Participation in teaching is an essential part of training in the graduate program. In addition, teaching experience can be helpful later in obtaining employment. Students are required to TA one graduate adviser-approved undergraduate course. It is expected that students fulfill this requirement during the third quarter of their first year or during the first two quarters of the second year. It must be fulfilled prior to the qualifying examination.

Teaching assignments may vary according to past teaching experience and source of support. Open positions are advertised quarterly across the campus. Application forms may be obtained from Departmental offices. In general, applications are current only for the quarters indicated on the form. New applications must be filed for subsequent consideration.

5) **Committees**
   a) **Executive Committee**
   Upon the appointment of the new chair of the group, the chair will constitute an Executive Committee of at least 5 members, including the chair. To ensure the broadest of membership participation, the Executive Committee shall have at least the representation of three departments and three Colleges/Schools. The new Executive Committee shall assume office by July 1, of the year upon election and appointment. The appointments will be for two years.

   b) **Recruitment and Admissions Committee**
   Once the completed application, all supporting material, and the application fee have been received, the application will be submitted to the Admissions Committee. The Admissions Committee consists of the committee chair and three other members appointed by the Executive Committee. Based on a review of the entire application, a recommendation is made to accept or decline an applicant’s request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions will be sent by Graduate Studies.

   c) **Course Guidance/Advising/Major Professor Selection**
   Upon entering the group, students are assigned an Academic Adviser. A minimum of 12 units is required per quarter to maintain full time student status. Selection of the dissertation adviser (major professor) is normally accomplished by the end of the winter quarter, first year. Satisfactory progress in the Biophysics Graduate Group is dependent upon assignment of a dissertation adviser by the beginning of spring quarter in the first year. Lack of a major professor would lead to loss of funding, an unsatisfactory progress report, and eventual dismissal.
d) **Committee on Educational Policy**
   The Committee on Educational Policy consists of the committee chair, the graduate advisers, and up to two other members appointed by the Executive Committee to ensure representation from the School of Medicine, the Colleges of Engineering and Biological Sciences, and the Division of Letters and Sciences. The Committee will oversee curriculum policy, course offerings in biophysics, supervision of teaching assignments, and teaching experience of graduate action/consideration. The committee will also constitute QE committees by assigning the chair and members. The term of service will be two years.

e) **Qualifying Examination Committee**
   A student, in consultation with the graduate adviser and major professor, will suggest to the chair of the Committee on Educational Policy (CEP) up to 8 faculty members of the QE committee, will indicate in writing the reason for excluding any faculty member, and will identify the area(s) of research specialization. The candidate should consult with the major professor and academic adviser to formulate these lists. Guided by the candidates’ lists, the CEP will then forward their nomination of five faculty (one from outside the program membership) to serve on the committee to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy. The Major Professor may not serve as Chair of the QE Committee. The Chair of the Committee must be a member of the BPH program. If required, the QE committee can act as the comprehensive examination committee for the Master’s degree Plan II.

f) **Dissertation Committee**
   In consultation with the Major Professor and Graduate Adviser, students will nominate a minimum of three faculty to serve as the Dissertation Committee. The Major Professor will serve as Chair. These nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy. The Major Professor serves as Chair of the Dissertation Committee.

6) **Mentoring**
   The **Major Professor** is the faculty member who supervises the student’s research and dissertation; this person serves as the Chair of the Dissertation Committee. The **Graduate Adviser**, who is nominated for appointment by the Chair of the program, and formally appointed by the Office of Graduate Studies, is a resource for information on academic requirements, policies and procedures, and registration information. The **Mentoring Guidelines** can be found on the web (http://gradstudies.ucdavis.edu/gradcouncil/mentoring.pdf).

7) **Advancement to Candidacy**
   After the qualifying exam is passed (typically in the 7th quarter), a student must file an application for advancement to candidacy for the degree of Doctor of Philosophy. The chair of a student's qualifying examination committee is sent the application form for advancement to candidacy. When the student has passed the examination, the chair signs and dates the form. The student then identifies a dissertation committee, provides a dissertation title, obtains signatures of the major professor and graduate adviser, pays a fee, and files the form with Graduate Studies. Graduate Council requires that students must be advanced to candidacy by the ninth quarter of academic enrollment to be eligible for continued appointment as a graduate student researcher or teaching assistant.
8) Qualifying Examination and Dissertation requirements:

a) Examination Requirements

The Graduate Advisor will verify the candidate's eligibility to take the QE. The examination must be scheduled only after the student has completed all courses and other program degree requirements, including the TA requirement. However, the QE may be scheduled during a quarter in which the student is taking the final 1 or 2 courses in his or her program of study. If that is the case, the Graduate Adviser must not sign the Advancement to Candidacy form until he/she can verify that the student has passed the courses and thereby satisfied all program requirements.

