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COURSE REQUIREMENTS

NOTE: From the first quarter of graduate study to the last, students are required to enroll in no less than 12 units per quarter. This is achieved by combining required courses and electives, which carry a fixed number of units, with laboratory research (596-599 courses). While required courses and electives have fixed unit values, the unit value for courses numbered 596-599 will equal the number of units needed, in addition to required courses and electives, to reach the required 12 units per quarter.

PROGRAM FOR DIRECT ADMIT AND GRADUATE PROGRAMS IN BIOSCIENCES (GPB) STUDENTS

First-year students take three one-quarter laboratory rotations together with the courses listed below.

- Mol Bio 254 A, B, C, D Concepts in Molecular Biosciences (3 units each)
- MIMG CM234 Ethics and Accountability in Biomedical Research (2 units)
- 200 Level Electives (2-4 units)
- 596 Research Rotations (2-6 units)

By the beginning of the second year, students shall have chosen a mentor. Two quarters of teaching (“TA-ship”) are required as per GPB policy; it is recommended to carry out one each in the second and third years. Students must enroll in the 375 course of the department for which they will teach, and must also take the 495 TA Training course offered by that department.

Students are required to take one of the following-

- Hum Gen 236A
- Hum Gen 236C

To complete the 12 units per quarter, students can take electives, and one of the following-

- Hum Gen 596 Lab Research
- Hum Gen 597 Preparation for PhD Qualifying Exam (Students who have taken their First Exam)
- Hum Gen 599 Dissertation Research (Students who have Advanced to Candidacy)
REQUIRED COURSES

- **236A. Advanced Human Genetics A: Molecular Aspects.** (4 units) Lecture, three hours. Recommended preparation: prior knowledge of basic concepts in molecular biology and genetics. Advanced topics in human genetics related to molecular genetics and relevant technologies. Topics include genomic technologies, human genome, mapping and identification of disease-causing mutations, transcriptomics, proteomics, functional genomics, epigenetics, and stem cells. Reading materials include original research articles and reviews or book chapters. Letter grading. *(Fall)*

- **236C. Societal and Medical Issues in Human Genetics** (5 units) Lecture, three hours; discussion, two hours. Sequence of entire human genome is now known. Consideration of how this knowledge impacts concepts of ourselves as individuals and of our place in biological universe; concepts of race/ethnicity and gender; ability of DNA-based forensics to identify specific individuals; ownership and commodification of genes; issues of privacy and confidentiality; issues of genetic discrimination; issues of predictive genetic testing. Discussion of human cloning for reproductive and therapeutic purposes. Exposure to medical genetics cases. Discussion of the role of whole genome sequencing in the clinical setting. Human Genome Project influence on medicine and on our concepts of self and identity. Letter grading. *(Spring)*

- **CM234. Ethics and Accountability in Biomedical Research.** (2 units) (Same as Microbiology and Immunology CM234.) Designed for graduate students and undergraduates who have credit for a life sciences or biomedical individual studies 199 course. Responsibilities and ethical conduct of investigators in research, data management, mentorship, grant applications, and publications. Responsibilities to peers, sponsoring institutions, and society. Conflicts of interest, disclosure, animal subject welfare, human subject protection, and areas in which investigational goals and certain societal values may conflict. Concurrently scheduled with course C134. S/U grading. *(Spring when offered)*

- **254A Concepts in Molecular Biosciences.** (3 units) (Formerly numbered Biological Chemistry 254A.) Lecture, three hours; discussion, two hours. Limited to human genetics and molecular biology graduate students. Five-week course covering four basic experimental approaches of biochemistry and molecular biology in context of various specific topics, including (1) structural biology, with protein and nucleic acid structure and molecular recognition, (2) use of cell-free and purified in vitro systems to dissect reaction mechanisms, (3) biochemical approaches to dissecting complex reactions/pathways in cells, and (4) enzymology and protein chemistry. Letter grading. *(Fall)*

- **254B Concepts in Molecular Biosciences.** (3 units) (Formerly numbered Biological Chemistry 254B.) Five-week course. Lecture, three hours; discussion, two hours. Enforced requisite: course 254A. Important biological problems that have been genetically analyzed in different organisms or small number of related problems. Major genetic approaches used in relevant organisms, including both forward and reverse genetic approaches, genetic interactions between genes (genetic enhancers and suppressors), transgenic technology, and systematic genomic strategies. Letter grading.

