Prerequisites For Admission to Graduate Studies

General Prerequisites

The applicant’s academic achievement must conform to the standards specified by Graduate Studies for graduate study.

Specific Prerequisites for M.S. and Ph.D. Programs in Physiology:

Physics, e.g. PHY 7A, 7B, 7C:

Lecture, 3 quarters or 6 semester hours
Laboratory, 3 quarters (an instrumentation laboratory may be substituted for physics lab) or 2 semester hours

Chemistry:

General chemistry, 3 quarters or 6 semester hours lecture
General chemistry laboratory, 3 quarters or 1 semester hour laboratory
Organic Chemistry, 2 quarters or 3 semester hours lecture
Organic Chemistry, laboratory 1 quarter or 1 semester hour laboratory

Introductory Biochemistry, 2 quarters or 4 semester hours,
Biochemistry laboratory (e.g., MCB 120L) or Cell Biology/Cell Physiology laboratory, (e.g., NPB 104L), 1 quarter or 3 semester hours

Mathematics:

Analytical geometry and calculus, 3 quarters or 6 semester hours
(e.g. Math 16A, 16B, 16C)

Statistics:

Introduction to statistics, 1 quarter or 3 semester hours (e.g., Statistics 13)

Biology:

General Biology, 3 quarters or 10 semester hours
Students requiring more than two courses to remedy deficiencies in the above requirements will not normally be admitted.

Admission Procedures

A. Graduate students must be accepted by both Graduate Studies and the Molecular, Cellular and Integrative Physiology Graduate Group.

B. Application forms can be requested from both the Office of Graduate Studies and the Molecular, Cellular and Integrative Physiology Graduate Group.

C. The Molecular, Cellular and Integrative Physiology Graduate Group will send to each applicant a brochure listing group members and their research interests and other general items of interest.

D. In addition to the material required by Graduate Studies for admission the Molecular, Cellular and Integrative Physiology Graduate Group requires the following:

   Molecular, Cellular and Integrative Physiology Graduate Group Supplemental Application

   At least three letters of recommendation

   GRE scores (General Test required)

E. The completed admissions application and the additional materials listed above should be returned to the Molecular, Cellular and Integrative Physiology Graduate Group by January 15th.

F. The Admissions Officer of the Group will insure that appropriate faculty are notified if an applicant expresses interest in a particular area of physiology. Students may also contact faculty of the Molecular, Cellular and Integrative Physiology Graduate Group to further explore their current and future research interests.

G. Applicants who are accepted by the Group will be placed in the M.S. or Ph.D. programs according to their request and the evaluation of their application by the Admissions Committee. As a general policy, students will be admitted only in the Fall quarter.

H. Upon acceptance, students will be assigned a graduate advisor who will help plan an appropriate program of instruction. The advisor is also available for general counsel and guidance concerning the Molecular, Cellular and Integrative Physiology Graduate Group and University requirements for the designated degree and will interpret the rules and policies of Graduate Studies and the Molecular, Cellular and Integrative Physiology Graduate Group as they apply to the student’s specific area.
Progress Reports

All students' progress will be reviewed at least once a year by the advisor or major professor as appropriate. The student is responsible to see that a written review is completed and submitted to the Graduate Advisor. Students who do not maintain a normal rate of progress, who do not maintain minimum levels of academic performance or for any reason do not comply with the standards of the Molecular, Cellular and Integrative Physiology Graduate Group will be referred to the Committee on Educational Policy for appropriate action. All full-time students are required to enroll in 12-units/quarter as stipulated by Graduate Studies. Normal level of academic standing will be defined as at least a “B” average (3.0) in physiology and closely related areas (exclusive of seminar, research, and lower division courses). Normal rate of progress refers to time to complete coursework, scheduling qualifying examination, and the productive engagement in one’s research. The Committee on Educational Policy will also respond to petitions from members of the Group, or from students who feel the need to appeal under special circumstances.

Students who are judged not to be meeting minimal academic standards of academic progress will be notified prior to the beginning of the succeeding quarter. Depending upon the considered severity of the problem, the Committee on Educational Policy, after consultation with the major professor, may address a letter to the student, to the major professor, and to the dean of Graduate Studies, or to any combination these, stating the problem and proposing corrective measures or termination of the student's graduate study. Every effort should be made by students to anticipate scholastic difficulties. Students are encouraged to consult with their instructors when difficulties emerge and should also take advantage of tutoring assistance available from their peers through the graduate student group.

