Requirements and Guidelines

Revised June 2, 2005
Approved by Graduate Council on June 9, 2005

2005/2006 Academic Year
Table of Contents

I. Guidance

A. Major Professor
B. Guidance Committee
C. Designation of Students to Advisers
D. Area of Emphasis, Special Topic and Course Plan

II. Courses

A. Transfer of Credit
   1. Concurrent Courses
   2. Summer Sessions
   3. Undergraduate Status
   4. University Extension
   5. University of California
   6. Other Universities

B. Non-graded S/U Courses and 298 Courses

C. Unit Load

D. Required Courses
   1. Required Seminar for all GGE Students

E. Annual Evaluation of Progress

F. Double Majors
III. Degree Programs

A. Master’s Degree ................................................................. 12
   1. Requirements for MS Degree ............................................ 12
      a. Residency .................................................................. 12
      b. Scholarship ................................................................. 12
   2. Choice of Degree Plan .................................................... 12
      3. Degree Plans and Unit Requirements .............................. 12
      4. Required and Suggested Area of Emphasis Courses ...... 13
         5. Advancement to Candidacy ........................................ 13
         6. Thesis Proposal (Plan I) ............................................. 13
         7. Thesis Committee (Plan I) .......................................... 13
         8. Examination (Plan II) .................................................. 14
         9. Transfer to the PhD Program ....................................... 14
   B. Doctoral Degree ................................................................. 14
      1. Residency .................................................................. 14
      2. Scholarship ................................................................. 14
      3. Pre-Qualifying Written Examination .............................. 14
         a. Materials Covered ..................................................... 15
         b. Examination Committee ............................................ 15
         c. Nature of Examination .............................................. 15
         d. Examination Outcome ............................................... 16
      4. Research Proposal Seminar .......................................... 17
      5. Qualifying Examination ............................................... 17
      6. Qualifying Examination (QE) ....................................... 17
         a. Timing of the Examination ......................................... 18
         b. Eligibility ................................................................. 18
         c. Selection of the Committee ........................................ 18
         d. Student Responsibilities ............................................ 20
         e. Format and Administration ....................................... 21
         f. Examination ............................................................ 23
g. Assessment of Student Performance by Committee......23
6. Transfer from PhD to MS

7. Advancement to Candidacy

8. The Dissertation

9. Selection of Dissertation Committee

10. Dissertation Topic

11. Dissertation Exit Seminar

12. Dissertation Defense

13. Filing the Dissertation

14. Abstracts

15. Filing Fee

a. Eligibility

16. Non-resident Tuition Reduction after Advancement to Candidacy

Progress Outline

Faculty Areas of Interest

Appendix A – Guidance Committee Form

Appendix B – Area of Emphasis

Infectious Disease Epidemiology

Health Services and Health Economics

Epidemiologic Methods and Biostatistics

Occupational and Environmental Epidemiology

Nutritional Epidemiology

Wildlife Epidemiology

Zoonotic and Vector-borne Diseases

Appendix C – Required Coursework
I. Guidance

A. Major Professor

The term “major professor” is used by the Group to indicate the faculty member who is or who will be guiding the student in his/her research. Before advancement of the student to candidacy, the Chair of the Guidance Committee acts in the capacity of the major professor for both MS and Ph.D. students. The Chair of the Guidance Committee may be changed by the Graduate Adviser, after consultation with the student, if the new Chair is more closely aligned with the student’s research interests or if the previous chair cannot serve due to sabbatical leave or illness. After advancement to candidacy (completing at least half the coursework on their program of study for MS students and passing of the Oral Qualifying Exam for Ph.D. students) and after consultation with the student, a faculty member is nominated by the Graduate Adviser to serve as Chair of the Dissertation Committee. The major professor should be considered to be the principal faculty contact for the student.

B. Guidance Committee

Initially, each student will have a Guidance Committee composed of three Academic Senate faculty, at least two of whom must be members of the Graduate Group in Epidemiology (GGE), appointed by the Graduate Adviser in consultation with the student. The GGE faculty member whom the student suggests as Chair of his/her Dissertation or Thesis Committee (“major professor”) will be appointed Chair of the Guidance Committee. If the student does not know who will be his/her major professor, an interim chair will be appointed by the Graduate Adviser until the third quarter of the first year, which is the deadline for determination of the major professor. If the major professor is different from the Chair, the major professor will be appointed as the new Chair of the Guidance Committee. The Chair must be a member of the GGE. Guidance Committees are appointed via the GGE “Guidance Committee” form (Appendix A) which accommodates signatures of the three members and the Graduate Adviser.

The Guidance Committee shall recommend to the Graduate Adviser: 1) the equivalency of any
prerequisite and required courses taken at an institution other than UCD, 2) the course work needed to fulfill the requirements in an appropriate field of emphasis and special topic, and 3) whether the student has met course requirements, and is eligible to request advancement to candidacy (M.S. students) or the qualifying examination (Ph.D. students). The Guidance Committee should meet as a group with the student during the first quarter after admission and at least once a year thereafter, or when there are changes in the course of study. More frequent meetings are recommended. After the student has been advanced to candidacy, the Guidance Committee will be replaced by the Thesis (M.S.) or Dissertation (Ph.D.) Committee.

C. Designation of Students to Advisers

Each student is asked to choose an adviser from the Committee of Graduate Advisers during the first quarter of enrollment. This person will serve as their Graduate Adviser. If a student does not choose one, a Graduate Adviser will be assigned by the Committee of Graduate Advisers. See the Policy and Procedure Manual on the GGE web site for more details.

D. Area of Emphasis, Special Topic, and Course Plan

The area of emphasis is the major focus of research the student will pursue within the broad scope of epidemiology, and the special topic is the specific disease, condition or problem the student will investigate in his/her research. The area of emphasis, special topic, and appropriate course plan are determined by the student in consultation with his/her Guidance Committee and approved by the Graduate Adviser. For satisfactory progress to be made, the area of emphasis, special topic, and course plan must be filed by the end of the first quarter of the student’s enrollment as a graduate student in the GGE. The area of emphasis, special topic, and course plan may be changed later, with approval of the Guidance Committee and Graduate Adviser.

All students (Ph.D. and M.S.) must complete a minimum of 9 elective units in their area of emphasis. Ph.D. students and M.S. students on Plan II (exam option) must take a minimum of 12 elective units total in approved courses, which includes, the 9 area of emphasis units (see
Appendix B). Within the various areas of emphasis, certain classes may be required of all students selecting that area. To request an area of emphasis other than one of those suggested, a request must be made in writing by the Chair of the Guidance Committee to the Adviser. In consultation with the Graduate Group in Epidemiology (GGE) Educational Policy Committee, the Adviser will determine appropriateness of the suggested area of emphasis. GGE faculty wishing to add a new suggested area of emphasis or a course to an existing area of emphasis should submit a request to the GGE Educational Policy Committee.

II. Courses

A. Transfer of Credit

With the consent of the Graduate Adviser and the Dean of Graduate Studies, some work taken elsewhere may be credited toward degree requirements. The limit for the transfer of such credit is six units from another institution or up to one-half of the unit requirement from another campus of the University of California, if the units were not used to satisfy the requirements for another degree.

1. Concurrent Courses

A student may be allowed to transfer up to twelve units of credit for upper division and graduate work taken through UC Davis Open Campus (Extension) courses prior to admission to a graduate program. A letter from the Graduate Adviser indicating approval of the transfer must be sent to Graduate Studies before the transfer can be made. The student will be required to submit an official copy of the current University Extension transcript if one is not already on file in Graduate Studies. Students will receive unit and grade point credit for their transferred concurrent course work.

2. Summer Sessions

Credit for work taken during the Davis Summer Sessions prior to admission may be transferred towards the graduate program provided the work was done after
receipt of the bachelor’s degree and was not a requirement for admission.
3. Undergraduate Status

Under current regulations at UC Davis, as many as six units of graduate course work taken by a student in undergraduate status may be credited towards a graduate degree program provided they were not used in satisfaction of the unit or any other requirements for the bachelor’s degree. Only 200-level courses are eligible for transfer.

4. University Extension

By Academic Senate regulation, University Extension X300 level courses cannot be used to satisfy unit requirements for graduate degrees.

5. University of California

Up to one half of the unit requirement may be transferred from graduate level enrollment at another UC campus. Grade points and residency are transferable.

6. Other Universities

Up to six units may be transferred from another university if the student was in graduate status. 100 or 200 level courses may be transferred; grade points do not transfer.

B. Non-graded S/U Courses and 298 Courses

Students who have not advanced to candidacy may take one S/U course per quarter with approval of the Graduate Adviser and the Associate Dean of Students. The course must be in an area that is new or exploratory for the student (e.g., not in the special topic or area of emphasis).

*Courses designated by the number 298* have not been approved by the Academic Senate and, therefore, *are not acceptable to fulfill either required courses or the 9 units of electives* necessary for the area of emphasis.
C.  Unit Load

Graduate students are expected to enroll for a minimum of 12 units each quarter. Exceptions are part-time students, first quarter international students and students with special circumstances. If a student has special circumstances, the Graduate Adviser should advise Graduate Studies, so a “hold” is not placed on the student’s registration. Units of 299 should be assigned for students doing supervised preparation for qualifying examinations. For budgetary purposes, Graduate Studies wants students to enroll in course work (12 units) each quarter, before the last day of the third week of classes. The following are suggestions from Graduate Studies for course loads for full-time students.

1. Students should not enroll for more than 16 units of 100 and 200 level courses combined or for more than 12 units of 200 level course work.