- **M254C Concepts in Molecular Biosciences.** (3 units) (Formerly numbered Biological Chemistry 254C.) Five-week course. Lecture, three hours; discussion, two hours. Enforced requisites: courses
254A, 254B. Molecular mechanisms underlying complex problems in cell biology. Experimental approaches used to define mechanisms involved in protein targeting, cell structure, and subcellular organization, cell communication, and intracellular signaling. Analysis of pathways that connect these cellular processes. Letter grading. (Winter)

- **M254D Concepts in Molecular Biosciences.** (3 units) (Formerly numbered Biological Chemistry 254D.) Five-week course. Lecture, three hours; discussion, two hours. Enforced requisites: courses 254A, 254B, 254C. Application of biochemical, molecular biological, genetic, and cell biological approaches to understand specialized topics in life and biomedical sciences, including developmental disease, stem cell biology, synaptic transmission in nervous system, cancer, and heart disease. Letter grading.

- **375. Teaching Apprentice Practicum.** (1 - 4 units) Credit for being a TA—each time the student teaches, s/he enrolls in that department’s 375 course.

- **495. Preparation for Teaching.** (2 units) Credit for being a TA—each time the student teaches, s/he enrolls in that department’s 495 course.

- **596. Directed Individual Research in Human Genetics.** (4 - 12 units) S/U

- **597. Preparation for M.S. Comprehensive Examination or Ph.D. Qualifying Examinations.** (2 - 12 units) S/U

- **598. Thesis Research for M.S. Candidates.** (2 to 12 units) S/U

- **599. Research for and Preparation of Ph.D. Dissertation.** (4 - 12 units) S/U
ELECTIVE COURSES

Biostatistics

- **M203. Stochastic Models in Biology.** (4 units) (Formerly numbered 203.) (Same as Human Genetics M203.) Lecture, four hours. Requisite: Mathematics M170A or equivalent experience in probability. Mathematical description of biological relationships, with particular attention to areas where conditions for deterministic models are inadequate. Examples of stochastic models from genetics, physiology, ecology, and a variety of other biological and medical disciplines. S/U or letter grading. *(Winter)*

- **M207A. Theoretical Genetic Modeling.** (4 units) (Same as Biostatistics M272, and Human Genetics M207A.) Lecture, three hours; discussion, one hour. Preparation: coursework equivalent to Mathematics 115A, 131A. Mathematical models in statistical genetics. Topics include population genetics, genetic epidemiology, gene mapping, design of genetics experiments, DNA sequence analysis, and molecular phylogeny. S/U or letter grading. *(Fall)*

- **M207B. Applied Genetic Modeling.** (4 units) (Same as Biostatistics M237B, and Human Genetics M207B.) Lecture, two hours; laboratory, two hours. Preparation: coursework equivalent to Biostatistics 110A, 110B. Methods of computer-oriented genetic analysis. Topics may include segregation analysis, parametric and nonparametric linkage analysis, quantitative methods, and phylogenetics. Laboratory for hands-on computer analysis of genetic data; laboratory reports required. Course complements M207A; students may take either and are encouraged to take both. S/U or letter grading. *(Winter)*

Biostatistics

- **M272A. Theoretical Genetic Modeling.** (4 units) (Same as Biomathematics M207A, and Human Genetics M207A.) Lecture, three hours; discussion, one hour. Preparation: coursework equivalent to Mathematics 115A, 131A. Mathematical models in statistical genetics. Topics include population genetics, genetic epidemiology, gene mapping, design of genetics experiments, DNA sequence analysis, and molecular phylogeny. S/U or letter grading. *(Fall)*

