

# PHARMACOLOGY & TOXICOLOGY GRADUATE GROUP

## DEGREE REQUIREMENTS

Revised: June 11, 2008; March 2011, May 2014  
Graduate Council Approval: May 6, 2011; March 6, 2015

### Master's Degree Requirements

#### 1) Admissions requirements:

Applicants for admission must meet the University of California minimum GPA requirement for admission of 3.0. In addition, applicants are expected to have a B.S. or B.A. degree with coursework in Biochemistry, Physiology, General Chemistry, Organic Chemistry, Biology, Calculus, and Physics. Consideration for program admission also requires three letters of recommendation, official transcripts, GRE scores, TOEFL or IELTS score (if applicable) and Office of Graduate Studies online application with fee by the stated admission deadline. However, admissions decisions are made on a case-by-case basis. Meeting some or all of these criteria does not guarantee admission, but merely eligibility. The decision to recommend admission to the Dean of Graduate Studies will be made by the Program Admissions Committee on the basis of available space and the competitiveness of applicants compared to the eligible pool.

- a) **Prerequisites:** Applicants are expected to have a B.S. or B.A. degree with coursework in:
  - Biochemistry (UCD Biological Sciences 101 - Genes and Gene Expression; 102 - Structure and function of biomolecules; 103 - Bioenergetics and metabolism; 104 - Regulation of Cell Function; 120L - Biochemistry laboratory; or ETX 103A - Biological Effects of Toxicants; 103B - Biological Effects of Toxicants: Experimental Approaches or equivalent).
  - Physiology (UCD NPB 101 Systemic Physiology or equivalent), General Chemistry (UCD General Chemistry 2A, 2B, 2C or equivalent).
  - Organic Chemistry (UCD Organic Chemistry for Health and Life Sciences 118A, 118 B, 118C or UCD Organic Chemistry 128 A and 128B or equivalent).
  - Biology (UCD Introductory Biology 2A or equivalent).
  - Mathematics (UCD 17A, 17B, 17C Calculus or equivalent).
  - Physics (UCD General Physics 7A, 7B and 7C or equivalent).
- b) **Deficiencies:** Course work deficiencies are identified by the Graduate Adviser and should be made up by the end of the first academic year following initial enrollment by earning a letter grade of "B" or better.

#### 2) Degrees & Master Plan

##### M.S. Plan I and II

**Plan I (Thesis).** This plan requires 36 units of graduate courses and, in addition, the passing of a written prequalifying examination, and a thesis. At least 21 of the 36 units must be graduate coursework in the major field.

**Plan II (Capstone Requirement).** This plan requires 36 units of graduate courses and, in addition, the passing of a written prequalifying examination, and a capstone paper requirement consisting of a detailed literature review in lieu of a thesis. At least 21 of the 36

units must be graduate coursework in the major field. No thesis is required.

### 3) Course Requirements - Core and Electives (total 36 units)

#### a) Core Courses (total 17 units)

PTX 201	Principles of Pharmacology and Toxicology	5 units
PTX 202	Principles of Pharmacology and Toxicology	4 units
PTX 203	Principles of Pharmacology and Toxicology	4 units
STA100	Applied Statistics	4 units

#### b) Elective Courses (total $\geq$ 13 units)

Graduate courses in Pharmacology/Toxicology	at least 8 units
Advanced graduate level coursework ("Breadth requirement")	at least 5 units

Examples: courses in morphology, biochemistry, cell biology, physiology, immunology, pathology, epidemiology or molecular biology

In some instances professional or upper division undergraduate courses may be taken to fulfill the elective course unit requirements. Students should consult with their graduate adviser for acceptable choices. The required elective courses should provide depth in the student's area of research. A list of potential elective courses is provided to all incoming students.

#### c) Seminars (total $\geq$ 6 units)

at least 6 units

A total of 6 seminar courses are required in the first 2 years of the graduate program. CRN numbers for the proper course(s) are available from the graduate administrative assistant. During quarters in which PTX seminars are not required (e.g. winter quarters), students should select seminars in an area of their interest. As an example, ETX 290 is offered in winter quarter and would be an appropriate choice for MS students enrolled in the PTX GG. A list of potential seminars is provided to all incoming students.

#### d) Course in Scientific Ethics (total $\geq$ 1 unit)

at least 1 unit

All students are expected to take a course in The Responsible Conduct of Research; several existing 1 unit seminars that fulfill this requirement (e.g., PTX 290C, which requires students to complete the RCR training offered by the UC Davis Office of Research – this entails eight 1 hour sessions offered over the course of one year) as well as several 2-3 unit courses (e.g., GGG296, Scientific Integrity and Professionalism). PTX 290C can count towards the required 6 units of seminars; 2-3 unit courses in scientific/research ethics can count towards elective requirements.

#### e) Summary: 17 units of core coursework, at least 13 units of electives (advanced pharm/tox and breadth), at least 6 units of seminars for a total of 36 units.

There are currently three required core PTX courses that must be completed without substitution. In addition, all students are required to complete a series of approved elective courses from advanced pharmacology and toxicology, breadth course work relevant to the students' research, a statistics course, and six seminar series. All of the required and potential elective courses will be listed annually on the program web site, as course offerings may change from year to year. Full-time students must enroll for 12 units per quarter including research, academic and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless the course is normally graded S/U. Once course requirements are completed, students can take additional classes as needed, although the 12 units per quarter are generally fulfilled with a research class (299) and perhaps seminars. 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 or better to be eligible for appointment in a graduate student academic title. A minimum 3.0 GPA is required to be eligible for a living allowance/stipend fellowship, an in-state fee fellowship, or a non-resident tuition award. If the GPA falls below 3.0, the student is placed on academic probation. After two consecutive terms on academic probation, a student is subject to disqualification by the Dean of Graduate Studies. A student earning a grade of C+ or lower in a required course will receive an "Unsatisfactory" progress evaluation and must retake the course and earn a grade of B- or better. If the student does not earn a grade of B- or better the second time, s/he will receive an "Unsatisfactory" evaluation. Two "Unsatisfactory" evaluations are grounds for disqualification from the PTX GG program.

#### 4) Special requirements:

**Plan I (Thesis) – Laboratory Rotations.** Plan I masters students are strongly encouraged to identify a major professor and laboratory as soon as possible, even before the beginning of their first year. Students who have not selected a major professor and laboratory can do up to two 5-week laboratory rotation projects during the fall (3-6 credit units per quarter) and then choose a lab for their thesis research starting in the winter quarter of the first year. As soon as Plan I masters students have established a satisfactory arrangement with a Major Professor, they are encouraged to begin their thesis research work.

Students in Plan I are expected to present the results of their research in the winter and spring quarters of their first year along with the doctoral students (PTX 290 Laboratory rotation presentations).

#### 5) Committees:

##### a. Executive Committee

The executive committee consists of seven members. One member is the PTX GG Chair and the other six members are elected from the membership for a term of 2 years. The principal duties of the Executive Committee are to determine and implement policy for the PTX GG, to receive and act upon petitions from students and faculty and to represent the interests of the Group to various universities and other organizations.

##### b. Committees on Admissions, Recruitment and Fellowships:

Once the completed application and all supporting materials and fees have been received, the application will be submitted to the Admissions Committee. The Admissions Committee consists of a Chair, appointed from the Executive Committee, 6 voting members of the graduate group, the Chairperson of the Executive Committee (ex officio) and at least two representative graduate students. At least two of the voting members will be official graduate advisers of the PTX Graduate Group. The Admissions Committee will make a recommendation to the Dean of Graduate Studies for admission/denial of each applicant. Notification of admissions decisions will be sent by Graduate Studies. The deadline for priority applications is December 15 for fall admission of that same year. Under unusual circumstances, admissions at other times will be considered. The same group of faculty and graduate student will also serve as the Recruitment and Fellowship committees.

##### c. Committee on Educational Policy

The Committee on Educational Policy (CEP) is charged in general with setting the standards for graduate education within the PTX GG. CEP consists of a chair selected

from the Executive Committee along with five or more voting members, two of whom are graduate advisers. Two representative graduate students will also serve on the committee. CEP is charged with: 1) reviewing all proposed new course offerings to determine whether they meet the standards acceptable for credit toward graduate degrees offered through the group, 2) reviewing all core courses, 3) appointing two instructors of record (IORs) for each core course, 4) nominating members to qualifying examinations, 5) preparing and administering the written prequalifying examination for all students, 6) evaluating the petitions from graduate students/advisers wishing to substitute comparable courses taken at other institutions for PTX degree requirements, and 7) annual review of progress reports of all students in the Graduate Group, with particular focus on students matriculated in the program for 5 or more years.

**d. Thesis Committee and Capstone Requirement Faculty Mentor**

**Thesis Committee:** The M.S. student (Plan I) in conjunction with his/her Major Professor and Graduate Adviser (see definitions below) shall recommend a Thesis Committee consisting of the student's Major Professor (as chair) and at least two additional members to Graduate Studies. The committee member selection is provided on the advancement to candidacy form, which can be done after 3 quarters as a full-time student. All recommended members not authorized by the Graduate Group Bylaws to serve on graduate thesis committees must be approved by the Dean of Graduate Studies. This committee will evaluate whether the thesis has been satisfactorily completed. Thesis committee nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy.