2. Teaching Assistants are not expected to enroll in more than 9 units of seminar or graded course work, but should try to attain the expected 12 unit load with appropriate 299 units and credit for courses in techniques of teaching and laboratory supervision. Credit for these legitimate activities can increase the number of credits the T.A. receives without increasing the workload.

3. Graduate Student Researchers (GSRs) should enroll in 12 units. These 12 units can be made up of courses on the student’s program of study, any other elective courses, and 299s.

D.  Required Courses

Required courses (Appendix C) are those required of all students in the program (M.S. and Ph.D.). These requirements cannot be waived, and Ph. D. students must meet these requirements prior to taking their Oral Qualifying Examination.

1. Required Seminar for all GGE Students

The EPI 290 course, offered Fall and Spring quarters each year with one unit of credit, is
required of all GGE students for both quarters each year until a student advances to candidacy, after which attendance is strongly recommended. It will be the Graduate Adviser’s responsibility to ensure that all students satisfy this important requirement.

The seminar series will be organized in such a way that a broad number of topics are considered. Research topics should be included, but topics need not necessarily be exclusively in this category. The purpose of this seminar is to provide as wide a forum as possible, which shall include discussions of epidemiological and relevant statistical methodology and their applications to the study of various species, in order that students and faculty alike will have regular access to the variety and richness of topics that relate to the core discipline of Epidemiology. While this richness is certainly available across the campus in the form of a collection of separate seminars, we recognize the need to provide a single forum which covers this breadth.

E. Annual Evaluation of Progress

The median time to degree depends on whether students have a prior related degree, such as a Master’s Degree in Statistics or an MPVM degree, because the time to complete course work differs for these two groups. The median times to degree for MS students are 2-3 years and for PhD students are approximately 4 years (with prior degree) and 6 years otherwise.

Graduate Council policy requires the Graduate Adviser to file an annual, written evaluation of the academic progress of each graduate student. This procedure is intended to ensure that each student receives from the faculty (Major Professor or Guidance Committee Chair) a careful, written assessment of his/her progress at least once during every academic year. On the basis of this evaluation, each student who is rated as making unsatisfactory progress receives a warning letter from Graduate Studies indicating specific conditions that must be met in order to continue in graduate status. A satisfactory progress report does not necessarily imply that a student will ultimately succeed in completing a graduate program. These reports do, however, serve to provide the student and Graduate Studies with a more
accurate assessment of performance than might otherwise be available.
Students will be evaluated annually (July of every year) on their progress. Ph.D. students must maintain a G.P.A. of 3.3 (B+) or better and M.S. students 3.0 (B) or better in all graduate and upper division course work to maintain satisfactory progress. For PhD students in the GGE, satisfactory progress consists of:

a) GPA of 3.3 or better;

b) successful completion of Oral Qualifying Examination and advancement to candidacy filed within 2 quarters of becoming eligible to take the examination, within 2 years of entering the program for students with a prior related degree and within 3 years of entering the program for students without a prior related degree;

c) completion of all degree requirements, including successful exit seminar on the dissertation and filing of the dissertation, within 3 years of advancing to candidacy and within 5 or 6 years of entering the PhD program, depending on prior degree status. Students who exceed either of the above requirements by less than one year at the annual evaluation of progress (June 30) will be given a “marginal” evaluation, and students who exceed either requirement by more than one year will be given an “unsatisfactory” evaluation. Appeals for exceptions to this policy may be made to the Committee of Graduate Advisers.

F. Double Majors

The minimum G.P.A. normally required for admission to a double major is 3.3. Applicants for admission to two graduate programs administered by Graduate Studies must file the Petition for Double Major along with the regular graduate studies application, application fee and transcripts.

Under a ruling by the Graduate Council, a student who is in a double major program (either a professional degree/academic degree program or two academic degree programs) may transfer a total of 12 units overall between academic programs with the approval of the Graduate Adviser and the Dean of Graduate Studies. The student must spend a minimum of two quarters in regular graduate standing in the Master’s program to fulfill the residency requirements of
Graduate Studies.
III. Degree Programs

The Graduate Group in Epidemiology offers MS degrees under Plan I (Thesis Option) and Plan II (Comprehensive examination Option), and Ph.D degree under Plan B. The specific requirements for these degrees as listed below:

A. The Master’s Degree

A Master’s degree is awarded to recognize a student’s command of a wide range of knowledge in a specific area or field. A Master’s degree may be awarded upon completion of one of two basic plans in which either a thesis or a comprehensive examination is required.

1. Requirements for M.S. Degree

   a. Residency: Candidates for the M.S. degree must be in residence at least three academic quarters. Two consecutive six-week summer sessions may be counted as the equivalent of one regular quarter. A minimum of two units must be taken in each session.

   b. Scholarship: Only courses in the 100, 200, 300 or 400 series in which the student receives grades of A, B, C and S may be counted in satisfaction of the requirements for the Master’s degree. A course in which a student receives a D+ or lower cannot be used to satisfy the unit requirement for the Master’s degree but will count in determining the grade point average. Courses in the 300 or 400 series may be accepted as 200 series courses if they have been approved by Graduate Council as graduate-level courses. Students must maintain a G.P.A. of 3.0 or better in all upper division and graduate courses elected during their residence as graduate students.

2. Choice of Degree Plan: Students must satisfactorily complete either a Thesis (Plan I) or a Comprehensive Examination (Plan II).

3. Master’s Degree Plans and Unit Requirements

There are two degree plans for Master’s students: 1) The Thesis Plan (Plan I), and the Examination Plan (Plan II). In the Thesis Plan (Plan I), students are required to take a minimum
of 30 units of courses and a minimum of 6 credits of research units (EPI 299). In Examination Plan (Plan II), students are required to take a minimum of 36 units of courses.

4. **Required and Suggested Area of Emphasis Courses for M.S**

Required classes (Appendix C) are those required of all students in the program (M.S. and Ph.D.), with the exception of EPI 208, Analysis & Interpretation of Epidemiologic Data. EPI 208 is no longer required for the Master’s degree due to the fact that it will now be offered in the Fall quarter, which would make it impossible for some students to complete the MS program in two years or less. However, in lieu of taking 208, MS students must select a suitable alternative *regular course*, with the approval of the Committee of Graduate Advisers (in conjunction with the GGE Educational Policy Committee if necessary). EPI 208 would of course be an acceptable choice. These requirements cannot be waived. A minimum of 9 credits in Area of Emphasis courses must also be taken (Appendix B).

5. **Advancement to Candidacy**

Master’s degree students should file an official application for Advancement to Candidacy after completion of at least one-half of the course requirements for the degree and at least one quarter before completion of all degree requirements. The forms can be obtained from Graduate Studies, Room 250 Mrak Hall or downloaded from the Office of Graduate Studies website (http://gradstudies.ucdavis.edu/)

6. **Master’s Thesis Proposal (Plan I)**

For students in Plan I, a research topic must be approved by the student’s Guidance Committee prior to commencing research, usually by the end of the first year or beginning of the second year.

7. **Thesis Committee (Plan I)**

For students in Plan I, after Guidance Committee approval of the topic, a thesis committee with three members will be nominated by the Graduate Adviser, in consultation with the student, and appointed by the Dean of Graduate Studies or Chair of the Graduate Council. The completed
thesis must be approved by the Thesis Committee. The topic should be acceptable to all three members of the Committee when they agree to serve, and a joint meeting of the committee members and the student should be held at that time. The thesis will be presented in a GGE seminar open to the public.

8. Examination (Plan II)
Master’s students in examination Plan II are required to complete a comprehensive oral examination administered by a committee of at least three members nominated by the Graduate Adviser, in consultation with the student.

9. Transfer to the PhD Program
MS students who desire to enter the PhD program must have at least a 3.3 GPA in courses taken while enrolled in the MS option, in addition to receiving a letter of recommendation from the proposed major professor. Students then petition the Committee of Graduate Advisers (who should consult with the Admissions Committee) for a change of degree objective (MS to PhD).

B. The Doctoral Degree
The recipient of a Ph.D. degree is understood to possess thorough knowledge of a broad field of learning and to have given evidence of distinguished accomplishment in that field. The degree is a warrant of critical ability and powers of imaginative synthesis. The degree also signifies that the recipient has presented a doctoral dissertation containing an original contribution to knowledge in her or his chosen field of study.

Requirements for Ph.D. Degree

1. Residency: Students working toward a doctorate must be registered and in University (Graduate Studies) residence for a minimum of six quarters. Two consecutive six-week summer sessions may be counted as the equivalent of one regular quarter if at least two units are taken in each.

2. Scholarship: Students must have completed all required course work and have achieved a G.P.A. of 3.3 or better in all graduate work.
3. **Pre-Qualifying Written Examination**

After completion of coursework and equivalents, and before the oral qualifying examination, *students must pass a pre-qualifying written examination*. The purposes of the written examination are to determine whether a PhD student has mastered the material offered in the required core courses and to improve assessment of students during the Qualifying Examination by reducing time spent examining the student on material covered in didactic instruction.

**a. Material Covered:** The areas covered in the written examination will be those presented in the required core courses in basic epidemiology, epidemiologic study design, advanced epidemiology, and statistics. Material to be examined will be limited to that presented in those core courses and will be described in a student syllabus, which will identify subjects, topics, and concepts, with the skills, knowledge, and/or abilities expected of the student. EPI 208, Analysis & Interpretation of Epidemiologic Data, will no longer be on the Pre-Qualifying Written Examination; however, EPI 208 material will be on the Qualifying Examination (QE).