- **M237B. Applied Genetic Modeling.** (4 units) (Same as Biomathematics M207B, and Human Genetics M207B.) Lecture, two hours; laboratory, two hours. Preparation: coursework equivalent to Biostatistics 110A, 110B. Methods of computer-oriented genetic analysis. Topics may include segregation analysis, parametric and nonparametric linkage analysis, quantitative methods, and phylogenetics. Laboratory for hands-on computer analysis of genetic data; laboratory reports required. Course complements M207A; students may take either and are encouraged to take both. S/U or letter grading. *(Winter)*

- **M278. Statistical Analysis of DNA Microarray** (4 units) (Same as Human Genetics M278) Lecture, three hours. Requisites: Biostatistics 200C, its equivalent, or consent of the instructor. The course seeks to provide instruction in the use of statistical tools used to analyze micro-array data. We will explore data normalization, cluster analysis and prediction methods. The structure will correspond to the analytical protocol an investigator might follow when working with microarray data. The final project will give the students an opportunity to analyze a microarray data set. *(Fall, Spring)*
Human Genetics

- **M207A. Theoretical Genetic Modeling.** (4 units) (Same as Biomathematics M207A and Biostatistics M272.) Lecture, three hours; discussion, one hour. Preparation: coursework equivalent to Mathematics 115A, 131A. Mathematical models in statistical genetics. Topics include population genetics, genetic epidemiology, gene mapping, design of genetics experiments, DNA sequence analysis, and molecular phylogeny. S/U or letter grading. **(Fall)**

- **M207B. Applied Genetic Modeling.** (4 units) (Same as Biomathematics M207B and Biostatistics M237B.) Lecture, two hours; laboratory, two hours. Preparation: coursework equivalent to Biostatistics 110A, 110B. Methods of computer-oriented genetic analysis. Topics may include segregation analysis, parametric and nonparametric linkage analysis, quantitative methods, and phylogenetics. Laboratory for hands-on computer analysis of genetic data; laboratory reports required. Course complements M207A; students may take either and are encouraged to take both. S/U or letter grading. **(Fall)**

- **CM222. Mouse Molecular Genetics.** (2 units) (Same as Microbiology Immunology and Molecular Genetics M222.) Lecture, two hours. Requisite: Life Science 3, 4. Strongly recommended CM 248. Emphasis on the use of mouse genetic approach to studying fundamental biological questions. Topics include mouse genome and functional genomics, mutagenesis screening and cloning of disease genes, transgenesis and its application in developmental biology, stem cell biology, neurobiology, and modeling human genetic disorders. Reading materials include original papers and reviews. **(Spring)**

- **C244. Genomic Technologies.** (4 units) Lecture, three hours; discussion, one hour. This course surveys the key technologies that have led to the successful application of genomics in biology focusing on the theory behind specific genome-wide technologies and their current applications. **(Fall)**

Microbiology & Immunology

- **M261. Molecular and Cellular Immunology.** (6 units) (Same as Microbiology M261 and Molecular, Cell, and Developmental Biology CM261.) Lecture, four and one-half hours; discussion, 90 minutes. Requisite: Biological Chemistry. **(Spring)**

- **M294. Molecular Basis of Cancer.** (4 units) (Same as Pathology M294.) Lecture, three hours. Requisites: course M229, Biological Chemistry CM253, CM267, Neurobiology M209A. Fundamental biological, genetic, and molecular process involved in genesis and growth of cancer cells and diagnosis, characterization, and treatment of cancer. **(Spring when offered)**

Molecular, Cell & Developmental Biology

- **M230B. Structural Molecular Biology.** (4 units) (Same as Chemistry M230B.) Lecture, three hours; discussion, one hour. Requisites: Mathematics 3C, Physics 6C. Selected topics from principles of biological structure; structures of globular proteins and RNAs; structures of fibrous proteins, nucleic acids, and polysaccharides; harmonic analysis and Fourier transforms; principles of electron, neutron, and X-ray diffraction; optical and computer filtering; three-dimensional reconstruction. S/U or letter grading. **(Winter)**
Molecular & Medical Pharmacology