Normal progress established by Graduate Studies means completion of the Masters degree in two years, and the Ph.D. degree in five years.

Filing Fee Status

A student who has completed all other requirements for the degree, and must only file a thesis or dissertation or take the M.S. comprehensive examination, may apply to pay a “filing fee.” Students do not qualify for “filing fee” status if they are using University facilities by taking courses, using laboratories or libraries, or making demands upon faculty time (other than that needed for the final reading of the thesis or holding the final examination for an M.S. Plan II student).
REQUIREMENTS FOR THE M.S. DEGREE IN PHYSIOLOGY

Introduction

The programs for the Master’s degree (Plans I and II) are designed to provide training in depth in either Cellular Physiology or Systemic Physiology.

General Requirements

All incoming graduate students must enroll in GGG 296 (Fall Quarter) and MCP 291D (Winter Quarter) during their first year of matriculation. Thereafter, students must take 290 each quarter for the next four quarters or until graduation (whichever comes first). Full time students must enroll for a minimum of 12 units per quarter. All students are required to attend the annual Molecular, Cellular and Integrative Physiology Graduate Group Research Colloquia until graduation. All prerequisite deficiencies must be completed by the end of the first year of enrollment.

Plan I: Requirements for Thesis Option

A total of 30 units in Physiology or closely related subjects.

A minimum of 12 units of graduate level courses in Physiology or closely related subjects.

The MCP Core Course, 210A, 210B, and 210C is required. The balance of the 30 units are to be selected from upper division or graduate courses in physiology or closely related subjects.

No more than six of the 30 units can be credited from 290-level courses [i.e., 290/291D/298(Group Study), 299 (research), or GGG 296].

All units must be selected in consultation with the graduate advisor from the course listing for either the Cellular or System Physiology subspecialty.

Grading:

S/U grading: the S/U option in courses where letter grades are given may be elected only for exploratory courses clearly outside of Physiology, or for making up lower division prerequisites. Final interpretation and approval of this option rests with the student’s graduate advisor.

MCP Core Course grading: students in the core course must receive a grade of B- or better to satisfy the core course requirements.
Research Program and Thesis:

A research program and thesis must be completed under the direct guidance of a major professor who is a member of the Molecular, Cellular and Integrative Physiology Graduate Group. At least two other faculty members assist the major professor as members of the thesis committee. A written outline of the research project shall be submitted to the thesis committee. This outline will include critical evaluation of the methods and their limitations plus a full description of experimental design, protocols, and data analysis.

Consultations should occur at reasonable time intervals between the candidate and the thesis committee meeting as a Group. The M.S. thesis in Physiology should be:

A scholarly piece of experimental research

Rigorous in approach (design, methodology, and analysis), but not as extensive as a Ph.D. thesis.

Plan II: Requirements for Exam option

A total of 36 units of upper division or graduate courses in Physiology or closely related subjects:

A minimum of 18 units in graduate level Physiology courses including the MCP Core Course, 210A, 210B, and 210C.

No more than six of the 36 units can be credited from 290-level courses [i.e., 290/291D/298 (Group Study), or 299 (research) or GGG 296].

Grading:

S/U grading: the S/U option in courses where letter grades are given may be elected only for exploratory courses clearly outside of Physiology, or for making up lower division prerequisites. Final interpretation and approval of this option rests with the student’s graduate advisor.

MCP Core Course grading: students in the core course must receive a grade of B- or better to satisfy the core course requirements.
A comprehensive exam in Physiology:

This examination shall be administered by a three faculty member committee appointed by the Committee on Educational Policy (students through their graduate advisor can submit to the Committee on Educational Policy a list of faculty whom they would suggest to be on this committee). At least two members must be in the Molecular, Cellular and Integrative Physiology Graduate Group, and at least one must be in the student’s area of specialization (i.e., Cellular Physiology or Systemic Physiology).

The M.S. comprehensive examination shall:

Be oral and/or written;

Determine the general knowledge and understanding that the candidate possesses in both cellular and system physiology, such that the candidate is judged competent to teach introductory physiology courses.

The M.S. degree Plan II is considered a terminal graduate degree in physiology at U.C. Davis.

REQUIREMENTS FOR THE Ph.D. DEGREE IN PHYSIOLOGY

Introduction

The Ph.D. degree is designed to provide in depth training in the areas: cardiorespiratory physiology, cellular physiology, comparative physiology, endocrinology, exercise physiology, neurophysiology, reproductive physiology, and/or systemic physiology. In addition, the candidate must demonstrate the ability to conduct independent research of sufficient originality and quality to merit publication in a reputable journal in the field.