b) Written component of Qualifying Examination

Dissertation Prospectus: The written component consists of a research proposal similar to an NIH grant proposal that describes the dissertation work to be undertaken (typically 10-15 double-spaced pages completely referenced). This prospectus should be submitted to the QE Committee no later than two weeks prior to the examination date.

c) Oral component of the Qualifying Examination

The oral portion of the qualifying exam is intended to demonstrate the student's critical thinking ability, synthesis, and broad knowledge of the field of study. It consists of a three-hour oral exam with the five committee members present. The student typically begins the exam with a brief summary of the research proposal (prospectus) and the committee then questions him/her on the details. Then the questioning is opened up to three previously agreed upon areas of specialization within biophysics that have been approved by the Committee on Educational Policy.

The committee will evaluate the student's general qualifications for a respected position as an educator or leader as well as the student's preparation in a special area of study based upon relevant portions of the student's previous academic record, performance on specific parts of the examination, and the student's potential for scholarly research as indicated during the examination.

If required, the QE committee can act as the comprehensive examination committee for the Master’s degree Plan II.

d) Qualifying Examination Evaluations/Outcomes

There are three possible outcomes of the first examination - Pass, Not Pass, and Fail. Pass enables a student to advance to candidacy for the Ph.D. Fail means that the student will be recommended to the Dean of Graduate Studies for disqualification.

Not Pass means that the student is required to retake all or part of the examination OR to satisfy another requirement of the Committee, as specified in the Chair’s examination report. If requested, the second examination is to be scheduled at the earliest possible date (timeline to be specified in the Chair’s report) and will be administered by the same committee.

There are only two possible outcomes of the second examination – Pass or Fail. A student must receive a Pass on the second examination (or completion of the new
requirement) in order to Advance to Candidacy. Receiving a Fail on the second examination will result in a recommendation for disqualification.

Note: To officially advance to candidacy, a fee must be paid to the Cashiers Office and the fully endorsed Advanced to Candidacy Petition can then be submitted to Graduate Studies.

e) Dissertation Exit Seminar

All students must present a PhD Dissertation Research Seminar prior to filing their dissertation. This requirement must be verified by the Dissertation Committee when the dissertation is signed by the Committee.

9) Normative Time to Degree

A minimum of three years is required for the Ph.D. but ordinarily a student should plan on four to five years to satisfy all requirements of the degree. Normative time, measured from the time a student begins graduate study at any level at UCD, is 5 years for the current groups.

10) Typical Time Line and Sequence of Events

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<th>Year 1</th>
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<td><strong>Fall</strong></td>
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<td>BPH 200 LA/LB (6)</td>
<td>BPH 200 LA/LB (6)</td>
<td>Elective (2-4)</td>
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<td>MCB 221A (4)</td>
<td>BPH 200A (3)</td>
<td>BPH 200B (3)</td>
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<td>BPH 290 (1)</td>
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<td>BPH 293 (1)</td>
<td>Elective (2-4)</td>
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<td><strong>Fall</strong></td>
<td><strong>Winter</strong></td>
<td><strong>Spring</strong></td>
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<tr>
<td>Statistics 130A, 131A, or 100 (4)</td>
<td>Electives</td>
<td>BPH 241 (3)</td>
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<th>Year 3</th>
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<td>Electives; Qualifying Examination and Advancement to Candidacy in 7th quarter.</td>
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<tr>
<th>Years 4-6</th>
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<tr>
<td>Research and completion of dissertation.</td>
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11) Sources of funding

Students are supported through block grant funds and/or fellowships for the first two quarters. Once a student has identified a Major Professor, the Major Professor is responsible for supporting the student. This can be through GSR, TA or a combination of the above. Lack of a major professor would lead to loss of funding, an unsatisfactory progress report, and eventual dismissal.
12) **PELP, In Absentia, and Filing Fee status.**

Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Handbook: [http://www.gradstudies.ucdavis.edu/publications](http://www.gradstudies.ucdavis.edu/publications)