**b. Examination Committee:** An Examination Committee consisting of 6 faculty will be appointed by the Executive Committee to develop and maintain the syllabus, to develop and grade examination questions, to schedule and administer the examination, and to report results of the examination. The Committee will have a Chair, and will be composed of two statisticians and four epidemiologists, with a membership representing the Schools of Veterinary Medicine and Medicine and another School or College. The Committee will develop questions from a bank of questions presented by GGE faculty members. The Committee will assess the appropriateness of each question and the answer provided by the faculty member who developed the question, after consulting with those who have provided instruction in the core courses. Each question will be graded by at least 2 faculty, the one who proposed the question and 1 of the committee members. Previous exam questions will be available for
students to review.

c. **Nature of the examination:** Exam questions will test the student’s knowledge of epidemiologic and statistical methods and of their theoretical bases and the student’s ability to evaluate methodology, analyze data, and demonstrate logical interpretation of data. Question types will be essay, problem solving, and derivations. The examination will be an integrated exam which covers basic epidemiology, epidemiologic design, advanced epidemiology and statistics. It is expected that questions relating to epidemiology will constitute approximately 70% of the examination and statistics approximately 30%. The exam will take place during two 4-hour sessions (1 session per day) for 2 days in September, about 2 weeks before the Fall quarter begins.

   Early in the following April, students who did not pass one or both parts in their first attempt will retake the part(s) of the exam they did not pass. The duration and scheduling of the sessions will be the same as for the first examination.

   Examinations will be identified by a confidential student code, which will be un-blinded after the exam has been graded, the score has been determined, and a ‘Pass’, ‘Not Pass’, or ‘Fail’ decision has been made.

d. **Examination outcome:** The passing score for the examination will be determined by the examination committee for each offering of the examination. Passing scores will not be determined by ‘curve grading’. Within 4 weeks of the last day of the September examination, the Examination Committee will submit the final score and a Pass or Not Pass to the Chair of the GGE and the Graduate Advisers. Students will be notified of a Pass or Not Pass result.

   Students who receive a Not Pass on the first examination in September will have an opportunity to retake the portions of the exam that they did not pass in the early spring. In the second, retake examination, the passing score will again be determined by the examination committee. Within 4 weeks of the last day of the examination, the Examination Committee will
submit the final score and a Pass or Fail to the Chair of the GGE and the Graduate Advisers. Students will be notified of a Pass or Fail result. A student who receives a Fail in the second examination will be dropped from the program. Students have the right to appeal the Examination Committee’s decision to the Executive Committee and/or to Graduate Studies.

4. Research Proposal Seminar: The student is required to present a seminar describing the proposed dissertation research topic. The seminar should indicate the specific hypotheses, and reasoning behind the hypotheses, design, materials, assays, methods, statistical tests, and anticipated results. The seminar must be presented prior to the Qualifying Examination. All Qualifying Exam committee members must attend, and the seminar must be advertised by e-mail to the entire GGE.

5. Qualifying Examination: Students must pass the pre-qualifying written and Qualifying Examinations (see Pre-Qualifying and Qualifying Examinations sections of this Document.)

Students in a PhD program at the University of California are required by the University to pass the Qualifying Examination (QE) before being advanced to candidacy for the degree. The Qualifying Examination Committee evaluation will consider relevant portions of the student’s academic record and performance on the examination in making an overall evaluation of the student's performance and potential for scholarly research.

The purpose of the QE in the GGE is to assess whether the student is prepared for and capable of independent and critical thinking in general, and especially in the broad areas of epidemiology, statistics, the area of emphasis, and in the special topic selected by the student, and to assess whether the student is qualified to pursue the formal research phase of the PhD program.

The QE differs from the GGE pre-qualifying written examination in that the QE evaluates the student’s ability to integrate and utilize the knowledge and skills critical for independent and
creative research and analysis. The pre-qualifying examination emphasizes the assessment of mastery, working knowledge, and understanding of the materials presented in the required core courses of the GGE program; whereas the QE focuses on the student’s ability to synthesize ideas and concepts, formulate approaches, problem-solve, and demonstrate the breadth and depth of knowledge at an advanced level of understanding of the theory and concepts in areas being examined. QE assessment often is made partly in the context of the student’s proposed research, whereas assessment in the pre-qualifying examination does not.

a. **Timing of the Examination**

If minimal or no required course work has been undertaken prior to admission, the Qualifying Examination should be taken between Spring quarter of the second year and the end of Spring quarter of the third year. If significant course work (e.g., Master in Preventive Veterinary Medicine course work) has been taken prior to admission, however, the student is expected to take the Qualifying Examination before Fall quarter of the third year. Failure to meet these milestones may be considered unsatisfactory progress. Once each quarter, the Graduate Advisers will nominate Qualifying Committees for those students who will become eligible to take the Qualifying Examination by the end of that quarter. The date of the examination will be determined by the student and the committee chair. It is the responsibility of the student to arrange the date and time of the examination with all committee members. The examination should be scheduled at least 3 months from the time committee nominations are submitted to Graduate Studies. Note that some faculty are on 9-month appointments and may not be available during the summer.

b. **Eligibility**

To be eligible for the Qualifying Examination the student must have satisfied all GGE course requirements, removed any deficiencies, and have at least a ‘B +’ (3.3 G.P.A.) average for all upper division and 200-series courses taken while registered as a graduate student. The student must be registered for the quarter in which any portion of the examination is taken. In
order to take the Qualifying Examination over the summer, the student must be registered during spring quarter.

c. Selection of the Committee

A Qualifying Examination Committee ordinarily consists of five members. The student should meet with the Graduate Adviser at least three months prior to the proposed date of the examination to discuss the examination. The student is to notify the Graduate Adviser of the field of the special topic, which he/she will defend. The field of special topic is the minor area of specialization the student intends to pursue during the research phase of the program. If a student wishes, he/she may submit names of faculty he/she considers qualified to examine the student in the fields of the Area of Emphasis and Special Topic. During the quarter in which all course requirements will have been met, the Graduate Adviser will submit to the student an initial list of faculty for the Committee. There should be no expectation that any of those listed by the student necessarily will be nominated. One member may be appointed from outside the Group. See the adviser’s document of the Policy and Procedure Manual for further details.

After consulting with the student, the Adviser will submit nominations to Graduate Studies. Any member who serves on the Qualifying Committee is ineligible to serve later as Chair of the Dissertation Committee. Qualifying Committees are appointed by Graduate Studies, which asks that the Graduate Adviser nominate faculty for a Qualifying Examination at least eight weeks prior to the examination date. A student must not take the examination prior to formal appointment of the committee by Graduate Studies. Requirements for membership on Qualifying Examination Committees have been established by the Graduate Council in an effort to ensure that the examination is a fair and accurate measure of the student’s ability and progress. A member of a committee must have earned a doctorate and must have demonstrated creative and independent research and distinguished accomplishment in the field being examined. Under some circumstances, one member of the committee, who is not a faculty member of the University of California, may be appointed on the basis of special
expertise and qualifications. The Graduate Adviser must submit to Graduate Studies a brief statement indicating the potential appointee’s affiliation and title and degrees held, and describing the special expertise that is not otherwise available. A curriculum vitae and a letter from the nominated person indicating willingness to serve also should be submitted. If a student is dissatisfied with a nomination, the student should submit an appeal to the Executive Committee of the GGE via the Chair of the GGE. If the student is dissatisfied with the decision of the Executive Committee, the student may submit an appeal to the Associate Dean of Graduate Studies.

d. Student Responsibilities

Prior to nomination of the QE committee, the student should provide the Graduate Adviser with a one-page abstract or summary of the student’s proposed research, including the hypothesis and methods to assist the Graduate Adviser in identifying appropriate faculty to serve on the QE. The student should meet with each nominated QE committee member at least twice before the scheduled examination. Frequency, duration, and number of meetings between an individual committee members and the student are decided by those two individuals. The purposes of the meetings should be to understand the committee member’s expectations for the student’s performance on the QE, to identify relevant material and approaches for preparation, and to familiarize the faculty with the student’s proposed research. Students may enroll in an EPI 299 course with each faculty member, if warranted by the body of subject material and agreed upon by the committee member. Students should notify their Graduate Adviser if a committee member could not accommodate a request to meet at least twice before the scheduled examination. The student must contact each member of the QE committee to determine dates and times available for the QE, and must notify each QE committee member of the final date, time, and location of the QE.

The student must reserve a room for the QE for at least 4 hours for the date and time; the typical time for the examination process is at least 3 hours. The GGE administrative support
person can help the student identify available rooms. The student is responsible for scheduling, in conjunction with the QE committee members, the required GGE seminar on his/her proposed research sometime before the QE; the seminar must be attended by all QE members.

In coordination with the chair of the QE committee, the student must provide each QE committee member with a written project proposal at least one week before the scheduled examination. General recommendations for the written proposal are provided in the “Requirements and Guidelines for the GGE”, but the student should consult with the chair of the QE committee to determine any specific expectations the committee members may have for format, detail, and length of the proposal.

e. Format and Administration of the Examination

The general guidelines for administration of the QE, including responsibility of the QE committee chair, options for passing, not passing, or failing, and advancement to candidacy are available from Graduate Studies, UC Davis, Mrak Hall.

Shortly after the QE committee receives notification of its nomination, the QE committee chair, in consultation with the Graduate Adviser and the QE committee, should determine if the examination should proceed, as judged by a review of the student’s transcripts, to verify that all requirements have been met, to assess performance in required core and elective courses and in the research proposal seminar, and to assess preparation for his/her area of emphasis and special topic. Copies of student’s transcripts and of the approved course plan, which indicates all the courses taken to fulfill the Area of Emphasis and Special Topic, will be provided at the time of notification of nomination by the Graduate Adviser. Although the Guidance Committee, “major professor”, Graduate Adviser, and Committee of Graduate Advisers all are responsible for assessing whether the student is prepared to take the QE, the QE committee assumes the final responsibility in determining whether the examination should proceed. The committee, or a committee member communicating through the chair, however, may determine at any time
before the scheduled QE that the student is not prepared to take the QE and that the QE should not proceed as scheduled.