- **288. Gene Therapy.** (4 units) Lecture, three hours; discussion, one hour. Introduction to basic concepts of gene therapy, wherein treatment of human disease is based on transfer of genetic material into an individual. Molecular basis of disease, gene delivery vectors, and animal models. Letter grading. *(Spring)*

Neurobiology

- **M204. Cell, Molecular, and Developmental Neurobiology.** (6 units) (Same as Molecular, Cell, and Developmental Biology M220 and Neuroscience M201.) Lecture, six hours. Fundamental topics concerning cellular, developmental, and molecular neurobiology, including intracellular signaling, cell-cell communication, neurogenesis and migration, synapse formation and elimination, programmed neuronal death, and neurotropic factors. *(Fall)*

Pathology and Laboratory Medicine

- **M255. Mapping and Mining the Human Genome.** (3 units) Lecture, 90 minutes; discussion, 90 minutes. Basic molecular genetic and cytogenetic techniques of gene mapping. Selected regions of human genomic map scrutinized in detail, particularly gene families and clusters of genes that have remained linked from mouse to human. Discussion of localizations of disease genes. S/U or letter grading. *(Spring)*

Physiological Science

- **M227. Neuroendocrinology of Reproduction.** (4 units) (Same as Neurobiology M227.) Lecture, three hours; discussion, one hour. Didactic presentations and discussion of developmental, anatomical/histological, physiological, cellular, and molecular aspects of reproductive system and functional integration of neuroendocrine-reproductive axis. *(Winter)*

Computer Science Courses

- **CS 240A. Databases and Knowledge Bases.** (4) Lecture, four hours; outside study, eight hours. Requisite: course 143. Theoretical and technological foundation of Intelligent Database Systems, which merge database technology, knowledge-based systems, and advanced programming environments. Rule-based knowledge representation, spatio-temporal reasoning, and logic-based declarative querying/programming are salient features of this technology. Letter grading. *(Winter)*

- **CS 241A. Object-Oriented and Semantic Database Systems.** (4) Lecture, three and one-half hours; recitation, 30 minutes; laboratory, one hour; outside study, eight hours. Requisite: course 143. Object and database principles. Data models and accessing. Database systems architecture and functional components. Extended relational systems. Object and semantic systems. Systems comparison. Database design, organization, indexing, and performance. Other topics at discretion of instructor. Letter grading. *(Fall)*

- **CS 262A. Reasoning with Partial Beliefs.** (4) Lecture, four hours; outside study, eight hours. Requisite: course 112 or Electrical Engineering 131A. Review of several formalisms for representing and managing uncertainty in reasoning systems; presentation of comprehensive description of Bayesian inference using belief networks representation. S/U or letter grading. *(Fall)*
• **CS 280A-280ZZ. Algorithms. (4 each)** Lecture, four hours; outside study, eight hours. Requisite: course 180. Additional requisites for each offering announced in advance by department. Selections from design, analysis, optimization, and implementation of algorithms; computational complexity and general theory of algorithms; algorithms for particular application areas. Subtitles of some current sections: Principles of Design and Analysis (280A); Distributed Algorithms (280D); Graphs and Networks (280G). May be repeated for credit with consent of instructor and with topic change. Letter grading. (Fall, Winter, Spring)

• **Math 270A. Techniques of Scientific Computing.** Mathematical modeling for computer applications, scientific programming languages, software development, graphics, implementation of numerical algorithms on different architectures, case studies. (Fall)

**Mathematics/Statistics Courses**

• **Human Genetics M207A. Theoretical Genetic Modeling . (4)** (Same as Biomathematics M207A and Biostatistics M237A.) Lecture, three hours; discussion, one hour. Preparation: coursework equivalent to Mathematics 115A, 131A. Mathematical models in statistical genetics. Topics include population genetics, genetic epidemiology, gene mapping, design of genetics experiments, DNA sequence analysis, and molecular phylogeny. S/U or letter grading. (Fall)