13) **Leaving the Program Prior to Completion of the PhD Requirements**

Should a student leave the program prior to completing the requirements for the PhD, they may still be eligible to receive the Master’s Plan I degree if they have fulfilled all the requirements for that degree (see Master’s section below). By special exception only, a student may complete the Master’s Plan II degree. Students may use the Change of Degree Objective form available from the Registrar’s Office: [http://registrar.ucdavis.edu/PDFFiles?D065PetitionForChangeOfGraduateMajor.pdf](http://registrar.ucdavis.edu/PDFFiles?D065PetitionForChangeOfGraduateMajor.pdf)

Students who wish to earn a Master’s *en route* to the PhD need only to apply for candidacy for the Master’s degree when completing the requirements for the master’s: [http://gradstudies.ucdavis.edu/forms](http://gradstudies.ucdavis.edu/forms)
1) **Admissions Requirements**

Students are only admitted to the Ph.D. program in Biophysics. Students can petition to earn a Master’s Plan I degree *en route* (or by special exception a Plan II degree) provided the courses and/or research meet the requirements of the master’s degree as determined by the Advisers and Chair.

2) **M.S. Degree, Master’s Plan I and Plan II:**

Plan I. This plan requires a minimum of 34 units of adviser-approved, graduate and upper division courses (the 100 and 200 series only) and, in addition, a thesis. At least 12 of the 30 units must be graduate work in the major field.

Plan II. **Only by special exception is a student considered eligible for this degree.** This plan requires a minimum of 36 units of adviser-approved, graduate and upper division courses, of which 18 units must be graduate courses in the major field. Not more than 9 units of research (299 or equivalent) may be used to satisfy the 18-unit requirement. A comprehensive final examination in the major subject is required; no thesis is required.

3) **Course Requirements (Plan I: 34 units total; Plan II: 36 units total)**

**a) Core Courses (Plan I and Plan II: 14 units):**

- Molecular and Cellular Biology 221A (Physical and chemical biochemistry) (4 units)
- Biophysics 200, A and B (Biophysics techniques) (6 units)
- Statistics 130A, 131A, or 100 (4 units)

**b) Required Lab Rotation courses (Plan I and Plan II: 12 units):**

- BPH 200LA– (3 units each, taken four times for a total of 12 units) Biophysics Laboratory Rotations. Two 5-week rotations per quarter, taken in both the fall and winter for a total of 6 units per quarter. At the end of each rotation, students give short presentations on their rotation projects to other first-year students, the instructor in charge and any other faculty and students who wish to attend. In addition, each student prepares a short written report.

**c) Elective Courses (Plan I: minimum 8 units; Plan II: minimum 10 units):**

- Two additional graduate courses in the area of specialization such as structural biology, membrane dynamics, electron transfer, computational biology, theory, cellular regulation, and imaging.

**d) Summary:**

- **Total Minimum Unit Requirement:**
  - Plan I requires a minimum of 34 units: 14 core coursework units, 12 units of laboratory rotations, and 8 units of electives.
  - Plan II requires a minimum of 36 units: 14 core coursework units, 12 units of laboratory rotations, and 10 units of electives.
• Students will enroll for 12 units per quarter including research, academic and seminar units. Courses that fulfill any of the course requirements may not be taken S/U unless the course is normally graded S/U.
• Per UC regulations students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter.
• Students must maintain a GPA of 3.0. If the GPA falls below 3.0, the student is placed on academic probation. If a student is on academic probation for more than three consecutive quarters, the student is subject to disqualification upon recommendation of the Biophysics Executive Committee to the Dean of Graduate Studies.

4) **Special Requirement: Teaching Assistantship (TA):**
Participation in teaching is an essential part of training in the graduate program. In addition, teaching experience can be helpful later in obtaining employment. Students are required to TA one adviser-approved undergraduate course. It is expected that students fulfill this requirement during the third quarter of their first year or during the first two quarters of the second year.
Teaching assignments may vary according to past teaching experience and source of support. Open positions are advertised quarterly across the campus. Application forms may be obtained from Departmental offices. In general, applications are current only for the quarters indicated on the form. New applications must be filed for subsequent consideration.