If it is determined that the QE should not proceed, the chair is responsible for communicating in writing to the student, with copy to the Graduate Adviser, why the committee believes the QE should not proceed and what student deficiencies must be met in a specified time frame before the QE can be rescheduled. The rescheduled QE should take place in the most expedient and specified time frame based on student deficiencies that need to be fulfilled, preferable within six months of the first scheduled QE.

If it is determined that the QE should proceed, the QE committee will determine, by majority vote, the specific format of the exam. The format should consider whether, in addition to the oral component, the examination will include a written component from one or more committee members, the specific format for any written component, whether or not the student should present an overview of the proposed research, the duration of any such presentation, the format for oral questioning, and scheduled breaks in the examination. Students should be given at least 2 months to complete any written component of the QE, which should be handed back to the QE committee at least 2 weeks before the scheduled date of the QE. Written questions may also be given for retake of certain portions of the exam on which the student’s performance was not adequate (any written component is considered part of this administration of the QE). While students are encouraged to use library resources, the student may not discuss written questions with individuals other than members of their QE committee. The QE committee is responsible for ensuring that the anticipated effort to be put forth by the student in completing the examination is fair and reasonable.

The content of examination questions or material used by an individual committee member to assess student abilities is determined by the individual member; academic freedom dictates that the content of questions or examination material of individual faculty members is not subject to debate by the QE committee. All members of the QE committee must meet
formally as a group with the student to administer the QE, to clarify any written responses to
questions administered prior to the scheduled QE, and to assess the student’s overall
performance on the examination. All committee members are required to attend (as required by
the Academic Senate), and should actively participate, during the entire scheduled QE of the
student. The QE should not be allowed to proceed if all members will not or cannot be present
during the entire scheduled examination.

f. Examination

In preparing for the qualifying examination, the following significance and expectation of
the Ph.D. degree should be borne in mind by the student and qualifying committee: “The
recipient of the Ph.D. degree is understood to possess thorough knowledge of a broad field of
learning and to have given evidence of creative and distinguished accomplishment in that field;
the degree is a warrant of critical ability and powers of imaginative synthesis” (Graduate
Adviser’s Handbook).

The dissertation proposal (Appendix D) is to be prepared by the student and distributed
to the committee at least one week prior to the examination. The proposal is to be written in the
format of an N.I.H. or U.S.D.A. grant and should not exceed six typed single-spaced pages.
The proposal will be considered in evaluating the student’s potential for scholarly research. The
student also is to provide the chair of the Qualifying Examination Committee with a curriculum
vitae.

An integral part of the examination will involve specific coverage of the materials
presented in the capstone course, EPI 208, Analysis & Interpretation of Epidemiologic Data.
In addition to the fields of epidemiology, research and quantitative methods, the student will be
examined in both a major (the approved area of emphasis) and a minor (special topic selected
by the student) field within the broad scope of epidemiology. The special topic is the minor field
of interest chosen by the student with approval of the Guidance Committee and Adviser.
Informal “mock” examinations with a group of faculty are encouraged.
g. **Assessment of Student Performance by the Committee**

A committee member should refrain from making conclusions as to the ultimate disposition of the QE until the final phase of the process when the QE committee deliberates the final decision.

The QE should attempt to assess the student’s performance with respect to his/her ability of independent and critical analysis, including analytical skills specific to epidemiology, statistics, the Area of Emphasis, and the Special Topic; ability to apply principles and knowledge in the subject area; knowledge of current and contemporary issues in the student’s proposed research; general knowledge of science; ability to integrate information and to reason based on examples or situations not necessarily related to his/her proposed research; and ability to hypothesize, extrapolate, and synthesize ideas.

Although the student will have passed the pre-qualifying written examination, and, therefore, will be assumed to possess a mastery of the material presented in the required GGE core courses, QE committee members may in the course of the examination address issues of mastery of core course material, as deemed necessary.

Assessment of student performance should consider the student’s ability to defend methods and concepts, justify analyses, and critically assess the strengths and weaknesses of his/her proposed research, and to be able to provide appropriate reasoning behind the research. The student should be able to demonstrate an appropriate depth and breadth of knowledge in the area of his/her research.

Assessment of student performance should not be based on such factors as the nature of perceived scientific merit of the proposed research, future career goals, academic affiliations, faculty membership, or funding potential of proposed research.

Student performance on the QE as a whole is evaluated by all committee members. In reaching a committee agreement on overall assessment, each member should evaluate the student’s
performance on a) each of the following areas: epidemiology, statistics, the area of emphasis, and the special topic and b) on the examination overall.

Five outcomes of the first QE are possible:

* a student may pass,
* a student may not pass all or part of the examination,
* a student may fail the QE,
* a “no exam” may be declared,
* a “split vote” may be cast by the QE committee.

In order to declare a pass, the QE committee must be unanimous in agreeing that the student has passed each of the four areas of the examination and the examination overall. A pass on the qualifying exam indicates that the student’s performance has been judged to be of sufficiently high quality to recommend him/her to be advanced to candidacy to pursue the formal research phase of their graduate education in epidemiology.

6. Transfer from PhD to MS

The GGE Educational Policy Committee considered the following 4 scenarios in which a student may be in the PhD program and transfer to the MS program and made recommendations for each:

a. The student passes the PhD written exam but not the qualifying (oral) exam. This by itself is not sufficient for a MS degree because one of the two plans (thesis or oral exam) must be satisfied to fulfill degree requirements.

1) the oral exam committee can decide if a MS level of proficiency was demonstrated, and if the student petitions to change to the MS program, the committee can recommend a passing result for a MS oral exam

2) the oral exam committee can decide that proficiency was not demonstrated at either the PhD or MS level, but the student can still petition to change to the MS
The committee can recommend the student enter the thesis plan; however, the student may select the oral exam plan.

b. The student **does not pass** the PhD written exam and has thus not demonstrated basic competency in the discipline. A student in this situation cannot be automatically moved into the MS program. However, the student may petition to the Graduate Advisers Committee (who should consult with the Admissions Committee) to move into the MS program in either the thesis or oral exam plan.

c. The student may after 3 quarters and prior to taking the written pre-qualifying PhD exam petition to the Committee of Graduate Advisers (who should consult with the Admissions Committee) to move into the MS program in either the thesis or oral exam plan (if the student’s academic performance meets the requirement of the MS program, including a minimum GPA of 3.0 in all upper and lower division and graduate level courses taken while in the PhD program).

d. The student **passes** both the PhD pre-qualifying written exam and the oral Qualifying Exam, but is unable to complete his or her dissertation within the allowable period (ie, 3 years with an additional year of probation after the successful completion of the qualifying exam). Such a student has effectively met all the requirements of the MS program and should be encouraged to change his/her degree objectives accordingly.

7. **Advancement to Candidacy**

Upon successful completion of the qualifying examination, the student is sent an application for advancement to candidacy by Graduate Studies. After the application is filled out
and signed by the Graduate Adviser and major professor, the student pays the advancement to candidacy fee at the Cashier’s office and returns the form to Graduate Studies. When the application is submitted to the Graduate Adviser for signature, a letter should accompany it from the proposed Chair of the Dissertation Committee recommending faculty for the Dissertation Committee. Upon advancement to candidacy for the degree, the Dissertation Committee will be appointed to direct the student in his/her research problem and to guide in the preparation of the dissertation.

8. **Dissertation**: The GGE operates under the Graduate Studies Plan B for dissertations. Students must submit a dissertation approved by the Dissertation Committee, which is composed of three to five faculty members who guide the candidate in his/her research and pass upon the merits of the dissertation.

9. **Selection of the Dissertation Committee**
   
a. The Graduate Adviser nominates to Graduate Studies three members of the Dissertation Committee after consultation with the student. These three faculty members guide the candidate in the research phase and approve the dissertation.

b. Qualifications for membership on the Dissertation Committee are the same as for members of the Qualifying Examination Committee. The student should consult with his/her major professor about membership before meeting with the Graduate Adviser.

c. The Chair and at least one other member must be members of the GGE.

d. Once a committee has been constituted, changes in membership may cause hardship for students as well as additional workload for Graduate Studies. Disagreement over the quality of a student’s performance is not a legitimate reason for a member to be asked to be removed from a committee or for him/her to be replaced. Acceptable reasons for replacement of a member are: 1)
extended absence from the campus, 2) illness or 3) a substantial and justified change in the student’s research topic. When membership changes must be made, the Graduate Adviser should nominate a new committee member giving reason for the change. For any change once a committee has been constituted, the Graduate Adviser must submit a statement of the reason for the request for change, and the reason must be acceptable to the Dean of Graduate Studies.

10. The Dissertation Topic

A dissertation on a subject chosen by the candidate and of such character as to show the ability to conduct an independent, original, and creative investigation must be approved by the Dissertation Committee and by the Graduate Council. A degree cannot be granted only on the basis of completion of a course of study, however extensive. A doctoral student who, after a written warning from the Dissertation Committee, has not made acceptable progress on a dissertation for at least a year, may be subject to disqualification.