• **Human Genetics M207B. Applied Genetic Modeling . (4)** (Same as Biomathematics M207B and Biostatistics M237B.) Lecture, two hours; laboratory, two hours. Preparation: coursework equivalent to Biostatistics 110A, 110B. Methods of computer-oriented genetic analysis. Topics may include segregation analysis, parametric and nonparametric linkage analysis, quantitative methods, and phylogenetics. Laboratory for hands-on computer analysis of genetic data; laboratory reports required. Course complements M207A; students may take either and are encouraged to take both. S/U or letter grading. (Winter)
SEMINARS

Biological Chemistry

- **251A-251B-251C. Seminars: Transcriptional Regulation.** (2 units each) Advanced courses on mechanics of gene transcription in both eukaryotes and prokaryotes intended for students actively working or highly interested in transcription. S/U grading. *(Fall/Winter/Spring)*

- **M266A-M266B-M266C. Seminars: Molecular Embryology.** (2 units each) (Same as Molecular, Cell, and Developmental Biology M266A-M266B-M266C.) Advanced course in developmental genetics and biochemistry, with emphasis on early development. Intended mostly for students actively working or highly interested in embryology. S/U grading. *(Fall/Winter)*

Microbiology, Immunology, and Molecular Genetics

- **M262A. Seminar: Current Topics in Immunobiology of Cancer.** (2 units) (Same as Microbiology and Immunology M262A.) Review of recent literature in immunology, biology, and biochemistry of cancer, with emphasis on fundamental studies involving cell-mediated immunity, humoral response, tumor specific antigens, and new techniques. Discussion of reports on scientific meetings. May be repeated for credit. S/U or letter grading. *(Fall)*

Molecular Biology

- **298. Seminar: Current Topics in Molecular Biology.** (2 units) (Formerly numbered M298.) Students conduct and participate in discussions on assigned topics. May be repeated for credit. S/U or letter grading. *(Spring)*

Molecular, Cell, and Developmental Biology

- **M266A-M266B-M266C. Seminars: Molecular Embryology.** (2 units each) (Same as Biological Chemistry M266A-M266B-M266C.) Advanced course in developmental genetics and biochemistry, with emphasis on early development. Intended mostly for students actively working or highly interested in embryology. S/U grading. *(Fall/Winter/Spring)*

Neurobiology

- **M270A-M270B-M270C. Cell, Molecular, and Integrative Biology Seminars.** (2 units each) (Same as Physiology M270A-M270B-M270C.) Seminar, one hour; discussion, one hour. Designed for graduate students. Presentation of weekly seminars and discussion on current topics in cell and molecular biology by faculty members from Neurobiology, Physiology, and other UCLA departments, in addition to invited lecturers. S/U grading. *(Fall/Winter/Spring)*
* * * * * *

**Supplemental Educational Activities**

In addition to the courses and seminars described above, the Department of Human Genetics organizes the following activities in which all graduate students should participate:

**Monday Seminar Series**

These bi-weekly meetings occur every other Monday from 11:00 AM to 12:00 PM in the Gonda (first floor) conference room. Guest speakers are invited by department faculty to share the latest scientific information in their field.

**Statistical Genetics Round Table**

This monthly meeting brings together our large, expert statistical genetics group to hear a short, informal presentation on a problem area in a current research project, by a local or invited colleague. We then discuss possible solutions to the problem. Research collaborations often result.

**Bioinformatics Special Interest Group**

This monthly meeting discusses practical, hands-on questions on how to use available systems for Bioinformatics research. At each meeting appropriate news items are announced, there is a brief presentation of a new technique, and then attendees ask practical questions on specific tasks, and get advice from the rest of the attendees.

**Stats Club**

Stats Club is a weekly seminar/journal club that meets on Friday mornings from 10-11am. It is an informal meeting where we gather to discuss original research loosely centered on statistical genetics, genomics, gene expression, bioinformatics and related topics. The goal of this meeting is to teach each other about current research in this field.