**Faculty mentor for capstone requirement:** Students electing the MS Plan II will need to make an arrangement with a faculty member belonging to the PTX GG to serve as a mentor for the capstone requirement. This arrangement should be started in the Spring Quarter of their 1st year. The student, in consultation with the faculty mentor, selects a topic within the broad area of pharmacology and toxicology. This exercise is intended to further develop skills in the identification and synthesis of appropriate scientific literature. The mentor is to guide the student in the preparation of this treatise and is to evaluate the final product regarding its acceptability in meeting the capstone requirement. A copy of the paper and a letter from the mentor is to be placed in the student's records following completion of this requirement.

**6) Advising Structure and Mentoring:**

The **Graduate Adviser** is a key figure for each graduate student throughout his/her program of study, but particularly during the period prior to advancement to candidacy. Graduate advisers are appointed by Graduate Studies and are assigned to each student upon his/her indication of intent to matriculate into the program. The Graduate Adviser is involved in many aspects of a graduate student's progress and is the student's first source of academic information and provides assistance with fulfilling the requirements of the PTX GG. This includes choosing a major professor, planning coursework, and conducting annual reviews of progress. New students should meet as soon as possible with their Graduate Advisers to discuss academic registration, adequacy of undergraduate preparation, and lab rotations. In those cases where students choose to conduct their planned thesis/dissertation in the laboratory of their graduate adviser another graduate adviser will be assigned. The graduate adviser may not be the student's major professor. The role and responsibilities of the Graduate Adviser are listed in detail in the Graduate Adviser's Handbook, published by Graduate Studies. In the PTX GG program the major responsibilities of the advisers are:

- a. Review and approve each graduate student's study list each quarter.

- b. Review and act on petitions of graduate students regarding changes in course registration, planned educational leave, filing fee status and advancement to candidacy.
- c. In cooperation with students and Major Professors, review the nominations qualifying examination committees, requests for advancement to candidacy, and nominations of thesis/dissertation committees.
- d. In consultation with the involved student, review the nominations of capstone mentors.
- e. Serve on either the PTX Educational Policy or the Admissions Committees.
- f. In general, act as a graduate student's primary source of information concerning the academic program and provide assistance with the procedural details of progress toward the degree.

The **Major Professor** is a faculty member belonging to the PTX GG who supervises the student's research and thesis; this person serves as the Chair of the Thesis Committee, and is the mentor for the student's research activities. The major professor advises on details of course work and other aspects of the academic program that are tailored to suit the individual student's programmatic needs and career goals. The major professor must be immediately involved with the planning and execution of the experimental work done to formulate the thesis. **Mentoring guidelines** from Graduate Council can be found on the Graduate Studies website. Selection of the major professor occurs during the first year.

The **Graduate Program Staff** assists students with identifying a major professor, identifying appointments with faculty, and general university policies.

### **Progress in the PTX GG Program**

Graduate advisors must file an annual progress report (usually towards the end of each academic year) with Graduate Studies on each student's progress towards a degree. The report informs the student of the remaining steps necessary to attain the degree and assesses progress as satisfactory, unsatisfactory, or marginal. The advisor reviews the reports, discusses the student's progress, and ensures that the student clearly understands what is necessary to complete the degree. The student then takes the Graduate Studies form to a meeting with his or her major professor (Plan I) or faculty mentor (Plan II).

#### **7) Advancement to Candidacy:**

Plan I and Plan II MS candidates must file an advancement to candidacy form prior to taking the written prequalifying examination in June of their first year of graduate studies. Both Plan I and II MS candidates must have taken at least half of the required coursework for their respective degree requirements (18 units for Plans I and II). The student must have a grade point average of 3.0 to be eligible for advancement. The candidacy application must be signed by the thesis chairperson (major professor) or capstone faculty mentor, and the student's graduate adviser. At the same time, the thesis committee is to be established for Plan I students. All students are expected to advance to candidacy by the end of the sixth quarter of enrollment. 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 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 appropriate graduate staff person and the student, and the Thesis Committee Chair will also receive a copy, if applicable. 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) Written Prequalifying Examination (Plan I & II), Thesis Requirements (Plan I) and Capstone Requirement (Plan II)**

**a. Written Prequalifying Examination**

All M.S. students must pass a written prequalifying exam that focuses on testing basic competence in pharmacology and toxicology and will be based on material presented in PTX 201, 202, and 203. This part of the exam will test the depth of a student's factual knowledge, and ability to integrate that knowledge into coherent written responses. The examination will be administered to all students (M.S. and Ph.D.) in the program simultaneously within a month of completion of spring quarter, first year. The examination will be prepared by the Committee on Educational Policy (CEP) with assistance from the instructors in the PTX 200 series. Students not receiving a passing grade on the exam will be required to remediate the deficiencies prior to the beginning of their 2<sup>nd</sup> year. The remediation will be determined by the faculty member who wrote the question with approval of CEP. Failure to pass the remediation exam may result in a recommendation for disqualification from the program.

The following grading scheme is applied for the written prequalifying examination:

<b>Pass – complete exam</b>	<b>Fail – complete exam</b>	<b>Fail – portion(s) of exam</b>
≥ 70% overall (≥ 70 points total)	< 70% overall (< 70 points total)	≥ 70% overall (≥ 70 points total)
≥ 50% in each question (≥ 12.5 points in each question)		< 50% in one or more questions (< 12.5 points in one or more questions)
	Re-take complete exam prior to beginning of 2 <sup>nd</sup> year	Re-take failed questions prior to beginning of 2 <sup>nd</sup> year

**b. Thesis Requirement (Plan I)**

Thesis committee meetings: The candidate and major professor should meet at least once a year with the other members of the thesis committee to discuss progress and any changes in research objectives.

Thesis: Research for the Master's thesis is to be carried out under the supervision of a faculty member of the program and must represent an original contribution to knowledge in the field. The thesis research must be conducted while the student is enrolled in the program. The thesis is submitted to the thesis committee at least one month before the student plans to make requested revisions. Students should expect to submit an approved thesis to the Office of Graduate Studies between the 6<sup>th</sup>-9<sup>th</sup> quarter

of the program. Generally, an acceptable thesis presents a body of original scientific work in the area of Pharmacology/Toxicology which is published or publishable in a peer reviewed, national/international journal. Students should consult the Graduate Studies website for additional details regarding the filing of a thesis at [http://www.gradstudies.ucdavis.edu/forms/GS304\\_MastersDegreeCompletionList.pdf](http://www.gradstudies.ucdavis.edu/forms/GS304_MastersDegreeCompletionList.pdf).

For the thesis to be acceptable for the degree all members must sign the title page certifying that the student has completed the thesis to their satisfaction. If the thesis is regarded by the committee as of less than acceptable quality the student will be given an appropriate period of time by the committee in which to improve the work. If, after that period of time, (usually a quarter or more), the thesis is still unacceptable to a majority of the committee, the program may recommend the student for disqualification from the program to the Dean of Graduate Studies.

The thesis must be filed in a quarter in which the student is registered or on filing fee. 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 and in the Class Schedule and Registration Guide issued each quarter. A student must have a GPA of 3.0 for the M.S. degree to be awarded.

**c. Capstone Requirement (Plan II)**

Timing: Plan II students write a capstone paper in lieu of a thesis. Students electing the MS Plan II will need to make an arrangement with a faculty member belonging to the PTX GG to serve as a mentor for the capstone requirement as soon as they have completed the written prequalifying examination at the end of their first year. Students should expect to complete the capstone between the 6<sup>th</sup> - 9<sup>th</sup> quarters of the program.

Topic: The student in consultation with the faculty mentor selects a topic within the broad area of pharmacology and toxicology. This exercise is intended to further develop skills in the identification and synthesis of appropriate scientific literature. The paper will be approximately 20 typed pages or 5000 words in length. The mentor is to guide the student in the preparation of this treatise and is to evaluate the final product regarding its acceptability in meeting the capstone requirement. A copy of the paper and a letter from the mentor is to be placed in the student's records following completion of this requirement. A candidate must be a registered student or in Filing Fee status at the time the program submits the form, with the exception of the summer period between the end of the Spring Quarter and the beginning of Fall Quarter. The program must file the report with Graduate Studies within one week of the end of the quarter in which the student's degree will be conferred.

**9) Normative Time to Degree:** Students can complete all of the course work requirements within five to six quarters. Master's degree students typically fulfill either the thesis or capstone requirement in two to three years (six to nine academic quarters).