The research plan must be approved in writing by the Dissertation Committee and submitted to the Graduate Adviser within one quarter after being advanced to candidacy. The plan should indicate that the dissertation will address a subject chosen by the student and contain the following elements:

1. It must be original.
2. It must demonstrate creative and independent work and be of publishable quality for a peer-reviewed journal.
3. It must contribute to the body of knowledge in epidemiology.
4. All aspects must be defensible, including hypothesis(es), quality of data, methods, results and interpretation. The student must participate in sufficient study design, sample collection, biologic tests or assays, and data collection to demonstrate knowledge of respective techniques, errors, and biases.
5. Use of established statistical methods on an existing database is not acceptable.
for a dissertation. Development of new statistical or analytic methods using an existing database is acceptable, however, provided the student demonstrates experience in appropriate study design and data collection to the satisfaction of the Dissertation Committee.

6. The work must be primarily that of the student; the student should be primary author of all chapters or manuscripts included in the dissertation.

7. The dissertation must be tied together by a unifying theme.

The format of the Dissertation would typically include the following sections:

1. Introduction
2. Critical review of the literature
3. At least three chapters, each representing a publishable paper in journal-ready format for a peer-reviewed journal.
4. Summary

A monograph format may be used if deemed appropriate by the student’s Dissertation Committee.

It is strongly recommended that at least one manuscript derived from the dissertation be submitted for publication in a peer-reviewed journal before the dissertation is approved.

Instructions on the dissertation format are available from Graduate Studies.

11. Dissertation Exit Seminar:

All students must present their dissertations before their Dissertation Committee in a GGE exit seminar announced and open to the public. The seminar is expected to be a well-organized and succinct presentation of the research. Faculty should be aware that the quality of the dissertation exit seminar is reflective of the quality of support and guidance provided by the dissertation committee. The student will make one copy of the dissertation draft available to faculty and students at least one week before the scheduled public exit seminar. The exit seminar is to be announced to the Group in writing with a brief abstract.
12. Dissertation Defense

A dissertation defense, separate from the required exit seminar, may be required at the discretion of the Dissertation Committee. The committee should require a defense if no papers have been published or accepted for publication and the dissertation is not in the form of manuscripts for publication. If the student has papers already published (or accepted for publication) from the dissertation, the defense need not be required. If the dissertation is in the form of manuscripts for publication but they have not been published or accepted yet, the committee will decide whether to recommend a defense. The student must be notified by the Dissertation Committee well in advance of the exit seminar if a defense is required and may be cancelled by that committee if it feels the performance on the exit seminar was sufficient.

13. Filing the Dissertation

The candidate must file with the Office of Graduate Studies one copy of the dissertation approved by the Dissertation Committee, not later than three weeks before the close of the quarter in which the degree is to be conferred. An abstract of the dissertation must be filed by the same date.

At the time of filing the dissertation, the student is encouraged to sign an agreement with University Microfilms, Inc. to microfilm the dissertation and print the abstract in Dissertation

14. Abstracts

Arrangements for copyrighting the dissertation and for obtaining reprints of the abstract, if desired, must also be made at this time. Students should contact Office of Graduate Studies for additional information.

15. Filing Fee

The Filing Fee was established expressly to assist those students who had completed all requirements for degrees except filing theses or dissertations and/or taking formal final examinations (Master’s comprehensive examinations or doctoral dissertation defenses).
a. **Eligibility for Filing Fee**

To prevent abuses of the Filing Fee, definite limitations on eligibility for the status have been established. In general, these limitations are based upon the principle that students using University facilities or making demands upon faculty time - other than the time involved in the final reading of dissertations or theses or in holding final examinations - are not eligible to employ the Filing Fee status. Students on Filing Fee status are not registered students eligible for the privileges accorded regularly enrolled students. In particular, students on Filing Fee Status:

1. may not make use of University educational facilities, such as the Library (unless the student has purchased a Library use card) or laboratories;
2. are not eligible for the services of the University Health Center or for University housing;
3. may not take course work of any kind;
4. may not make use of faculty time except as noted above;
5. may not hold any academic student appointment titles (e.g., Graduate Student Researcher, Teaching Assistant, Post Graduate Researcher, Associate In, Graduate Reader);
6. may not receive a fellowship or financial aid.

Students who plan to make use of Library or other facilities or to take courses must register as regular students. Students who plan to be away from the campus but to be in an instructional relationship with faculty members must register as regular students (a student outside the State of California may be eligible to register for reduced fees). Students planning to take Qualifying Examinations for the Ph.D. must register as regular students. Completion of formal course work or residency requirements does not entitle a student to apply for the Filing Fee Status unless she or he will use no University facilities or faculty time except as noted above.
Students wishing to make use of the Filing Fee Status should secure a Filing Fee application from the Graduate Division, obtain the signatures of the Graduate Adviser and major professor, and return the form to the Graduate Division before she or he stops registering. The Filing Fee is payable at the time the application is submitted to the Graduate Division. The Filing Fee is assessed only once.

16. **Nonresident Tuition Reduction after Advancement to Candidacy:**

Nonresident PhD students who have advanced to candidacy by the first day of Fall quarter are eligible for a 75% reduction of the tuition charge beginning that Fall quarter. The student is eligible for the reduced charge for up to 3 years after advancement to candidacy. After 3 years if the student has not completed their degree, the charge will revert to whatever is in place at that time.
# Progress Outline
## M.S. and Ph.D.

Possible tracks:

**Track 1**: Proposed Curriculum with probable scenario for MS or Ph.D. students who have not completed statistics and calculus requirements before entering the program.

<table>
<thead>
<tr>
<th>Summer</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPI 205A (4)</td>
<td>EPI 205B (2)</td>
<td>EPI 206 (3)</td>
<td>EPI 207 (4)</td>
</tr>
<tr>
<td>EPI 290 (1)</td>
<td>PHR 202* (3)</td>
<td>EPI 290 (1)</td>
<td></td>
</tr>
<tr>
<td>Prerequisites MPM 402 (4) or STA 102 (4)</td>
<td>STA 106 (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 16A(3) or 21A (4)</td>
<td>Elective (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPI 205A (4)</td>
<td>EPI 205B (2)</td>
<td>EPI 290 (1)</td>
<td></td>
</tr>
<tr>
<td>EPI 290 (1)</td>
<td>PHR 202* (3)</td>
<td>EPI 290 (1)</td>
<td></td>
</tr>
<tr>
<td>MATH 16A(3) or 21A (4)</td>
<td>Elective (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Year 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take Written Pre-Qualifying Exam. + Prepare for oral Qualifying Examination</td>
<td>EPI 208* (3)</td>
<td>Oral Qualifying Examination → Dissertation Research</td>
<td>Dissertation Research</td>
</tr>
<tr>
<td>EPI 290 (1)</td>
<td>Prepare for Oral Qualifying Examination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STA 144* (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Students take one of the sampling courses, STA 144 or PHR 202

**Summer after year 2 course work: MS students complete master’s project or take master’s oral examination.**

**Track 2**: Proposed Curriculum with probable scenario for Ph.D. students who have completed statistics and calculus requirements before entering program.

<table>
<thead>
<tr>
<th>Summer</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPI 205A (4)</td>
<td>EPI 205B (2)</td>
<td>EPI 206 (3)</td>
<td>EPI 207 (4)</td>
</tr>
<tr>
<td>EPI 290 (1)</td>
<td>STA 130A (4)</td>
<td>EPI 290 (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHR 202* (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EPI 290 (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective (2-4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take Written Pre-Qualifying Exam. + Prepare for oral Qualifying Examination</td>
<td>EPI 208 (3)</td>
<td>Oral Qualifying Examination → Dissertation Research</td>
<td>Dissertation Research</td>
</tr>
<tr>
<td>EPI 290 (1)</td>
<td>Prepare for Oral Qualifying Examination</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electives (6)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Students take one of the sampling courses, STA 144 or PHR 202

---

Epidemiology Degree Requirements
Approved on June 9, 2005
YEAR 1

Fall
Meet with major professor, if known, or the special adviser assigned to you in this case, and the graduate adviser to form the Guidance Committee.
Determine Fall classes.
Meet with the Guidance Committee and prepare plan of course work for degree.
File a two-year course plan with the Graduate Advisor.
Investigate scholarships and fellowships.
Area of Emphasis and appropriate course plan must be filed by end of the quarter.
Follow course plan

Winter
Follow course plan

Spring
Follow course plan
Prepare grant applications
Student must choose major professor by the end of the third quarter of the 1st year.

Summer
Track 2 Ph.D. students prepare for written pre-qualifying examination, and take it in late September.

YEAR 2

Prior to or at the beginning of Fall Quarter meet with major professor, Guidance Committee, and Graduate Adviser to confirm course plan and to make any adjustments. Investigate scholarships and fellowships.

Fall
Follow course plan
Prepare research plan for approval
Track 2 Ph.D. students who passed their written examination, prepare for qualifying examination and take EPI 208.

Winter
Follow course plan
Research
Track 2 students prepare for and take qualifying examination.
Track 1 students follow course plan and research

Spring
Meet with Guidance/Dissertation Committee to review progress
Track 2 students - research
Track 1 students - follow course plan and research

Summer
Track 2 students - research
Track 1 Ph.D. students prepare for written pre-qualifying examination, and take it in late September. Track 1 MS students complete master's project or take masters oral exam.

YEAR 3 (and subsequent years)

Fall/Winter/Spring
Track 2 - Research
Track 1 meet with Dissertation Committee to review progress, take EPI 208, prepare for and take qualifying examination by the end of winter quarter.
Faculty Profiles

Entomology

THOMAS SCOTT, Department of Entomology. Ecology, evolution, and epidemiology of infectious diseases with a focus on the role of mosquitoes in virus transmission cycles. E-mail: twscott@ucdavis.edu.