We are lucky to have regular attendance from professors, post-docs and students with both statistical and biological backgrounds. Each week features a presentation by a different Stat Club member or an invited speaker. We have very interactive discussion.

If you are interested in being added to the email list please contact the department Student Affairs Officer.
Applicable only to students admitted during the 2016-2017 academic year.

**Human Genetics**

**School of Medicine**

**Graduate Degrees**

The Department of Human Genetics offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Human Genetics.

**Master's Degree**

**Advising**

Students entering the master's program are expected to identify a faculty mentor to serve as their adviser. For as long as no faculty mentor is identified, the departmental Faculty Graduate Adviser (appointed by the Chair) will serve as the adviser.

**Areas of Study**

The field of human genetics incorporates multiple areas of modern experimental biology (including but not limited to molecular and behavioral genetics, epigenetics, biochemistry, cell and developmental biology, imaging, and large-scale omics approaches such as genomics, transcriptomics and functional genomics) and of computational biology (including bioinformatics and biostatistics).

**Foreign Language Requirement**

None.

**Course Requirements**

Students are required to take a minimum of one course of the series Human Genetics 236A-236C (or, under exceptional circumstances, an equivalent graduate-level course approved by the Faculty Graduate Adviser) and must complete a course on ethics in research. Elective courses must be taken to complete the minimum of nine courses (36 units) required for the master's degree, with at least five of them (20 units) being at graduate level. No more than two independent study courses (eight units) in the 500 series may be applied toward the minimum course requirement of 36 units for the master's degree, and only one of these (four units) may be applied toward the minimum requirement of 20 units in graduate courses.

**Teaching Experience**

Not required.

**Field Experience**

Not required.

**Comprehensive Examination Plan**

None.

**Thesis Plan**

*Every master's degree thesis plan requires the completion of an approved thesis that demonstrates the student's ability to perform original, independent research.*

A written thesis is required for master's degree students. A thesis committee composed of at least three faculty members helps the student to plan the thesis research and makes a recommendation on granting the terminal degree.

**Time-to-Degree**

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<th>DEGREE</th>
<th>NORMATIVE TIME TO ATC (Quarters)</th>
<th>NORMATIVE TTD</th>
<th>MAXIMUM TTD</th>
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</thead>
<tbody>
<tr>
<td>MS</td>
<td>9</td>
<td>9</td>
<td>24</td>
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**AY 16-17**
Doctoral Degree
Advising
The departmental Faculty Graduate Adviser (appointed by the Chair) will serve as adviser of students who have not yet selected a laboratory for their doctoral studies. Once students select a faculty mentor, typically at the end of the first year, the faculty mentor automatically becomes the student's adviser. A doctoral committee is constituted by the end of the second year, and its members act as additional advisers. Students are expected to meet with that committee at least once a year until graduation.

Major Fields or Subdisciplines
The field of human genetics incorporates multiple areas of modern experimental biology (including but not limited to molecular and behavioral genetics, epigenetics, biochemistry, cell and developmental biology, imaging, and large-scale omics approaches such as genomics, transcriptomics and functional genomics) and of computational biology (including bioinformatics and biostatistics).

Foreign Language Requirement
None.

Course Requirements
During the first year, students take the course series Molecular Biology 254A through 254D, and must complete a course on ethics in research. In subsequent years, students are required to take a minimum of one course of the series Human Genetics 236A-236C or, under exceptional circumstances, an equivalent graduate-level course approved by the Faculty Graduate Adviser.

Teaching Experience
Students teach for two quarters as a teaching assistant in a department of the College of Letters and Science. The teaching is to be performed preferably in years two and three. Students are encouraged to teach in Life Sciences 4 (the genetics component of the Life Sciences Core Curriculum) as teaching a general course in genetics reinforces understanding of fundamental aspects of the field.

Written and Oral Qualifying Examinations
Academic Senate regulations require all doctoral students to complete and pass University written and oral qualifying examinations prior to doctoral advancement to candidacy. Also, under Senate regulations the University oral qualifying examination is open only to the student and appointed members of the doctoral committee. In addition to University requirements, some graduate programs have other pre-candidacy examination requirements. What follows in this section is how students are required to fulfill all of these requirements for this doctoral program.