The normal sequence of events for a student entering with all prerequisites would be two years of coursework. This period would also include the teaching experience. The student would then take the qualifying exam. The next two to three years would consist of performing the laboratory research, writing a dissertation and presenting an exit seminar.

Residence Requirements

By regulation of the Academic Senate, the minimum residence requirement for the Ph.D. degree is two years (six quarters) although most students exceed the two year requirement in the program. Students are regarded as being “in-residence” for one quarter if they are registered and attending at least 12 units of upper division or graduate level courses during a regular quarter [two units of upper division or graduate level courses in two consecutive summer sessions would be considered one quarter of residency]. Graduate students may complete part of their work elsewhere, subject to approval of their graduate advisor, the Committee on Educational Policy of the Molecular,
Cellular and Integrative Physiology Graduate Group, and the Graduate Council of the Academic Senate.

Course Requirements (Full time students must enroll in a minimum of 12 units per quarter):

All prerequisite deficiencies must be completed by the end of the first year of enrollment.

Structural/Molecular Biology: One course to be chosen from the list of acceptable courses in these areas with graduate advisor consent.

Statistics:

Two courses to be chosen from the list of acceptable statistics courses with graduate advisor consent.

Physiology Core Course:

Molecular, Cellular and Integrative Physiology, MCP 210A, B, & C

Physiology Specialization Requirements:

Nine units (three courses minimum with at least two 200-level courses), selected with approval of the student's graduate advisor, from one of the following areas:

1) cardiorespiratory physiology
2) cellular physiology
3) comparative physiology
4) endocrinology
5) exercise physiology
6) neurophysiology
7) reproductive physiology
8) systemic physiology

Laboratory:

Students will be required to take a laboratory course. The lab course can satisfy one of their specialty courses or, if related, the structural/molecular biology course option.

Introduction to Ethics and Research:

All incoming Ph.D. students must enroll in GGG 296 (Fall Quarter) and MCP 291D (Winter Quarter) during their first year of matriculation.
Seminars:

Beginning their third quarter, all students are required to enroll in one section of the topical seminar series (MCP 290 or equivalent) until passage of the qualifying exam or for each of four quarters, whichever comes first. Each quarter several sections of 290 are offered by faculty on a rotational basis. The seminars focus on some aspect of the faculty member’s research. Students are asked to engage in a library review of literature, synthesis, and oral presentation.

Grading:

S/U grading: the S/U option in courses where letter grades are given may be elected only for exploratory courses clearly outside of Physiology, or for making up lower division prerequisites. Final interpretation and approval of this option rests with the student’s graduate advisor.

MCP Core Course grading: students in the core course must receive a grade of B- or better to satisfy the core course requirements.

Teaching Requirements:

One of the education objectives of the program is to offer experience in laboratory instruction. Graduate students are required to serve as teaching assistants (TA’s) before taking their qualifying exam.

The following statements describe the Graduate Group’s teaching experience requirement:

Students must complete a minimum of 120 contact hours by teaching any appropriate physiology laboratory courses in which significant opportunity exists to prepare demonstrations, lead discussions, and share in the responsibilities for test construction, and evaluation of student achievement leading to the assignment of grades.

Any questions regarding this requirement should be addressed to the graduate advisor.

Molecular, Cellular and Integrative Physiology Graduate Group Research Colloquia:

All students are required to present at the Molecular, Cellular and Integrative Physiology Graduate Group Research Colloquia at least once before graduation.

Course requirements:

1. **UC Davis student who has been admitted into the MCP M.S., changes objective to the Ph.D., and will not complete the M.S.** The student must fulfill all Ph.D. requirements.

2. **UC Davis student who changes major to the MCP Ph.D. from the M.S. in a different program.** The student must fulfill all the course requirements for the Ph.D. Courses
taken while earning a master’s can be used to satisfy these requirements with advisor approval.

3. **Students entering the Ph.D. program with a master’s degree from another institution** will be required to take MCP 210 A, B, C, and seminars including GGG 296 and MCP 291D. Students may transfer unit credit, with approval of the graduate advisor, within the limits set by Academic Senate regulations. Additionally, if the student has taken courses as part of the curriculum for the master's at another University, whose content overlaps substantially with courses required by the UCD MCP program, then the student may, with approval of the graduate advisor, substitute other UCD course work for the required MCP course work. The intent is to avoid redundancy for the student, but not to reduce Ph.D. course requirements below levels specified by the graduate group’s approved degree requirements. The student will be required to satisfy the Teaching Assistantship requirement.