**10) Typical Time Line and Sequence of Events:**

Year One	Fall	Winter	Spring
	PTX 201 (5 units)	PTX 202 (4 units)	PTX 203 (4 units)
	PTX 290 (Meet the faculty)	PTX 290 (lab rotation presentations Plan I, other seminar (Plan II))	PTX 290 (seminar)

	PTX 290 (lab rotation presentations Plan I, other seminar (Plan II))	Advanced/breadth requirement elective courses (3 – 5 units)	Advanced/breadth requirement elective courses (3 – 5 units)
	Remediate any prerequisite deficiencies	Laboratory research rotations (3 – 6 units; Plan I)	STA 100 – Biostatistics (4 units)
	Laboratory research rotations (3 – 6 units; Plan I)		Begin thesis research (Plan I); begin capstone faculty mentor identification and work (Plan II)
			File advancement to candidacy form
			Take written prequalifying examination in June
			June: Annual assessment of coursework and research (Plan I) by major professor and graduate advisor.
<b>Year Two</b>	<b>Fall (Written Prequalifying Examination completed)</b>	<b>Winter</b>	<b>Spring</b>
	PTX 290 (Grant writing)		PTX 290
	Advanced/breadth requirement elective courses (3 – 5 units)	Advanced/breadth requirement elective courses (3 – 5 units)	Thesis research (Plan I) Capstone work (Plan II)
	Thesis research (Plan I) Capstone work (Plan II)	Thesis research (Plan I) Capstone work (Plan II)	Meet with thesis committee (Plan I) Meet with Capstone faculty mentor (Plan II)
			June: Annual assessment of coursework and research (Plan I)/capstone (Plan II) by major professor/capstone faculty mentor and graduate advisor.
<b>Year Two Three</b>	<b>Summer</b>	<b>Fall</b>	<b>Winter/Spring</b>
	Finish Thesis research (Plan I) Finish Capstone work (Plan II)	Finish Thesis research (Plan I) and file with Graduate Studies Finish Capstone work (Plan II) and file with Graduate Studies	

### 11) Sources of funding

PTX GG does not assume responsibility for financial support. All costs are the responsibility of the applicant. Individual faculty members within the group can choose to support students from their resources; arrangements must be made directly with the faculty member.

### 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 Guide: <http://www.gradstudies.ucdavis.edu/publications/>

## **Ph.D. Degree Requirements**

### **1) Admissions requirements:**

Applicants for admission must meet the University of California minimum GPA requirement for admission of 3.0. In addition, applicants are expected to have a B.S. or B.A. degree with coursework in Biochemistry, Physiology, General Chemistry, Organic Chemistry, Biology, Mathematics, and Physics. Consideration for program admission also requires three letters of recommendation, official transcripts, GRE scores, TOEFL or IELTS score (if applicable) and Office of Graduate Studies online application with fee by the stated admission deadline. However, admissions decisions are made on a case-by-case basis. Meeting some or all of these criteria does not guarantee admission, but merely eligibility. The decision to recommend admission to the Dean of Graduate Studies will be made by the Program Admissions Committee on the basis of available space and the competitiveness of applicants compared to the eligible pool.

- a) **Prerequisites:** Applicants are expected to have a B.S. or B.A. degree with coursework in:
  - Biochemistry (UCD Biological Sciences 101 - Genes and Gene Expression; 102 - Structure and function of biomolecules; 103 - Bioenergetics and metabolism; 104 - Regulation of Cell Function; 120L - Biochemistry laboratory; or ETX 103A - Biological Effects of Toxicants; 103B - Biological Effects of Toxicants: Experimental Approaches or equivalent).
  - Physiology (UCD NPB 101 Systemic Physiology or equivalent), General Chemistry (UCD General Chemistry 2A, 2B, 2C or equivalent).
  - Organic Chemistry (UCD Organic Chemistry for Health and Life Sciences 118A, 118 B, 118C or UCD Organic Chemistry 128 A and 128B or equivalent).
  - Biology (UCD Introductory Biology 2A or equivalent).
  - Mathematics (UCD 17A, 17B, 17C Calculus or equivalent).
  - Physics (UCD General Physics 7A, 7B and 7C or equivalent).
- b) **Deficiencies:** Course work deficiencies are identified by the Graduate Adviser and should be made up by the end of the first academic year following initial enrollment by earning a letter grade of “B” or better.
- c) **Transfer Students:** Requests to transfer from another graduate group into the PTX GG program will be reviewed by the Admissions committee, whose recommendation will be considered by the Executive Committee. All students admitted to the PTX GG Ph.D. program from another graduate institution or another UC Davis graduate program must demonstrate proficiency in general subject matter equivalent to PTX GG students already enrolled at UC Davis. The graduate advisor will determine whether a transfer student has taken equivalents of PTX GG-required courses at another institution. If not, the student must take the required courses at UC Davis. The graduate advisor will prepare a report to the student and the Dean of Graduate Studies specifying which portion of the degree requirements previously met at another institution will be accepted in partial fulfillment of the PTX GG requirements and which degree requirements remain to be fulfilled at UC Davis. A Ph.D. transfer student is required to take a PTX GG oral qualifying examination.

A student switching from a M.S. to a Ph.D. degree objective will be required to take the oral qualifying examination at the end of year 2 or the beginning of year 3, as the only new requirement because M.S. students are required to take the written prequalifying examination.

## 2) **Dissertation Plan:**

The degree of Doctor of Philosophy is given under dissertation Plan B, which specifies a three member (minimum) dissertation committee, and an optional final oral examination (made on an individual student basis by the dissertation committee). All students are required to present an exit seminar.

## 3) **Course Requirements - Core and Electives (total 42 units)**

### a) **Core Courses (total 17 units)**

PTX 201	Principles of Pharmacology and Toxicology	5 units
PTX 202	Principles of Pharmacology and Toxicology	4 units
PTX 203	Principles of Pharmacology and Toxicology	4 units
STA100	Applied Statistics	4 units

All of the core course requirements can be completed within one year.

### b) **Elective Courses (total $\geq$ 13 units)**

Graduate courses in Pharmacology/Toxicology at least 8 units

Advanced graduate level coursework at least 5 units

("Breadth requirement")

Examples: courses in morphology, biochemistry, cell biology, physiology, immunology, pathology, epidemiology or molecular biology

In some instances professional or upper division undergraduate courses may be taken to fulfill the elective course unit requirements. Students should consult with their graduate adviser for acceptable choices. The required elective courses should provide depth in the student's area of research. A list of potential elective courses is provided to all incoming students.

### c) **Seminars (total $\geq$ 6 units)** at least 6 units

A total of 6 seminar courses are required in the first 2 years of the graduate program. CRN numbers for the proper course(s) are available from the graduate staff. During quarters in which PTX seminars are not required (e.g. winter quarters), students should select seminars in an area of their interest. As an example, ETX 290 is offered in winter quarter and would be an appropriate choice for PhD students enrolled in the PTX GG. All students are expected to take a course in The Responsible Conduct of Research (see d.); several existing campus seminars fulfill this requirement. A list of potential seminars is provided to all incoming students.

### d) **Course in Scientific Ethics (total $\geq$ 1 unit)** at least 1 unit

All students are expected to take a course in The Responsible Conduct of Research; several existing 1 unit seminars that fulfill this requirement (e.g., PTX 290C, which requires students to complete the RCR training offered by the UC Davis Office of Research – this entails eight 1 hour sessions offered over the course of one year) as well as several 2-3 unit courses (e.g., GGG296, Scientific Integrity and Professionalism). PTX 290C can count towards the required 6 units of seminars; 2-3 unit courses in scientific/research ethics can count towards elective requirements.

- e) **Laboratory rotations (total  $\geq$  6 units)** at least 6 units  
Students must participate in four, each of 5-week rotations during fall and winter quarters of the first year. Students are strongly encouraged to complete all 4 of the required rotations in different laboratories since this provides an overview of research being conducted in different laboratories and helps ensure a good fit between student and Major Professor. In some cases, students will establish a satisfactory arrangement with a Major Professor prior to the spring quarter and may choose to opt out of the rotation schedule to begin their research work for a degree. In unusual cases the students, with consent of the graduate adviser, may elect to do one more quarter of rotation when a suitable Major Professor has not been identified in the first two quarters of rotation. At the end of each rotation, each student will give a short oral presentation on the project to the other first- year students, the instructor in charge and any others who wish to attend. The student will also submit a short written report.

- f) **Summary: 17 units of core coursework, at least 13 units of electives (advanced pharm/tox and breadth), at least 6 units of seminars, and at least 6 units of lab rotations are required for a total of 42 units.**

There are currently three required core PTX courses that must be completed without substitution. In addition, all students are required to complete a series of approved elective courses from advanced pharmacology and toxicology, breadth course work relevant to the students' research, a statistics course, six seminar series and a number of laboratory rotations. All of the required and potential elective courses will be listed annually on the program web site, as course offerings may change from year to year. Full-time students must enroll for 12 units per quarter including research, academic and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless the course is normally graded S/U. Once course requirements are completed, students can take additional classes as needed, although the 12 units per quarter are generally fulfilled with a research class (299) and perhaps seminars. 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.

**All course requirements must be fulfilled by the end of the quarter in which the oral qualifying examination is taken.**

Students must maintain a GPA of 3.0 or better to be eligible for appointment in a graduate student academic title. A minimum 3.0 GPA is also required to be eligible for a living allowance/stipend fellowship, an in-state fee fellowship, or a non-resident tuition award. If the GPA falls below 3.0, the student is placed on academic probation. After two consecutive terms on academic probation, a student is subject to disqualification by the Dean of Graduate Studies. A student earning a grade of C+ or lower in a required course will receive an "Unsatisfactory" progress evaluation and must retake the course and earn a grade of B- or better. If the student does not earn a grade of B- or better the second time, s/he will receive an "Unsatisfactory" evaluation. Two "Unsatisfactory" evaluations are grounds for disqualification from the PTX GG program.