Nutrition

KENNETH H. BROWN, Department of Nutrition. Nutrition, infections, and growth of children in less-developed countries. E-mail: khbrown@ucdavis.edu

KATHRYN DEWEY, Department of Nutrition. Maternal and child nutrition, with emphasis on lactation and infant nutrition. Economic, agricultural and dietary factors associated with malnutrition among populations in developing countries. E-mail: kgdewey@ucdavis.edu

School of Engineering

DAVID ROCKE, Department of Applied Science. Robust statistical methods, components of variance and statistical inference in bioassay. E-mail: dmrocke@ucdavis.edu

School of Medicine

LAUREL BECKETT, Epidemiology and Preventive Medicine. Studies on aging. Methodology related to medical questions, including low-dose risk assessment, population-based study methodology, and longitudinal studies of chronic disease. E-mail lbckett@epm.ucdavis.edu

LESLEY BUTLER, Epidemiology and Preventative Medicine. Nutritional exposures and biomarkers of cancer.

DIANA CASSADY, Epidemiology and Preventative Medicine. Community nutrition, obesity prevention, reducing health disparities. E-mail dlcassady@ucdavis.edu

STUART COHEN, Division of Infectious and Immunologic Diseases. Epidemiology and microbiology of nosocomial infections. E-mail: stuart.cohen@ucdmc.ucdavis.edu

ROSEMARY CRESS, CA Cancer Surveillance program. Cancer epidemiology

JOHATHAN DUCORE, Department of Pediatrics; Childhood Cancer.

NEIL FLYNN, Department of Internal Medicine. AIDS Epidemiology. Current emphasis on the prevention of the spread of HIV among IV drug users and disinfection of IV drug paraphernalia using commonly available materials. E-mail: nmflynn@ucdavis.edu

D. ROSS GIBSON, Department of Internal Medicine. Epidemiology and primary prevention of HIV; substance abuse and HIV; theoretical and applied social psychology and community psychology. E-mail: drgibson@ucdavis.edu

ELLEN GOLD, Epidemiology and Preventive Medicine. Epidemiologic investigation of adverse reproductive outcomes (including menstrual cycle disturbances, infertility, spontaneous abortions and menopausal symptoms) and of cancer (including childhood, pancreatic, lung and breast cancer) associated with lifestyle and occupational and environmental exposures. E-mail: ebgold@ucdavis.edu

DANIELLE HARVEY, Epidemiology and Preventative Medicine. Biostatistics, longitudinal data analysis.

CALVIN HIRSCH, Professor of General Medicine, geriatric health-care policy and the organization and delivery of health care to the frail elderly; clinical epidemiology; functional assessment in clinical practice; alzheimer’s disease; teaching geriatric medicine.

IRVA HERTZ-PICCIOTTO, Epidemiology and Preventative Medicine. Epidemiologic investigation of the relation of environmental exposures to adverse reproductive and child health outcomes.

RICHARD L. KRAVITZ, Division of General Medicine, UCDMC. Understanding the clinical, psychological, and ethical aspects of physician behavior in the hope of improving quality of medical care. E-mail: rikravitz@ucdavis.edu

NATHAN KUPPERMANN, Emergency Medicine, UCDMC. Laboratory evaluation of young febrile children; laboratory and radiographic evaluation of pediatric trauma patients; and emergency department evaluation and treatment of children with diabetic ketoacidosis. Clinical and cost-effectiveness of laboratory testing in the setting of the pediatric emergency department. E-mail: nkuppermann@ucdavis.edu

J. PAUL LEIGH, Epidemiology and Preventive Medicine. Costs of occupational injuries and illnesses; applications of econometrics to epidemiology, e.g. instrumental variables; costs of Hepatitis C. E-mail: pleigh@ucdavis.edu

Epidemiology Degree Requirements

Approved on June 9, 2005
BRUCE LEISTIKOW, Epidemiology and Preventive Medicine. Occupational medicine, tobacco-related diseases. E-mail: bbleistikow@ucdavis.edu

HONGZHE LI, Internal Medicine/Rowe Program in Human Genetics. Developing statistical methods for genetic epidemiology and molecular biology, and applying these methods to genetic studies of complex human diseases. Statistical and mathematical formulation of problems in genomics and bioinformatics. E-mail: hli@ucdavis.edu.

JAMES P. MARCIN, Pediatrics, UCDMC. Health Services Research. Focus is in measures of quality of care, specifically, length of stay models, severity of illness measures, and clinical prediction rules. E-mail: jmmarcin@ucdavis.edu.

STEPHEN MCCURDY, Epidemiology and Preventive Medicine. General occupational medicine and occupational health among semiconductor manufacturing workers and agricultural workers, with emphasis on respiratory hazards. E-mail: samccurdy@ucdavis.edu.

JOHN ROBBINS, Division of General Medicine. Clinical epidemiology in humans. E-mail: jarobbins@ucdavis.edu

PATRICK ROMANO, Division of General Medicine. Evaluation of the clinical outcomes of medical care, including different systems of health care delivery or payment. Epidemiology of traumatic injury. Quality of medical and surgical care. E-mail: psromano@ucdavis.edu

JAMES P. MARCIN, Pediatrics, UCDMC. Health Services Research. Focus is in measures of quality of care, specifically, length of stay models, severity of illness measures, and clinical prediction rules. E-mail: jmmarcin@ucdavis.edu.

STEPHEN MCCURDY, Epidemiology and Preventive Medicine. General occupational medicine and occupational health among semiconductor manufacturing workers and agricultural workers, with emphasis on respiratory hazards. E-mail: samccurdy@ucdavis.edu.

STEPHEN MCCURDY, Epidemiology and Preventive Medicine. General occupational medicine and occupational health among semiconductor manufacturing workers and agricultural workers, with emphasis on respiratory hazards. E-mail: samccurdy@ucdavis.edu.

ROBERT SZABO, Department of Orthopaedic Surgery. The etiology and epidemiology of upper extremity work related disorders; musculoskeletal injury and prevention. E-mail: rmszabo@ucdavis.edu

JACOB WEGELIN, Epidemiology and Preventative Medicine. Biostatistics, latent models for cross-variance.

School of Veterinary Medicine

ROB ATWILL, Veterinary Medical Teaching and Research Center. Assessing the environmental and public health risk from and identifying cost-effective control strategies for minimizing non-point source microbial contamination of surface water from livestock production systems and free-ranging wildlife. Preharvest food safety on rangeland cow-calf operations and dairy calf production medicine. E-mail: ratwill@vmtrc.ucdavis.edu

ROBERT BONDURANT, Department of Population Health and Reproduction. Clinical, epidemiological and immunobiological aspects of bovine venereal disease; increasing the fecundity of ruminant livestock; causes of decreased reproductive efficiency in dairy animals. E-mail: rhbondurant@ucdavis.edu

TIM CARPENTER, Department of Medicine and Epidemiology. Epidemiology and animal health economics; simulation modeling; epidemiology and economics of fowl cholera. E-mail: tecarpenter@ucdavis.edu

JAMES CASE, California Veterinary Diagnostic Laboratory, Clinical Diagnostic Medicine. Veterinary informatics and the application of geographic information systems to the study of disease distributions. E-mail: jcase@cvdls.ucdavis.edu

BRUNO CHOMEL, Department of Population Health and Reproduction. Epidemiology of zoonoses; relationships between wildlife and domestic animal zoonoses. E-mail: bbchomel@ucdavis.edu

PATRICIA CONRAD, Department of Pathology, Microbiology and Immunology. Epidemiology of parasitic infections; molecular and antigenic characterization of protozoal parasites. E-mail: paconrad@ucdavis.edu

THOMAS FARVER, Department of Population Health and Reproduction. Sampling designs for estimating incidence and prevalence of disease in food animal populations. Application of multivariate methods in epidemiology and veterinary medicine. E-mail: tbfarver@ucdavis.edu

JANET FOLEY, Center for Vector Borne Disease. E-mail: jefoley@ucdavis.edu

IAN GARDNER, Department of Medicine and Epidemiology. Clinical an analytic epidemiology, multicausal nature of swine diseases and lowered productivity, especially respiratory diseases. E-mail: iagardner@ucdavis.edu

LYNETTE HART, Department of Medicine and Epidemiology. Animal behavior, companion animals. E-mail: lahart@ucdavis.edu

SHARON HIETALA, California Veterinary Diagnostic Laboratory. Clinical immunology, serology,
and applied biotechnology for laboratory diagnosis of food animal, equine, and poultry diseases. Seroepidemiology. E-mail: shietala@cvdls.ucdavis.edu

DAVID HIRD, Department of Medicine and Epidemiology. Quantitative epidemiologic studies and surveillance systems of health and productivity in livestock in the US and Latin America. E-mail: dwhird@ucdavis.edu

PHILIP KASS, Department of Population Health and Reproduction. Observational study design and inference, analytic epidemiology, biostatistics, public health and companion animal epidemiology; epidemiologic studies of animal models of human health hazards and outcomes. E-mail: phkass@ucdavis.edu

NICHOLAS LERCHE, California Regional Primate Research Center. Epidemiology and pathogenesis of retrovirus infections in nonhuman primates; development of nonhuman primate models of human disease; methods of diagnosis, control and eradication of infectious diseases in populations of captive primates; epidemiology of zoonotic diseases; ecology of parasites and infectious diseases and their impact of free-living populations of wild primates and other vertebrate species. E-mail: nwlerche@primate.ucdavis.edu

JONNA MAZET, Wildlife Health Center. Effects of petroleum products on wildlife, development of diagnostic tests for free-ranging wildlife, marine ecotoxicology, use of key wildlife species as biomarkers of environmental health. E-mail: jkmazet@ucdavis.edu