5) **Committees**

a) **Executive Committee**
Upon the appointment of the new chair of the group, the chair will constitute an Executive Committee of at least 5 members, including the chair. To ensure the broadest of membership participation, the Executive Committee shall have at least the representation of three departments and three Colleges/Schools. The new Executive Committee shall assume office by July 1, of the year upon election and appointment. The appointments will be for two years.

b) **Recruitment and Admissions Committee**
Once the completed application, all supporting material, and the application fee have been received, the application will be submitted to the Admissions Committee. The Admissions Committee consists of the committee chair and three other members appointed by the Executive Committee. Based on a review of the entire application, a recommendation is made to accept or decline an applicant’s request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions will be sent by Graduate Studies.

c) **Course Guidance/Advising/Major Professor Selection**
Upon entering the group, students are assigned an Academic Adviser. A minimum of 12 units is required per quarter to maintain full time student status. Selection of the dissertation adviser (major professor) is normally accomplished by the end of the winter quarter, first year. Satisfactory progress in the Biophysics Graduate Group is dependent upon assignment of a dissertation adviser by the beginning of spring quarter in the first
year. Lack of a major professor would lead to loss of funding, an unsatisfactory progress report, and eventual dismissal.

d) Committee on Educational Policy
The Committee on Educational Policy consists of the committee chair, the graduate advisers, and up to two other members appointed by the Executive Committee to ensure representation from the School of Medicine, the Colleges of Engineering and Biological Sciences, and the Division of Letters and Sciences. The Committee will oversee curriculum policy, course offerings in biophysics, supervision of teaching assignments, and teaching experience of graduate action/consideration. The committee will also constitute QE committees by assigning the chair and members. The term of service will be two years.

6) Mentoring
The Major Professor is the faculty member who supervises the student’s research and dissertation; this person serves as the Chair of the Dissertation Committee. The Graduate Adviser, who is nominated for appointment by the Chair of the program, and formally appointed by the Office of Graduate Studies, is a resource for information on academic requirements, policies and procedures, and registration information. The Mentoring Guidelines can be found on the web (http://gradstudies.ucdavis.edu/gradcouncil/mentoring.pdf).

7) Advancement to Candidacy
Students opting for the MS Plan I or Plan II (see 8b below) degree must file for Candidacy for the Degree of Master of Science at least one quarter before completing all degree requirements. The Candidacy for the Degree of Master form can be found online at: http://www.gradstudies.ucdavis.edu/forms/. A completed form includes a list of courses the student will take to complete degree requirements. If changes must be made to the student’s course plan after s/he has advanced to candidacy, the Graduate Adviser must recommend these changes to Graduate Studies. Students must have their Graduate Adviser and thesis committee Chair sign the candidacy form before it can be submitted to Graduate Studies. If the candidacy is approved, the Office of Graduate Studies will send a copy to the Thesis Committee Chair (plan I students), the appropriate graduate staff person, and the student. If the Office of Graduate Studies determines that a student is not eligible for advancement, the department and the student will be told the reasons for the application’s deferral. Some reasons for deferring an application include: grade point average below 3.0, outstanding “I” grades in required courses, or insufficient units.

8) Thesis and Comprehensive Exam Requirements
a) Thesis Requirements (Plan I)
The Master's thesis is to be carried out under the supervision of a faculty member of the Biophysics Graduate Group and must represent a contribution to knowledge in Biophysics. The thesis is submitted to a committee of three faculty members recommended by the Adviser and appointed in accordance with the Academic Senate regulations. The topic of the thesis should be acceptable to all members of the committee when they agree to serve and a joint meeting of committee members and the student should be held at that time. For the thesis to be acceptable for the degree, all
committee members must sign the title page. Should the committee determine that the thesis is unacceptable, even after substantial revisions, the program may recommend the student for disqualification form the program to the Dean of Graduate Studies. Instructions on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog.

b) Comprehensive Exam (Plan II)

*By special exception only*, a student may complete the Master’s degree under Plan II. This would only occur if, after passing the QE, a student elected to leave the PhD program and petitioned to receive the MS under Plan II. This petition requires approval of the Committee on Educational Policy (CEP). If the petition is approved, the comprehensive exam requirement will be met by passing the qualifying exam as described in the PhD section above.

9) Normative Time to Degree

As students do not directly enter the master’s program, normative time does not apply.

10) Typical Time Line and Sequence of Events

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<td>Electives; Advancement to Candidacy for MS Plan I</td>
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11) Sources of funding

There is no guarantee of funding for students in the Master’s program. Master’s students can TA to support themselves. Faculty are NOT required to support a MS student.

12) PELP, In Absentia, and Filing Fee status.

Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Handbook: [http://www.gradstudies.ucdavis.edu/publications](http://www.gradstudies.ucdavis.edu/publications)