#### 4) **Special Requirements:**

**Teaching Experience:** PTX GG strongly recommends that students acquire teaching experience in pharmacology or toxicology. In order to satisfy the teaching experience requirement, the student is expected to:

- a) Participate in teaching and course administration for a minimum of one academic quarter in a course preferably taught by a member of the PTX GG. This participation must include at least one hour of teaching a formal lecture, leading a class discussion and/or laboratory component, and help with exam generation and grading.
- b) Formally register for 1-3 units (depending upon the department) of 297T/396 or the equivalent during the quarter in which the student is gaining formal teaching experience.
- c) Receive a satisfactory grade in the 297T/396 course. In addition to the grade, the instructor-in-charge will meet with the student to discuss strengths and weaknesses with the goal of improving the student's teaching experience.

## 5) Committees:

### a. Executive Committee

The executive committee consists of seven members. One member is the PTX GG Chair and the other six members are elected from the membership for a term of 2 years. The principal duties of the Executive Committee are to determine and implement policy for the PTX GG, to receive and act upon petitions from students and faculty and to represent the interests of the Group to various universities and other organizations.

### b. Committees on Admissions, Recruitment and Fellowships:

Once the completed application and all supporting materials and fees have been received, the application will be submitted to the Admissions Committee. The Admissions Committee consists of a Chair, appointed from the Executive Committee, 6 voting members of the graduate group, the Chairperson of the Executive Committee (ex officio) and at least two representative graduate students. At least two of the voting members will be official graduate advisers of the PTX Graduate Group. The Admissions Committee will make a recommendation to the Dean of Graduate Studies for admission/denial of each applicant. Notification of admissions decisions will be sent by Graduate Studies. The deadline for priority applications is December 15 for fall admission of that same year. Under unusual circumstances, admissions at other times will be considered. The same group of faculty and graduate student will also serve as the Recruitment and Fellowship committees.

### c. Committee on Educational Policy

The Committee on Educational Policy (CEP) is charged in general with setting the standards for graduate education within the PTX GG. CEP consists of a chair selected from the Executive Committee along with five or more voting members, two of whom are graduate advisers. Two representative graduate students will also serve on the committee. CEP is charged with: 1) reviewing all proposed new course offerings to determine whether they meet the standards acceptable for credit toward graduate degrees offered through the group, 2) reviewing all core courses, 3) appointing two instructors of record for each core course, 4) nominating members to qualifying examinations, 5) preparing and administering the written prequalifying examination for all students, 6) evaluating the petitions from graduate students/advisers wishing to substitute comparable courses taken at other institutions for PTX degree requirements, and 7) annual review of progress reports of all students in the Graduate Group, with particular focus on students matriculated in the program for 5 or more years.

### d. Qualifying Examination Committee

Ph.D. students are generally expected to take the Oral Qualifying Examination before the

beginning of their third year, but the qualifying examination must be passed no later than the end of the third year (9<sup>th</sup> quarter). The student is required to prepare a written research proposal and submit it to the qualifying exam committee 1-2 weeks prior to the qualifying examination. The topic of examination and the composition of the committee are requested in the Application for Qualifying Examination from the PTX GG Administrative Assistant. Students must meet the following criteria set by Graduate Studies:

- To be eligible for examination, the student must have satisfied all group requirements, have removed all deficiencies, and must have at least a 3.0 in all work undertaken during their enrollment in the graduate program. Students must be registered during the quarter in which they take their Oral Qualifying Examination.
- Oral qualifying examination committees are to consist of 5 members; two of the members of the examination committee should be chosen who may also have expertise appropriate for serving on the dissertation committee.
- Committee composition: The student, in consultation with the Major Professor (see definitions below) will nominate 3 examiners who are knowledgeable in the student's research area. The CEP will generally honor this request, unless there appears to be a conflict of interest. The remaining two faculty will be nominated from the graduate group by the CEP, so that examination committees represent a broad range of faculty expertise. Departmental chairs are ineligible to serve as examining committee chairs for any student housed in their department and it is strongly recommended that the chair of the examining committee be housed in a department different from the student's home department. The student should complete the form titled "Request for Oral Qualifying Examination Committee", nominating 3 selected committee members and submit the form to the Committee on Educational Policy after obtaining the approval of the student's Major Professor and graduate adviser. Once the CEP has nominated the remaining two members and all members have agreed to participate, the Pharm/Tox administrative assistant will submit necessary forms to the Dean of Graduate Studies. The Dean of Graduate Studies appoints the final committee. (Note: the Graduate Council granted the Pharmacology / Toxicology graduate program an exemption from the requirement to have a committee member "external" to the graduate group, due to the size of the group, its breadth, and the fact that the CEP already nominates 2 faculty members to represent a "broad range of faculty expertise".)

e. **Dissertation Committee**

After passing the Oral Qualifying Examination, the Ph.D. student in conjunction with their Major Professor and Graduate Adviser shall recommend a Dissertation Committee consisting of the student's Major Professor (as chair), and at least two additional members to Graduate Studies. Any recommended members not eligible to serve graduate dissertation committees as defined by the Graduate Group Bylaws to must be approved by the Dean of Graduate Studies. This committee will evaluate whether the dissertation has been satisfactorily completed. Dissertation committee nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy (DDB 80. Graduate Council, B.1.). Refer to the Graduate Studies website for additional details regarding the filing of a dissertation.

- It is the responsibility of the Major Professor to see to it that at a minimum annual progress reports are prepared by the student and given to the Dissertation Committee and that Graduate Studies is informed of the student's progress. Students are

encouraged to schedule committee meetings more frequently than annually depending upon their progress.

## 6) Advising Structure and Mentoring:

The **Graduate Adviser** is a key figure for each graduate student throughout his/her program of study, but particularly during the period prior to advancement to candidacy. Graduate Advisers are appointed by Graduate Studies and are assigned to each student upon his/her indication of intent to matriculate into the program. The Graduate Adviser is involved in many aspects of a graduate student's progress and is the student's first source of academic information and provides assistance with fulfilling the requirements of the PTX GG. This includes choosing a major professor, planning coursework, and conducting annual reviews of progress. New students should meet as soon as possible with their Graduate Advisers to discuss academic registration, adequacy of undergraduate preparation, and lab rotations. In those cases where students choose to conduct their planned thesis/dissertation in the laboratory of their Graduate Adviser another Graduate Adviser will be assigned. The graduate advisor may not be the student's major professor. The role and responsibilities of the Graduate Adviser are listed in detail in the Graduate Adviser's Handbook, published by Graduate Studies. In the PTX GG program the major responsibilities of the advisers are:

- a. Review and approve each graduate student's study list each quarter.
- b. Review and act on petitions of graduate students regarding changes in course registration, planned educational leave, filing fee status and advancement to candidacy.
- c. In cooperation with students and Major Professors, review the nominations of capstone mentors, qualifying examination committees, requests for advancement to candidacy, and nominations of thesis/dissertation committees.
- d. Serve on either the PTX Educational Policy or the Admissions Committees.
- e. In general, act as a graduate student's primary source of information concerning the academic program and provide assistance with the procedural details of progress toward the degree.

The **Major Professor** is a faculty member belonging to the PTX GG who supervises the student's research and thesis; this person serves as the Chair of the Thesis Committee, and his/her laboratory is usually the setting for the student's research activities. The Major Professor advises on details of course work and other aspects of the academic program that are tailored to suit the individual student's programmatic needs and career goals. The Major Professor must be immediately involved with the planning and execution of the experimental work done to formulate the thesis.

**Mentoring guidelines** from Graduate Council can be found on the Graduate Studies website.

Selection of the Major Professor is normally accomplished by the end of the winter quarter of the first year, by mutual consent of the student and the intended Major Professor. The Chair of PTX GG sends a letter to each first year student, which is copied to the Graduate Advisor, requesting that the student identify a Major Professor who is willing to take the student into the laboratory and provide the necessary financial support. The PTX GG executive committee approves and makes final assignments upon confirmation of the Major Professor's agreement to accept and support the student.

A student may rotate through additional laboratories during spring quarter of the first year, if this is necessary to identify a Major Professor. Satisfactory progress during the first year in the PTX GG program depends upon assignment of a Major Professor by the end of spring quarter. A

student needing to rotate further during the summer must petition the Executive Committee for permission to do so.

The **Graduate Program Staff** assists students with identifying a Major Professor, identifying appointments, and general university policies.

## 7) Progress in the PTX GG Program

Graduate Advisors must file an annual progress report (usually towards the end of each academic year) with Graduate Studies on each student's progress towards a degree. The report informs the student of the remaining steps necessary to attain the degree and assesses progress as satisfactory, unsatisfactory, or marginal. The student initially fills out the report together with the major professor, who evaluates progress, explains the evaluation, and signs the report. The student then takes the Graduate Studies form and, if advanced to candidacy, a copy of the PTX GG dissertation committee meeting report, to a meeting with his or her graduate advisor. The advisor reviews the reports, discusses the student's progress, and ensures that the student clearly understands what is necessary to complete the degree.