JOAN DEAN ROWE, Department of Population Health and Reproduction. Epidemiologic aspects of reproductive performance in ruminants; epidemiology of caprine lentivirus infection. Bovine protozoal abortion. E-mail: jdrowe@ucdavis.edu

MARK THURMOND, Department of Medicine and Epidemiology. Application of prospective study designs and survival analyses in identifying and quantifying constraints to health of cattle populations. E-mail: mcthurmond@ucdavis.edu


Statistics

RAHMAN AZARI, Department of Statistics. Categorical data analysis, time series analysis. E-mail: asazari@ucdavis.edu

CHRISTIANA DRAKE, Department of Statistics. Biostatistics, epidemiologic studies. E-mail: cmdrake@ucdavis.edu

WESLEY JOHNSON, Department of Statistics. Bayesian methods, categorical data analysis, diagnostics, prediction, screening test methodology, survival analysis. E-mail: wojohnson@ucdavis.edu

HANS-GEORG MUELLER, Department of Statistics. Biostatistics, regression analysis, survival analysis, nonparametric curve estimation. E-mail: hgmueler@ucdavis.edu

ROBERT SHUMWAY, Department of Statistics. Time series applications. E-mail: rhshumway@ucdavis.edu

JESSICA UTTS, Department of Statistics. Application of statistics to various areas, including but not limited to medicine. E-mail: jmutts@ucdavis.edu
APPENDIX A

GUIDANCE COMMITTEE
GRADUATE GROUP IN EPIDEMIOLOGY

Student: __________________________________________  Degree Objective: _______

1. __________________________________, Chair
   Signature

2. __________________________________
   Signature

3. ____________________________________
   Signature

Graduate Adviser __________________________________
   Signature
APPENDIX B
SUGGESTED AREAS OF EMPHASIS

1. Infectious Disease Epidemiology

Strongly recommended
EPI 222 Epidemiological modeling (3)
VME 217 Evaluation of diagnostic tests (2)

Electives
ENT 153 Medical Entomology (4)
ENT 156 Biology of Parasitism (3)
IDI 280 Molecular Pathobiology for Diagnosis and Therapy of Human and Animal Diseases (3)
MMI 107 Chemical and Cellular Immunology (4)
MMI 115 Ecological Parasitology (3)
MMI 200D Mechanisms of Microbial Interactions with Hosts (3)
MMI 407 Chemical and cellular immunology (4)
MMI 409 Current immunology (2)
MMI 480A Medical immunology (2.5)
MIC 162 General Virology (4)
MIC 210 Molecular Mechanisms of Microbial Pathogenesis (3)
MIC 215 Recombinant DNA (2)
PMI 126 Fundamentals of Immunology (3)
PMI 126L Immunology Laboratory (2)
PMI 128 Biology of Animal Viruses (3)
PMI 270 Advanced immunology (3)
PHR 212 Epidemiology of the zoonoses (4)

2. Health Services and Health Economics

Required
AGE 100A Intermediate microeconomics (4)
AGE 100B Intermediate microeconomics (4)
or
VME 255 Animal Health Economics (3)
and either
AGE 252 Applied linear programming (4)
or
AGE 256 Applied econometrics (4)

Electives
AGE 130 Agricultural markets (4)
AGE 204 Microeconomic analysis (5)
AGE 215A Agriculture and economic development (4)
AGE 215B Open macroeconomics of development (4)
AGE 215C Empirical approaches to development analysis (4)
AGE 221 Agricultural policy in developed countries (4)
AGE 222 International agricultural trade and policy (4)
AGE 240A Econometric methods (4)
AGE 240B Econometric methods (4)
AGE 240C Econometric theory (4)
AGE 253 Optimization techniques with economic applications (4)
AGE 254 Dynamic optimization techniques for economic systems with applications (4)
AGE 255 Systems analysis and simulation (3)
3. Epidemiologic Methods and Biostatistics

PHR 203  Multivariate biostatistics (3)
EPI 222  Epidemiologic modeling (3)
EPI 223  Spatial epidemiology (3)
EPI 224  Human and ecologic risk analysis (3)
STA 135  Multivariate data analysis (4)
STA 137  Applied time series analysis (3)
STA 138  Analysis of categorical data (4)
STA 222  Biostatistics III (survival analysis) (4)
STA 223  Biostatistics I (generalized linear models) (4)
STA 224  Biostatistics II (clinical trials and advanced topics) (4)

4. Occupational and Environmental Epidemiology

Strongly recommended
OEH 190C  Research conference in occupational and environmental health (1)
EPI 220  Problems in EPI Study Design (4)
EPI 240  Principles of Injury Epidemiology (3)
EPI 250  Introduction to Clinical Research Design and Epidemiology (1)
EPI 251  Environmental epidemiology (3)
EPI 260  Epidemiology of Chronic Diseases and Aging (3)
EPI 270  Research methods in occupational epidemiology (3)
EPI 271  Epidemiology of diseases and injury in agriculture (3)

Electives
CMH 180  Aging and health (3)
ECI 149  Introduction to air pollution (3)
ETX 101  Principles of environmental toxicology (3)
ETX 112A-B  Toxicants in the environment (3/4)
ETX 114A  Biological effects of toxicants (3)
ETX 131  Air pollutants and inhalation toxicology (3)
ETX 138  Legal aspects of environmental toxicology (3)
ETX 203  Environmental toxicants (4)
PHR 203  Multivariate biostatistics (3)
VME 217  Evaluation of screening tests (2)
HIS 102E  Epidemics in historical perspective
NUT 101  Introduction to nutrition and metabolism (4)
NUT 110  Principles of nutrition (5)
PMB 210  Introduction to human pathology (4.5)
PTX 201  Principles of pharmacology and toxicology I (5)
PTX 202-3  Effects of drugs and toxicants on body systems and organs II & III (5)
PTX 230  Advanced topics in pharmacology and toxicology (1-3)
NBP 121&L  Physiology of reproduction (3/1)
PHR 231  Pathophysiology of mammalian reproductive processes (3)
PHR 292  Current topics in reproduction (1)
5. **Nutritional epidemiology**

**Prerequisite**
Nut 101, 112, 113 (8)

**Strongly recommended**
EPI 222  Epidemiological modeling (3)
VME 217 Evaluation of diagnostic tests (2)
**and either**  Nut 219A and 219B (6)
**or two of**  Nut 201, 202, 203, 204, FST 211 (4)

Students with prior training in nutrition may elect to waive the required nutrition courses providing adequate documentation is provided.

**Electives**
NUT 201  Vitamin metabolism (2)
NUT 202  Advanced nutritional energetics (2)
NUT 203  Advanced protein and amino acid nutrition (2)
NUT 204  Mineral metabolism (2)
NUT 219A/B  International nutrition (6)
NUT 258  Field research methods (3)
NUT 252  Nutrition and development (3)
FST 211  Lipids: chemistry and nutrition (3)
NUT 118  Community nutrition (4)

6. **Wildlife Epidemiology**

**Prerequisites**
EVE 101  Introduction to Ecology (4)
WFB 122  Populations dynamics and estimation (4)

**Strongly recommended**
ECL 204B  Population and community ecology (4)

**Electives**
PMI 294  Issues in conservation biology and veterinary medicine (1)
ECL 200A  Principles and applications of ecological theory (4)
ECL 200B  Principles and applications of ecological theory (4)
ECL 205  Structure of ecologic communities (4)
ECL 208  Conservation biology (4)
ECL 212A/B  Environmental policy analysis (4)
ECL 232  Theoretical ecology (3)
VMD 405  Veterinary parasitology (3.6)
PMI 418  Diseases of free-ranging wildlife (2)
PMI 418L  Wildlife disease field investigations (3)
ENT 225  Terrestrial field ecology (4)
ENT 153  Medical entomology (4)
ENT 253  Advanced medical entomology (3)
EST 161  Environmental law (4)
EST 128(+Lab)  Systems simulation (3/2)
EST 121  Population ecology (4)
MMI 115  Ecological parasitology (2)
MMI 116  Parasitology for wildlife biologists (2)
WFB 151  Wildlife ecology (3)
WFB 153  Wildlife ecotoxicology (4)
WFB 222  Advanced population dynamics (3)
7. **Zoonotic and Vector-borne diseases**

**Strongly recommended**
- WFB 293 Seminar in wildlife disease ecology (2)

**Electives**
- PHR 212 Epidemiology of the zoonoses (4)
- VME 222 Epidemiological modeling (3)
- VME 217 Evaluation of diagnostic tests (2)
- ENT 153 Medical entomology (4)
- ENT 253 Advanced medical entomology (3)
- ENT 156 Biology of parasitism (3)
Appendix C  
Required Courses

<table>
<thead>
<tr>
<th>COURSE NO.</th>
<th>TITLE</th>
<th>OFFERED</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 16A,B</td>
<td>Short calculus</td>
<td>F,W,S</td>
<td>3 - 3</td>
</tr>
<tr>
<td>or</td>
<td>Calculus</td>
<td>F,W,S</td>
<td>4 - 4</td>
</tr>
<tr>
<td>STA 102</td>
<td>Introduction to Probability Modeling and Statistical Inference</td>
<td>F,S</td>
<td>4</td>
</tr>
<tr>
<td>STA 106</td>
<td>Applied Statistical Methods; Analysis of Variance, ANOVA</td>
<td>F,W</td>
<td>4</td>
</tr>
<tr>
<td>STA 108</td>
<td>Applied Statistical Methods; Regression Analysis</td>
<td>F,W,S</td>
<td>4</td>
</tr>
<tr>
<td>or</td>
<td>Medical Statistics I</td>
<td>Summer</td>
<td>4</td>
</tr>
<tr>
<td>MPM 403</td>
<td>Medical Statistics II</td>
<td>Fall</td>
<td>4</td>
</tr>
</tbody>
</table>