Qualifying Examination:

The purpose of the qualifying examination is to evaluate the student’s competence in Physiology as a whole and the chosen area of specialization. The qualifying examination is to be completed within one quarter after completion of coursework (end of Fall quarter of third year for most students).

The major professor and student should prepare a list of suggested examiners for the qualifying examination committee. They should indicate whom they recommend to chair the committee. The qualifying examination committee will consist of five faculty members, at least four of whom are members of the Molecular, Cellular and Integrative Physiology Graduate Group.

The list should be submitted to the student’s graduate advisor who will then forward it to the Committee on Educational Policy (CEP).

CEP will meet and formalize the committee from this list. However, it should be understood that CEP’s selections are also guided by the need to ensure representative participation of all group members.

The list of committee members is given to the Group Graduate Program Assistant who will contact the proposed members to inquire if they are willing to serve on the student’s committee. The faculty will have approximately 3-5 days to respond to this inquiry.

The Program Assistant fills out the Application for Qualifying Exam and sends it to the student’s graduate advisor for signature. The advisor will then return the signed form to the program assistant who makes a copy for the student file.

The Graduate Program Assistant submits the application to Graduate Studies. Graduate Studies verifies that each proposed member is qualified to sit on the committee and the Graduate Council Chair has the final approval of committee membership. While Graduate Studies is verifying the list of members, the student’s advisor can tell the
student the names of the proposed members, but at the same time advise the student not to contact the members until the QE application has been approved.

Graduate Studies returns the approved QE application to the Program Assistant. The Program Assistant will send a formal letter to the student and the committee members from CEP regarding the format of the exam and the committee responsibilities. The Program Assistant will also enclose a copy of the student’s transcripts in the letter to the committee.

Graduate Studies will send a letter to the chair of the committee only; the letter contains information on how to report the exam outcome and a list of the constituted committee.

Graduate Studies will send a copy of the approved QE application and a letter stating that it is the student’s responsibility to notify committee members. Upon notification of the committee by Graduate Studies, the student should contact the chairperson and the rest of the committee to schedule the qualifying examination. It is also recommended the student arrange to meet with each committee member to discuss matters concerning the examination. The student is responsible for updating his/her advisor on the progress of this activity. The recommended time it takes for the student to prepare for the exam is about 3 months.

Although not required, it is strongly suggested that the student arrange with his/her major professor to take an oral pre-qualifying examination. The intent of this examination is to help both the major professor and the student determine if the student is prepared to take the qualifying examination. It is recommended that the major professor organize an examination committee consisting of the major professor and three or more persons, none of whom can be on the student’s qualifying examination committee.

Dissertation:

The doctoral dissertation is research conducted under the guidance of a major professor who is a member of the Molecular, Cellular and Integrative Physiology Graduate Group and two additional faculty members as a committee of three. The dissertation committee shall be constituted (informally if the student is not yet advanced to candidacy) at the very beginning of the candidate’s research to guide the proposed research and pass on the merits of the dissertation. The committee is appointed by the Chair of Graduate Council based upon consultation with the student’s major professor. A written outline of the research project should be submitted to the dissertation committee. This outline will include critical evaluation of the methods and their limitations plus a full description of experimental design, protocols, and data analysis.

Consultations should occur at reasonable time intervals (six months) between the candidate and the dissertation committee meeting as a group. Further, to improve communication between the candidate and the committee, the candidate should regularly submit short abstracts, similar to those required at scientific meetings, stating the progress or the difficulties which are encountered. This continuous flow of information would improve the guidance of the committee during the execution of the dissertation. The major professor is required to submit an annual progress report of the student’s status to the graduate advisor.
The doctoral dissertation should be:

A scholarly and creative piece of experimental research that makes a contribution to the field.

Rigorous in approach (design, methodology, and analysis)

Exit Seminar:

All Ph.D. candidates are expected to present their doctoral research at a one hour, open seminar on campus.

Appendix to By-laws

A. Ph.D. students can participate in the Designated Emphasis in either Reproductive Biology or Biotechnology.

B. The requirements for MD/PHD or DVM/PHD students should conform to current Memos of Understanding (MOU).