When progress is satisfactory, the report is placed in the student's PTX GG file. Copies are sent to the student, the student's graduate advisor, and the student's major professor.

When progress is marginal (e.g. academic difficulties or inadequate progress on research), the graduate adviser must share the information with the student and the student's major professor. The graduate advisor informs the student in writing what must be done to regain satisfactory status. The graduate adviser sends the report to the PTX GG staff program assistant, who sends it to Graduate Studies to be placed in the student's file. Copies are sent to the student, the student's graduate advisor, and the student's major professor.

When progress is unsatisfactory (e.g. academic difficulties, insufficient progress on research, failure to fulfill previous recommendations to maintain satisfactory progress), the Graduate Adviser must share the information with the student and the student's Major Professor. The Graduate Advisor, PTX GG Master Advisor and Major Professor, and optionally the PTX GG Chair, review the situation with the student and decide upon a course of action, which must be communicated to the student in writing. This information, along with a copy of the annual progress report, is sent by the Graduate Adviser to the PTX GG staff program assistant, who sends it to Graduate Studies to be placed in the student's file and also sends copies to the Graduate Advisor, the student, and the Major Professor. Graduate Studies places the student on academic probation. The Dean of Graduate Studies sends the student a notice delineating the work that must be completed to attain a satisfactory evaluation and the time limit for completing the work.

If the student fails to meet the requirements for satisfactory progress, the Graduate Advisor will request that Graduate Studies place a hold on the student's registration for the next quarter. If a student fails to meet the requirements specified in the letter from the Dean, the student is subject to disqualification from further study in the PTX GG program. Additionally, the Committee on Educational Policy sends out an annual questionnaire to all students that have passed their oral Qualifying Examinations. The purpose of this annual questionnaire is to ensure that the PTX GG does everything possible to provide each student with the opportunity to graduate successfully in a reasonable time frame. This is to serve as an additional means to check on the progress of students and is not a substitute for regular committee meetings. If CEP identifies specific barriers to graduation, they will work with the

PTX executive committee on identifying a solution.

### 8) Preliminary Examination - Written Prequalifying Examination.

All Ph.D. students must pass a written prequalifying exam that focuses on testing basic competence in pharmacology and toxicology and will be based on material presented in PTX 201, 202, and 203. This part of the exam will test the depth of a student's factual knowledge, and ability to integrate that knowledge into coherent written responses. The examination will be administered to all students (M.S. and Ph.D.) in the program simultaneously within a month of completion of spring quarter, first year. The examination will be prepared by the Committee on Educational Policy (CEP) with assistance from the instructors in the PTX 200 series. Students not receiving a passing grade on the exam will be required to remediate the deficiencies prior to the beginning of their 2<sup>nd</sup> year. The remediation will be determined by the faculty member who wrote the question with approval of CEP. Failure to pass the remediation exam may result in a recommendation for disqualification from the program.

The following grading scheme is applied for the written prequalifying examination:

Pass – complete exam	Fail – complete exam	Fail – portion(s) of exam
≥ 70% overall (≥ 70 points total)	< 70% overall (< 70 points total)	≥ 70% overall (≥ 70 points total)
≥ 50% in each question (≥ 12.5 points in each question)		< 50% in one or more questions (< 12.5 points in one or more questions)
	Re-take complete exam prior to beginning of 2 <sup>nd</sup> year	Re-take failed questions prior to beginning of 2 <sup>nd</sup> year

### 9) Qualifying Examination Requirements

To be eligible for the qualifying examination, the student must have completed all PTX GG course requirements, removed any deficiencies on the transcript, and must have at least a 3.0 in all work undertaken during their enrollment in the graduate program. The qualifying examination must be taken by the end of fall quarter of the student's third year (7th quarter). The student must be registered during the quarter in which the qualifying exam is taken.

The purpose of the qualifying examination is to determine that: 1) the student has acquired sufficient knowledge, in breadth and depth, of pharmacology and toxicology and related areas, and 2) the student has identified a dissertation research topic that asks a significant question in pharmacology and/or toxicology. The latter includes demonstration that the student has completed a literature review of that topic, has identified a set of achievable goals and has designed appropriate experimental approaches to accomplish those goals.

The student is required to prepare a written research proposal (“proposal”) and submit it to the qualifying exam committee at least 1-2 weeks prior to the qualifying examination. The topic of examination and the composition of the committee are requested in the Application for Qualifying Examination.

Research Proposal: The proposal should not exceed 4 pages, excluding references and should include the following sections:

- a. **Title**
- b. **Specific Aims:** State the specific purposes of the research proposal in the context of the central question to be addressed and the hypothesis to be tested.
- c. **Background/Significance:** Briefly describe the background to the proposal. This is an important consideration in review of your project. Concisely state the importance of the research by relating the specific aims to broad, long-term objectives.
  - a. **Experimental Design and Methods:** Provide an outline of the experimental design and the procedures to be used to accomplish the specific aims; a tentative sequence for the investigation; and procedures by which the data will be analyzed. Clearly establish how the procedures will answer the questions posed in the objective(s).
  - a. **Literature Citations:** These must include the names of all authors, title of article, name of the book or journal, volume number, page numbers, and year of publication.

Exam scheduling: Setting the date, time and place of the examination is an internal matter that does not require Graduate Studies approval. Upon the Dean's approval of the committee, the student, with the assistance of the chair of the student's committee, schedules the examination when the participating faculty and student are available. It is recommended that a reminder memo indicating date, time, and place be sent to each committee member.

Examination Procedure: The candidate is encouraged to communicate individually with the committee members about their expectations about the examination. These meetings are not pre-examinations of the student on the research proposals. Student should not ask for, nor should committee members provide, comments on weaknesses, potential problems, and errors in the research proposal.

The qualifying examination will test the student's ability to design and execute scientific research. Ph.D. students are expected to demonstrate a detailed understanding of their chosen field, an understanding of independent problem solving and proficiency in the scientific method. The committee will examine the student's critical reasoning ability and understanding of proposed methods and their limitations. Also stressed in the oral examination are the student's creativity, problem solving skills and ability to integrate and synthesize scientific material.

In general, the candidate is given a short time to present a chalk talk outlining the overall objectives and experimental approach. The committee's evaluation of the dissertation proposal is to be based on the candidate's research promise, not on research accomplishments or publications to date.

The chair of the qualifying examination committee is expected to ensure that the student receives a fair examination and that short breaks are taken as appropriate. Generally, the exam lasts no longer than 3 hours.

Qualifying Examination Evaluation: The committee will reach a decision on the student's performance immediately after the oral exam. The committee, having reached a unanimous decision, shall inform the student of its decision to:

- "Pass" (no conditions may be appended to this decision),

- “Not Pass” (the Chair’s report should specify whether the student is required to retake all or part of the examination, list any additional requirements, and state the exact timeline for completion of requirements to achieve a “Pass”), or
- “Fail”.

If a unanimous decision takes the form of “Not Pass” or “Fail”, the Chair of the QE committee must include in its report a specific statement, agreed to by all members of the committee, explaining its decision and must inform the student of its decision. Having received a “Not Pass” the student may attempt the QE one additional time; the QE report must list the specific conditions and timing for the second exam. After a second examination, a vote of “Not Pass” is unacceptable; only “Pass” or “Fail” is recognized. Only one retake of the qualifying examination is allowed. Should the student receive a “Fail” on the first or second attempt at the exam, the student will be recommended for disqualification from the PTX GG to the Dean of Graduate Studies.

### **10) Advancement to Candidacy**

The student is eligible for Advancement to Candidacy after successfully completing all graduate program requirements except for the dissertation and exit seminar, and after passing the qualifying examination. Advancement to candidacy typically occurs in the fall or winter quarter of the third year. A student’s application for advancement to candidacy form is signed and dated by the chair of the qualifying examination committee. The student, in conjunction with the major professor and graduate advisor, identifies two other faculty members to serve on the dissertation committee, obtains their consent, and obtains signatures of the major professor and the graduate advisor. After payment of the candidacy fee, the student files the form with Graduate Studies. The committee of three faculty members is appointed by the Dean of Graduate Studies to direct the student in the dissertation research and to approve the dissertation. PTX GG students are expected to advance to candidacy by the end of their seventh quarter of academic enrollment. A student must have advanced to candidacy by the beginning of the tenth quarter of academic enrollment to be eligible for continued appointment as a graduate student researcher or teaching assistant.

### **11) Dissertation Requirements**

#### Dissertation Committee Meetings:

Yearly meetings of the student and dissertation committee are required. Students are encouraged to schedule committee meetings more frequently than annually depending upon their progress. A written report must be filed with the PTX GG program staff program and academic adviser after each meeting. The report includes a 1-page form summarizing the committee’s assessment of progress and recommendations for the next year.

#### Dissertation:

The research conducted by the student must be of such character as to show ability to pursue independent research. The dissertation reports a scholarly piece of work of publishable quality that solves a significant scientific problem in pharmacology and/or toxicology and is carried out under the supervision of a member of PTX GG while the student is enrolled in the PTX GG program. The chair of the dissertation committee must be a member of the PTX GG

and must be immediately involved with the planning and execution of the experimental work done to formulate the dissertation. The major professor's laboratory is the setting for most of the student's research activities, unless an alternative site and immediate supervisor are approved in advance by the PTX GG Executive Committee.