**REQUISITE COURSES**

<table>
<thead>
<tr>
<th>COURSE NO.</th>
<th>TITLE</th>
<th>OFFERED</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPI 204</td>
<td>Statistical Models, Methods &amp; Data Analysis For Scientists</td>
<td>S</td>
<td>4</td>
</tr>
<tr>
<td>EPI 205A</td>
<td>Principles of Epidemiology</td>
<td>F</td>
<td>4</td>
</tr>
<tr>
<td>EPI 205B</td>
<td>Integration of Basic Epidemiologic Concepts</td>
<td>F</td>
<td>2</td>
</tr>
<tr>
<td>EPI 206</td>
<td>Epidemiologic Study Design</td>
<td>W</td>
<td>3</td>
</tr>
<tr>
<td>EPI 207</td>
<td>Adv Concepts in Epidemiologic Study Design</td>
<td>S</td>
<td>4</td>
</tr>
<tr>
<td>EPI 208*</td>
<td>Analysis &amp; Interpretation Epidemiologic Data</td>
<td>F</td>
<td>3</td>
</tr>
<tr>
<td>STA 130A</td>
<td>Mathematical Statistics: Brief Course</td>
<td>F</td>
<td>4</td>
</tr>
<tr>
<td>STA 130B</td>
<td>Mathematical Statistics: Brief Course</td>
<td>W</td>
<td>4</td>
</tr>
<tr>
<td>PHR 202</td>
<td>Sampling in Health-Related Research</td>
<td>W (alt yrs-01)</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td>Sampling Theory of Surveys</td>
<td>F (alt yrs-01)</td>
<td>3</td>
</tr>
<tr>
<td>EPI 290</td>
<td>Seminars in Epidemiology</td>
<td>F,S</td>
<td>1</td>
</tr>
<tr>
<td>a.</td>
<td>(Present Research Proposal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>(Present Defense of Thesis or Dissertation)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ELECTIVES**

PhD: 12 units required, 9 in the Area of Emphasis.
MS: 9 units required in the Area of Emphasis.

*Epi 208 not required for Master’s students; EPI 208 replacement course required.
APPENDIX D
Research Proposal
(An Outline)

Project Investigator

Project Title
A brief, clear, specific designation of the subject of the research. The title, used by itself, should reflect the objectives and scope of the project.

Project Summary
The proposal must contain a project summary, not to exceed one page single-spaced. The summary is not intended for the general reader; consequently, it may contain technical language comprehensible by persons in disciplines relating to the subject of the project. The project summary should be a self-contained, with a specific description of the activity to be undertaken and should focus on:

- Overall project goal(s) and supporting objectives;
- Plans to accomplish project goal(s); and
- Relevance of the project to potential long-range improvement in plant, animal, and/or human health.

Project Description
The text of the project description should not exceed 15 single spaced pages. All proposals should be submitted on standard 8-1/2" X 11" paper with typing on one side of the page only. In addition, margins must be at least 1", type size should be 12 characters per inch or larger, and there should be no page reductions. Applicants are encouraged to include original illustrations (photographs, color prints, etc.) to all copies of the proposal. Reviewers are not required to read beyond the 15-page limit. The project description must contain the following components:

- **Introduction.** A clear statement of the long-term goal(s) and supporting objectives of the proposed project should be included. The most significant published work in the field under consideration, including the work of key project personnel on the current application, should be reviewed. The current status of research in this field of science also should be described. Preliminary data pertinent to the proposed research should be included in this section. All work cited, including that of key personnel, should be referenced. Indicate the additional knowledge needed, which the project is expected to provide.

- **Rationale and Significance.** Present concisely the rationale behind the proposed research. The objectives' specific relationship to the potential long-range improvement in plant, animal, and/or human health should be shown clearly. Any novel ideas or contributions that the proposed project offers also should be discussed in this section. The facts and reasoning that logically support the hypothesis should be stated clearly (What is the factual and logical justification for each hypothesis?).

- **Hypothesis.** Provide a clear, logically arranged, and succinct statement of each research hypothesis being tested. For each, also provide the respective alternative hypothesis.

- **Experimental Plan.** For each hypothesis describe the following:
  - A description of the investigations and/or experiments proposed in the sequence in which the investigations or experiments are to be performed including the personnel involved in each procedure;
  - Describe all sources of bias (error) that may be present and specifically how the bias will be avoided, corrected, or controlled. Provide calculations for estimation of sample sizes;
  - Techniques to be used in carrying out the proposed project, including
the feasibility of the techniques;
- Results expected (provide examples);
- Means by which experimental data will be analyzed or interpreted;
- Means of applying results or accomplishing technology transfer, where appropriate;
- Pitfalls that may be encountered;
- Limitations to proposed procedures; and
- A tentative schedule for conducting major steps involved in these investigations and/or experiments. Provide an estimate of the maximum time likely to be required to complete the project and publish results.

In describing the experimental plan, the application must explain fully any materials, procedures, situations, or activities which may be hazardous to personnel (whether or not they are directly related to a particular phase of the proposed project), along with an outline of precautions to be exercised to avoid or mitigate the effects of such hazards.

Facilities and Equipment
All facilities and major items of equipment that are available for use or assignment to the proposed project during the requested period of support should be described. In addition, items of nonexpendable equipment necessary to conduct and successfully conclude the proposed project should be listed.

Budget
A detailed budget is required for each year of study. In addition, a summary budget is required detailing support for the overall project period.
A. Salaries and Wages - Salaries of the principal investigator and other personnel associated directly with the project should constitute direct costs in proportion to their effort devoted to the research. Charges by academic institutions for work performed by faculty members during the summer months or other period outside the base salary period are to be at a monthly rate not in excess of that which would be applicable under the base salary and other provisions of the applicable cost principles.

For other personnel (graduate students, technical, clerical, etc.), only the total number of persons and total amount of salaries per year in each category are required. Salaries requested must be consistent with the regular practices of the institution.
B. Fringe Benefits - If the usual accounting practices of the performing organization provide that the organizational contributions to employee "benefits" (social security, retirement, etc.) be treated as direct costs, award funds may be requested to defray such expenses as a direct cost.
C. Materials and Supplies - The types of expendable materials and supplies required should be indicated in general terms with estimated costs.
D. Travel - The type and extent of travel and its relationship to the research should be briefly specified. Funds may be requested for fieldwork or for travel to scientific meetings.
E. Publication Costs/Page Charges - Costs of preparing and publishing the results of research conducted under the award, including costs of reports, reprints, page charges or other journal costs, and necessary illustrations, may be included.
F. Computer Costs - The cost of computer services, including computer-based retrieval of scientific and technical information may be requested. A justification based on the established computer service rates at the proposing organization should be provided. Reasonable costs of leasing automatic data processing equipment may be requested, if justified.
G. All Other Direct Costs - Other anticipated direct costs not included above should be itemized. Examples are subawards or subcontracts, space rental at research establishments away from the performing organization, and service charges. Reference books and periodicals may be charged to
the award only if they are related specifically the research project.

Consultant services should be included in this section. Applicants normally are expected to utilize the services of their own staff to the maximum extent possible in managing and performing the activities supported by awards. If the need for consultant services is anticipated, the proposal narrative should provide appropriate rationale and the proposal budget should estimate the amount of funds which may be required for this purpose. List the names of consultant(s), the name of their organization(s) and, to the extent possible, a breakdown of the amount being charged to the award (For example: services, per diem, etc.).

**Budget Justification**

All salaries and wages, nonexpendable equipment, foreign travel, and “All Other Direct Cost” for which support is requested must be individually listed (with costs) and justified on a separate sheet of paper.

**Current and Pending Support**

The proposal must list any other current public or private research support (including in-house support) to which key personnel identified in the proposal have committed portions of their time, whether or not salary support for the person(s) involved is included in the budget. Analogous information must be provided for any pending proposals, including this proposal, that are now being considered by, or that will be submitted in the near future to, other possible sponsors.

**Assurance Statements**

If the project is expected to involve recombinant DNA molecules, human subjects at risk, or experimental vertebrate animals:

- **Recombinant DNA and RNA Molecules.** All key personnel identified in a proposal and all endorsing officials of a proposed performing entity are required to comply with the guidelines established by the National Institutes of Health entitled, “Guidelines for Research Involving Recombinant DNA Molecules”, as revised.

- **Human Subjects at Risk.** Responsibility for safeguarding the rights and welfare of human subjects used in any proposed project supported with grant funds provided by the NRICGP rest with the performing entity. The applicant must submit a statement certifying that the project plan has been reviewed and approved by the Institutional Review Board at the proposing organization or institution.

- **Experimental Vertebrate Animal Care.** The responsibility for the humane care and treatment of any experimental vertebrate animal, which has the same meaning as “animal” in section 2(g) of the Animal Welfare Act of 1966, as amended (7 U.S.C. 2132(g)), used in any project supported with NRICGP funds rests with the performing organization. In this regard, all key personnel associated with any supported project and all endorsing officials of the proposed performing entity are required to comply with applicable provisions of the Animal Welfare Act of 1966, as amended (7 U.S.C. 2131 et seq.), and the regulations promulgated thereunder by the Secretary of Agriculture in 9 CFR parts 1, 2, 3, and 4. In this regard, the applicant must submit a statement certifying that the proposed project is in compliance with the aforementioned regulations, and that the proposed project is either under review by or has been reviewed and approved by an Institutional Animal Care and Use Committee.

**Personnel**

List the leader or leaders and other technical workers assigned and % of effort.

**Literature Cited**

Provide a reference list of pertinent literature cited in the proposal.