The dissertation must be submitted to each member of the dissertation committee at least one month before the student expects to make requested revisions. Informing committee members of progress as writing proceeds helps the members to plan to read the dissertation and provide feedback within this time frame. The dissertation must be approved and signed by the dissertation committee before it is submitted to Graduate Studies for final approval.

The dissertation must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the dissertation and a schedule of dates for filing the dissertation in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog and in the Class Schedule and Registration Guide issued each quarter.

Exit Seminar:

Each student must present a public seminar on the dissertation research. The seminar is arranged through the major professor and advertised by the PTX GG office. Satisfaction of this requirement should be verified by the dissertation committee chair when he/she signs the dissertation.

**12) Normative Time to Degree**

A student should plan on at least 5 years to satisfy all requirements of the degree. Normative time to advancement to candidacy is 7 quarters. Normative time to complete the Ph.D., measured from the time a student begins graduate study in the PTX GG is 5.5 to 6 years.

Graduate Council has approved specific policies regarding maximum time to degree that state: Students will have 4 calendar years after the date they pass their qualifying examination to submit their dissertation. At this time, if a student has not submitted his/her dissertation to Graduate Studies, this student will receive a notice from Graduate Studies that s/he is placed on probation, and has 1 year from that date to submit the dissertation. If not submitted within 1 year, the student will no longer be allowed to enroll the following quarter and will be disqualified.

International students are entitled to reduced fees for a period of 3 years from the date of their qualifying examination and it is in the student's and program's best interest to stay within this time period.

**13) Typical Time Line and Sequence of Events**

Year One	Fall	Winter	Spring
	PTX 201 (5 units)	PTX 202 (4 units)	PTX 203 (4 units)
	PTX 290 (Meet the faculty)	PTX 290 (lab rotation presentations)	PTX 290 (seminar)
	PTX 290 (lab rotation presentations)	Advanced/breadth requirement elective courses (3 – 5 units)	Advanced/breadth requirement elective courses (3 – 5 units)
	Remediate any prerequisite deficiencies	Laboratory research rotations (3 – 6 units)	STA 100 – Biostatistics (4 units)

	Laboratory research rotations (3 – 6 units)	Select major professor; join laboratory (notify PTX GG admin staff of selection)	Begin dissertation research
			Take written prequalifying examination in June
			June: Annual assessment of coursework and research by major professor and graduate advisor.
<b>Year Two</b>	<b>Fall (Written Prequalifying Examination completed)</b>	<b>Winter</b>	<b>Spring</b>
	PTX 290 (Grant writing)		PTX 290 (QE preparation)
	Advanced/breadth requirement elective courses (3 – 5 units)	Advanced/breadth requirement elective courses (3 – 5 units)	Dissertation research
	PhD research	Dissertation research	Prepare research proposal for QE, select QE Date
		Select QE committee members	June: Annual assessment of coursework and research by major professor and graduate advisor.
<b>Year Two - Three</b>	<b>Summer</b>	<b>Fall</b>	<b>Winter/Spring</b>
	Prepare and take oral QE		Continue dissertation research
	Advancement to candidacy		
	Finalize dissertation committee		Meet with dissertation committee
	File advancement to candidacy form		June: Annual assessment of coursework and research by major professor and graduate advisor.
<b>Year Three - Five</b>	<b>Summer</b>	<b>Fall</b>	<b>Winter/Spring</b>
	Continue dissertation research		
	Meet with dissertation committee at least annually (more often towards the end)		
	June: Annual assessment of research by major professor, graduate advisor and thesis committee members.		
	Develop plan and timetable for completion of degree requirements		
	Submit dissertation		
	Exit seminar on dissertation research. File dissertation with graduate studies.		
<b>Year Five +</b>	<b>Summer</b>	<b>Fall</b>	<b>Winter/Spring</b>
	Continue dissertation research		
	Meet with dissertation committee		
	June: Annual assessment of research by major professor, graduate advisor and thesis committee members.		
	Develop plan and timetable for completion of degree requirements		
	Submit dissertation		
	Exit seminar on dissertation research. File dissertation with graduate studies		

#### **14) Sources of funding**

During their first two quarters, students are supported financially through PTX GG funding plus internal and external fellowships. Thereafter, students are supported through a combination of internal and external fellowships, training grant stipends, graduate student researcher positions with their major professors, and teaching assistantships.

#### **15) 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 Guide: <http://www.gradstudies.ucdavis.edu/publications/>

#### **16) 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 Masters if they have fulfilled all the requirements (see Master's requirements). Students can use the Change of Degree Objective form available from the Registrar's Office:

<http://registrar.ucdavis.edu/PDFFiles/D065PetitionForChangeOfGraduateMajor.pdf>

#### **17) Change of Major**

A student who wishes to change from PTX GG to another major (i.e., another graduate program on the Davis campus) obtains a Petition for Change of Major from Graduate Studies. The student's Graduate Adviser must sign the petition (and notify the Group chairperson) before either Graduate Studies or the new graduate program will honor the petition.

#### **18) Departure of Major Professor:**

When the Major Professor for a student whose degree objective is either M.S. Plan I or Ph.D. resigns or retires from the graduate group, the following procedures are followed:

- a. If the student is well along in the thesis/dissertation research, as certified by the Thesis/Dissertation Committee, it is appropriate for the student to complete the preparation of the thesis/dissertation, either on the Davis campus or in absentia. The approved thesis/dissertation will be submitted to Graduate Studies in accordance with their regulations.

NOTE: To exercise this option, Master's degree candidates must have been in residence at UC Davis at least three regular academic quarters. Doctoral candidates must have been in residence at least six academic quarters.

- b. If the student is not well along in the development of the thesis/dissertation research project, then one or the other of the following alternatives must be selected:

The student selects a new Major Professor from the membership of the PTX GG.

OR

The student elects to withdraw from the UC Davis PTX program. The negotiations involved in the decisions indicated above will concern the Graduate Adviser, the Thesis/Dissertation Committee (if appointed) and the Major Professor. The procedures given above are guidelines, not regulations.

- c. Although not recommended by the Group, it is possible for the departing Major Professor to retain membership on the Thesis/Dissertation committee. This requires an external member request and letter of explanation from the Graduate Adviser to the Dean of Graduate Studies. Even if the external faculty retains membership on the committee in question, the committee must be chaired by a current UC Davis faculty member.

Attachment 1

**POTENTIAL GRADUATE ELECTIVE COURSES FOR PTX GG STUDENTS  
(ADVANCED PTX and BREADTH REQUIREMENT)**

The best source of information about courses is the UC Davis General Catalog, which is available in the bookstore, in department offices, and on-line (registrar.ucdavis.edu). Relevant courses are listed under departments (note that departments in the schools of Engineering, Medicine and Vet Medicine are sub-listed under “E,” “M” and “V,” respectively, in the catalog) or under graduate groups (e.g. Genetics, Immunology).

Five weeks prior to the start of every quarter, the Class Schedule & Registration Guide can be obtained in the same places. Confirm the availability of graduate courses, which may differ from the listings in the General Catalog.

**\*\*Watch for new courses announced by posted fliers and e-mail\*\***

Graduate-level courses are numbered 200-299.

Undergraduate, upper division courses are numbered 100-199. Many are good for background, especially in areas you might not have covered as an undergraduate. Advanced undergraduate courses can count for up to 4 units of elective courses (advanced Pharm/Tox or breadth requirement) toward the course requirement.

Both graduate and upper division undergraduate courses are counted in your GPA.

<i>Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
<b><i>Anatomy, Physiology &amp; Cell Biology (APC), Veterinary Medicine</i></b>				
APC 285	Morphometry of Cells, Tissues, & Organs (Alternate years)	Hyde	2	W
APC 286	Basics of Microscopy & Cellular Imaging (Alternate years)	VanWinkle	2	S
APC 291	Topics in Biology of Respiratory System	Hyde/Wu/ Pinkerton	1	F/W/S
<b><i>Animal Biology (ABO)</i></b>				
ABO 255	Physiology of the Stress Response	Kueltz	2	S
<b><i>Animal Science (ANS)</i></b>				
ANS 131	Reproduction & Early Development in Aquatic Animals	Doroshov	4	S
<b><i>Applied Biological Systems Technology (ABT)</i></b>				
ABT 180	Introduction to Geographic Information Systems – Cancelled for 2010-2011	Plant	4	F
<b><i>Atmospheric Science (ATM)</i></b>				
ATM 160	Introduction to Atmospheric Chemistry	Anastasio	4	W
ATM 280A	Air Quality Policy in the Real World (Not offered every year)	Staff	4	W/S

<i>Quarter Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
ATM 280B	Air Quality Policy in the Real World (Not offered every year)	Staff	4	W/S
ATM 298	Group Study	Staff	1-5	Not Noted
<b><i>Avian Science (AVS)</i></b>				
AVS 103	Avian Development & Genetics	Delany	3	F
<b><i>Biological Chemistry (BCM), School of Medicine</i></b>				
BCM 230	Practical NMR Spectroscopy & Imaging	Staff	1	F
<b><i>Biochemistry &amp; Molecular Biology (BMB)</i></b>				
BMB 290	Seminar	Staff	1	F/W/S
<b><i>Biological Sciences (BIS)</i></b>				
BIS 101	Genes & Gene Expression F/W/S	Bowman, S. Chan,  Dvorak, Gottlieb, Heyer, O'Niell, Quiros, Rodriguez, Rose	4	
BIS 101D	Genes & Gene Expression Discussion	Staff	1	F/W/S
BIS 102	Structure & Function of Biomolecules	Gasser, Hilt, Leary, Theg, Toney	3	F/W/S
BIS 103	Bioenergetics & Metabolism	Abel, Callis, Doi, Fiehn, Hilt, I. Segel, L. Segel	3	F/W/S
BIS 104	Regulation of Cell Function	Edwards, Etzler, Kaplan, S. Lin, Myles, Privalsky, Shiozaki, Starr	3	F/W/S
BIS 298	Group Study	Staff	1-5	Not Noted
<b><i>Biostatistics (BST)</i></b>				
BST 290	Seminar in Biostatistics	Staff	1	F/W/S
<b><i>Cell &amp; Developmental Biology (CDB)</i></b>				
CDB 200	Current Techniques & Cell Biology (Same course as Molecular & Cellular Biology 200A)	Beck	2	F
<b><i>Cell Biology &amp; Human Anatomy (CHA), School of Medicine</i></b>				
CHA 101	Human Gross Anatomy	Gross	4	W
CHA 292	Fertilization & Gamete Literature Critique	Meizel	1	F/W/S

<i>Quarter</i>	<i>Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
<b><i>Cell &amp; Developmental Biology (CDB)</i></b>					
	CDB 200	Current Techniques in Cell Biology	Beck	2	F
	CDB 205	Topics in Cell Biology of the Cytoskeleton	McNally	2	F
<b><i>Chemistry (CHE)</i></b>					
	CHE 241C	Mass Spectrometry (Alternate years)	Staff	3	W
<b><i>Clinical Research (CLH), School of Medicine</i></b>					
	CLH 230	CHF Disease Mechanism	Goldkorn	3	W
	CLH 290A	Hot Topics in Clinical Research	Tarantal	1	W
	CLH 290B	Hot Topics in Stem Cell Biology	Tarantal	1	W
	CLH 298	Group Study	Staff	1-5	F/W/S
<b><i>Ecology (ECL)</i></b>					
	ECL 211	Advanced Topics in Cultural Ecology	Staff	4	F
	ECL 290	Seminar in Ecology	Staff	1-4	F/W/S
	ECL 296	Topics in Ecology & Evolution	Staff	1	F/W/S
	ECL 298	Group Study	Staff	1-5	F/W/S
<b><i>Endocrinology (EDO)</i></b>					
	EDO 220	Endocrinology Literature Critique	Turgeon	1	F/W
<b><i>Engineering: Applied Science (EAD)</i></b>					
	EAD 289E	Special Topics in Applied Science - Materials Science	Staff	1-5	F/W/S
<b><i>Engineering: Biomedical (BIM)</i></b>					
	BIM 109	Biomaterials	Revzin	4	S
<b><i>Engineering: Computer Science (ECS)</i></b>					
	ECS 124	Theory & Practice of Bioinformatics	Filkov, Gusfield	4	S
	ECS 165A	Database Systems	Gertz, Ludaescher	4	W
	ECS 234	Computational Functional Genomics	Filkov	4	W
<b><i>Engineering: Mechanical (EME)</i></b>					
	EME 161	Combustion and the Environment	Kennedy/Shaw	4	S
<b><i>Entomology (ENT)</i></b>					
	ENT 101	Functional Insect Morphology	Kimsey	3	W
<b><i>Epidemiology &amp; Preventive Medicine, School of Medicine</i></b>					
	EPP 245	Statistical Analysis of Laboratory Data	Rocke	4	F

<i>Quarter Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
<b><i>Environmental Toxicology (ETX)</i></b>				
ETX 101	Principles of Environmental Toxicology	Denison	4	F
ETX 102A	Environmental Fate of Toxicants	Tjeerdema	4	W
ETX 102B	Quantitative Analysis of Environmental Toxicants	Shibamoto	5	S
ETX 103A	Biological Effects of Toxicants	Rice	4	W
ETX 104	Environmental & Nutritional Factors In Cellular Regulation & Nutritional Toxicants	Oteiza, Rucker	4	S
ETX 110	Toxic Tragedies & Their Impact on Society	Rice	2	W
ETX 111	Introduction to Mass Spectrometry	Staff	3	W
ETX 120	Perspectives in Aquatic Toxicology	Tjeerdema	4	W
ETX 127	Environmental Stress & Development Summer In Marine Organisms	Cherr	10	
ETX 128	Food Toxicology	Shibamoto/ Mitchell	3	S
ETX 130	The Role & Applications of Toxicology In Modern Industry	Wong	3	S
ETX 131	Environmental Toxicology of Air Pollutants	Kado	3	F
ETX 135	Health Risk Assessment of Toxicants	Reed	3	F
ETX 138	Legal Aspects of Environmental Toxicology	Alexeeff	3	W
ETX 146	Exposure & Dose Assessment	Bennett	3	S
ETX 203	Environmental Toxicants	Matsumura	4	W
ETX 214	Mechanisms of Toxic Action	Denison/ Hammock	3	S
ETX 220	Analysis of Toxicants	Wood	3	F
ETX 220L	Analysis of Toxicants Laboratory	Wood	2	F
ETX 228	Gas Chromatography/Mass Spectrometry Of Toxic Chemicals	Holstege	3	W
ETX 234	Neurophysiological Basis of Neurotoxicology (Same class as Physiology 234)	Staff	3	F
ETX 240	Ecotoxicology	Johnson/Miles	3	S
ETX 250	Reproductive Toxicology (Alternate years)	Miller	3	W
ETX 260	Immunotoxicology (Alternate years)	Golub	3	
ETX 270	Toxicology of Pesticides	Matsumura	3	W
ETX 278	Molecular Techniques	Denison/Rice	3	F
ETX 280	Forensic DNA Analysis (Same course as Forensic Science 280) (Alternate years)	Von Beroldingen	3	

<i>Quarter</i>	<i>Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
<b><i>Geography (GEO)</i></b>					
	GEO 298	Group Study	Staff	1-5	
<b><i>Immunology (IMM)</i></b>					
	IMM 201	Introductory Immunology	Miller	4	F
	IMM 293	Current Concepts in Immunology	Baumgarth	4	W
	IMM 295	Cytokines	Luckhart	3	S
	IMM 296	Advanced Topics in Immunology	Maverakis	2	F
<b><i>Internal Medicine (IMD), School of Medicine</i></b>					
	IMD 220D	Cardiovascular System	Laslett	2.5	W
<b><i>Microbiology (MIC)</i></b>					
	MIC 215	Recombinant DNA	Privalsky	3	F
	MIC 292	Seminar in Bacterial Physiology & Genetics	Staff	1	F/W/S
<b><i>Biophysics (BPH)</i></b>					
	BPH 290	Biophysics Seminar	Staff	1	F/W/S
<b><i>Molecular, Cellular, &amp; Integrative Physiology (MCP)</i></b>					
	MCP 200L	Animal Cell Culture Laboratory	Wilson	4	W
	MCP 210A	Advanced Physiology	Adams	4	F
	MCP 216	Neurophysiology Literature	Pappone	3	F
	MCP 220	General & Comparative Physiology of Reproduction	Adams, Berger, Conley	3	S
	MCP 290	Seminar	Staff	1	F/W/S
	MCP 291D	Research Approaches to Physiology	Eiserich/Raybould	2	W
<b><i>Molecular and Cellular Biology (MCB)</i></b>					
	MCB 121	Molecular Biology of Eukaryotic Cells	Burgess, Dahmus, Gasser, Harmer	3	W/S
	MCB 162	Human Genetics	Chedin, Sanders	3	F
	MCB 200A	Current Techniques in Cell Biology (Same course as Cell & Dev Biology)	Beck	2	F
	MCB 200B	Current Techniques in Biochemistry	Kaplan	2	W
	MCB 221C	Molecular Biology (Same course as Genetics 201C)	Baldwin, Chen, Heyer, Korf, Stewart	4	S
	MCB 251	Molecular Mechanisms in Early Development F		Myles	3
	MCB 256	Cell & Molecular Biology of Cancer	Armstrong	2	F
	MCB 257	Cell Proliferation & Cancer Genes	Carraway, Radke	3	F
	MCB 263	Biotechnology Fundamentals & Application	Privalsky, Rodriguez, Vanderghaynst	2	W

<i>Quarter Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
MCB 291	Current Progress in Molecular & Cellular Biology	Draper	1	F/W/S
MCB 294	Current Progress in Biotechnology	Kjelstrom, McDonald, Rodriguez	1	F/W/S
MCB 295	Literature in Molecular & Cellular Biology	Baldwin, Fisher, Myles, Privalsky, Radke, Wilson	1	F/W/S
MCB 390	Methods of Teaching	Staff	1	F/W/S
<b><i>Medical Microbiology (MMI), School of Medicine</i></b>				
MMI 200D	Mechanisms for Microbial Interactions With Hosts	Baumler/Beaman	3	W
MMI 208	Seminars on Microbiology & Immunology	Torres	1	F/W/S
MMI 210	Animal Models of Infectious Disease Journal Club	Solnick	1	W
MMI 280	Molecular Pathobiology for Diagnosis And Therapy of Human & Animal Diseases	Tsolis	3	W
<b><i>Preventive Veterinary Medicine (MPM), Veterinary Medicine</i></b>				
MPM 402	Medical Statistics I Summer	Farver	4	
MPM 403	Medical Statistics II	Farver	4	F
<b><i>Neurobiology, Physiology, and Behavior (NPB)</i></b>				
NPB 100	Neurobiology (Not open for credit for students who have completed Neuroscience 221, 222)	Chapman/Cheng/ Mulloney/Sutter	4	F W/S
NPB 101	Systemic Physiology	Bautista/DeBello Fuller/Furlow/ Ishida/Goldberg/ Usrey/Weidner/ Wingfield	5	F/W/S
NPB 113	Cardiovascular, Respiratory, & Renal Physiology	Goldberg	4	W
NPB 130	Physiology of the Endocrine Glands	Adams	4	F
NPB 131	Physiological Genomics	Warden	3	F
NPB 168	Neurobiology of Addictive Drugs	Liets	4	S
NPB 161	Developmental Neurobiology	Chalupa/ McAllister/Zito	3	S
NPB 270	How to Write a Fundable Grant Proposal	Chalupa	3	S

<i>Quarter Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
<b><i>Neuroscience (NSC)</i></b>				
NSC 201	Neuroanatomy	Amaral/Jones/ Usrey	3	F
NSC 211	Advanced Topics in Neuroimaging	Miller	2	W
NSC 220	How to Give a Scientific Seminar	McAllister	3	W/S
NSC 221	Cellular Neurophysiology	Trimmer/Yamoah	4	F
NSC 222	Systems Neuroscience (Same course as Neurobiology, Physiology, & Behavior 222)	Usrey	5	W
NSC 223	Cognitive Neuroscience (Same course as Psychology 261)	Staff	4	S
NSC 224A	Molecular & Developmental Neurobiology	Dias/L'Etoile	2	W
NSC 285	Literature in Visual Neuroscience	Usrey/Britton	2	F/W/S
NSC 289	Topics in Molecular & Developmental Neurobiology	Diaz/McAllister/ Zito	1	W/S
<b><i>Nutrition (NUT)</i></b>				
NUT 111AV	Introduction to Nutrition & Metabolism	McDonald	3	S
NUT 230	Experiments in Nutrition: Design & Execution	Staff	2	F/W/S
NUT 251	Nutrition & Immunity (Alternate years)	Klasing, Erickson, Stephensen	2	W
NUT 291	Advanced Nutrition Seminar	Staff	1	F/W/S
NUT 492A	Professionalism: An Academic Perspective	Staff	2	Not Given
<b><i>Medical Pharmacology (PHA), School of Medicine</i></b>				
PHA 207	Drug Discovery and Development	Wulff	3	W
PHA 255	Gene Therapy	Segal	3	S
<b><i>Pathology, Microbiology, and Immunology (PMI), Veterinary Medicine</i></b>				
PMI 126	Fundamentals of Immunology	Stott	3	W
PMI 126L	Immunology Laboratory	Stott	2	W
PMI 250	Philosophy & Ethics of Biomedical Science	Galland	1	S
PMI 270	Advanced Immunology (Alternate years)	Stott	3	W
PMI 275	Comparative Pathology of Organ Systems	Affolter	4	F
PMI 285	Cellular Basis of Disease (Alternate years)	Mohr/Wu	3	W
PMI 293A	Seminar in Infectious Diseases	Byrne	1	F/W/S

<i>Quarter</i>	<i>Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
<b><i>Pharmacology &amp; Toxicology (PTX)</i></b>					
	PTX 277	Life & Death Decisions at the Cellular Level (Alternate years)	Goldkorn	2	S
<b><i>Plant Sciences (PLS)</i></b>					
	PLS 211	Principles & Practices of HPLC	Goyal	2	S
<b><i>Population, Health, &amp; Reproduction (PHR), Veterinary Medicine</i></b>					
	PHR 292	Current Topics in Reproduction	Staff	1	F/W/S
<b><i>Soil Science (SSC)</i></b>					
	SSC 290	Special Topics in Soil Science	Staff	1	F/W/S
<b><i>Statistics (STA)</i></b>					
	STA 100	Applied Statistics for Biological Sciences (Not open for credit for students who have taken STA 102)	Staff	4	F/W/S
	STA 102	Introduction to Probability Modeling & (Not open for credit for students who have taken STA 100)	Staff	4	F/S
	STA 106	Applied Statistical Methods: Analysis of Variance	Staff	4	F/W
	STA 108	Applied Statistical Methods: Regression Analysis	Staff	4	F/W/S
	STA 131A	Introduction to Probability Theory	Mueller	4	F/W/S
	STA 131B	Introduction to Mathematical Statistics	Mueller	4	W/S
	STA 226	Statistical Methods for Bioinformatics (Same class as Biostatistics 225 – alternate years)	Staff	4	W
<b><i>Veterinary Molecular</i></b>					
	VMB 247	Principles of Pharmacology and Toxicology Natural Toxicants (Alternate years)	Puschner	3	S
	VMB 253	Metabolism of Toxicants & Drugs	Staff	2	S
	VMB 254	Toxicology of the Respiratory System	Yu	2	W
	VMB 255	Pharmacokinetics and Biopharmaceuticals	Pinkerton	3	W
	VMB 234	Current Topics in Neurotoxicology	Knuch	2	W
			Lein	3	S
<b><i>Veterinary Medicine, Medicine &amp; Epidemiology (VME), Veterinary Medicine</i></b>					
	VME 413	Medical Primatology	Lerche	2	S
	VME 416	Diseases of Fish (Offered in alternate years)	Hedrick	2.1	S
	VME 463B	Food Animal Medicine, Level I	Angelos	3.4	F
	VME 464A	Equine Medicine	Wilson	3.2	S
<b><i>Veterinary Medicine, Surgical &amp; Radiological Science (VSR), Veterinary Medicine</i></b>					

<i>Quarter</i>	<i>Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
	VSR 401	Small Animal Radiology Case Discussions	Spriet	1	F/W/S
	VSR 402	Large Animal Radiology Case Discussions	Spriet	1	F/W/S
	VSR 491R	Anesthesia/Critical Care Basic Science Management Conference	Pypendop	1.2	F/W/S

<i>Quarter</i>	<i>Course #</i>	<i>Title</i>	<i>Instructor</i>	<i>Units</i>	<i>Offered</i>
<b><i>Wildlife, Fish, and Conservation Biology (WFC)</i></b>					
	WFC 120	Biology & Conservation of Fishes	Moyle	3	F
	WFC 121	Physiology of Fishes	Staff	4	W
	WFC 291	Seminar in Aquatic Ecology (Alternate years)		Moyle	2
		S			
	WFC 292	Physiology of Fishes Seminar	Staff	1	F

## Attachment 2

### POTENTIAL SEMINARS FOR PTX GG STUDENTS

Offerings vary by quarter and year. Watch for posted notices and for e-mail notices each quarter. Check current class schedule and room directory on the registrar's web site.

PTX 290	Meet the PTX GG Faculty (F)
PTX 290	Grant Writing (F)
PTX 290	Preparation for the oral Qualifying Examination (S)
PTX 290	Pharmacology and Toxicology Laboratory rotation presentations (FW)
PTX 290	Careers in Pharmacology and Toxicology (F)
PTX 290	Current Topics in Pharmacology and Toxicology (FWS)
IMM 292	Immunotoxicology seminar (F)
IMM 296	Advanced topics in immunology (F)
MCB 295	Literature in molecular and cellular biology (FWS)
MIC 274	Seminar in genetic recombination (FWS)
MIC 275	Seminar in DNA repair and recombination (FWS)
ETX 290	Current topics in environmental toxicology (FWS)
EPI 291	Seminar in Human Health Services Research and Clinical Epidemiology (FWS)
GGG 295	Seminar in Molecular Genetics (S)
PHA 291	Pharmacology Research Seminar (FWS)
CLH 290A	Hot Topics in Clinical Research (FWS)
CLH 290B	Hot Topics in Stem Cell Biology (FWS)
CLH 290C	Literature in Translational Research (FWS)
IMD 214	Topics in Medical Ethics (FWS)
IMD 290C	Controversies in Clinical Research (FWS)
MCB 294	Current Progress in Biotechnology (FWS)
MCB 291	Current Progress in Molecular and Cellular Biology (FWS)
MCB 295	Literature in Molecular and Cellular Biology (FWS)
NSC 283	Neurobiological Literature (FWS)
NSC 289	Topics in Molecular and Developmental Neurobiology (WS)