The Departmental Written Qualifying Examination (also known as the 'First Exam) and the University Oral Qualifying Examination (also known as the 'Second Exam') must be passed before students are advanced to candidacy for the doctoral degree. The two examinations are distinct and cannot be combined into a single examination. Prior to the examinations, students nominate a doctoral committee composed of at least four faculty members following university guidelines which must be approved by the Graduate Division. The faculty mentor is excluded from participating in the Departmental Written Qualifying Examination, which is administered by the remaining members of the doctoral committee. All members of the doctoral committee, including the faculty mentor, administer the University Oral Qualifying Examination.

The Departmental Written Qualifying Examination takes place during early stages of the student's dissertation research project, preferably during the second year, and must be passed by the end of the fourth year in order to avoid a recommendation for termination from the program. The goal of the Departmental Written Qualifying Examination is to evaluate the student's ability to think as a scientist, i.e., to propose and critically evaluate experiments or method developments that would potentially expand knowledge in the principal field of study. To this end, the student writes a
proposal following the style of the National Institutes of Health (NIH) National Research Service Award (NRSA) applications, and, one or two weeks after submission of the written proposal to the doctoral committee, defends the proposal in an oral presentation. The topic of the proposal is related to the ongoing research project of the student in the laboratory of the faculty mentor. However, in the Departmental Written Qualifying Examination the project itself is not under evaluation, as it is expected to be in its early stages. The oral part of the examination consists of a discussion of the proposal and of any additional questions posed by the committee to probe the student's general knowledge and understanding of human genetics.

The University Oral Qualifying Examination should take place before the end of the fourth year in the graduate program, preferably one year earlier. The goal of this examination is to evaluate the dissertation research project, i.e., whether it represents original, independent research and constitutes a distinct contribution to knowledge in the principal field of study, as well as whether it is feasible for the students to complete the project within the expected time-to-degree. To this end, the student submits a written proposal that clearly states the title and specific aims of the doctoral dissertation and explains the significance, progress to date, and the approach(es) and time line to bring the project to completion. One or two weeks after submission of the written component, the student defends the proposal in an oral presentation before the doctoral committee.

Advancement to Candidacy
Students are advanced to candidacy upon successful completion of the written and oral qualifying examinations.

Doctoral Dissertation
Every doctoral degree program requires the completion of an approved dissertation that demonstrates the student's ability to perform original, independent research and constitutes a distinct contribution to knowledge in the principal field of study.

Final Oral Examination (Defense of Dissertation)
Required for all students in the program.

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<tr>
<th>DEGREE</th>
<th>NORMATIVE TIME TO ATC (Quarters)</th>
<th>NORMATIVE TTD</th>
<th>MAXIMUM TTD</th>
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<tbody>
<tr>
<td>PhD</td>
<td>10</td>
<td>16</td>
<td>24</td>
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Individual Development Plan
Each year all students are required to prepare and/or update an Individual Development Plan. An Individual Development Plan is an essential planning tool used to map out academic and professional development throughout graduate school.

Termination of Graduate Study and Appeal of Termination

University Policy
A student who fails to meet the above requirements may be recommended for termination of graduate study. A graduate student may be disqualified from continuing in the graduate program for a variety of reasons. The most common is failure to maintain the minimum cumulative grade point average (3.00) required by the Academic Senate to remain in good standing (some programs require a higher grade point average). Other examples include failure of examinations, lack of timely progress toward the degree and poor performance in core courses. Probationary students (those with cumulative grade point averages below 3.00) are subject to immediate dismissal upon the recommendation of their department. University guidelines governing termination of graduate
students, including the appeal procedure, are outlined in *Standards and Procedures for Graduate Study at UCLA.*

**Special Departmental or Program Policy**

Doctoral students must complete and pass the Departmental Written Qualifying Examination (also known as the 'First Exam') by the end of their fourth year in the program. Students will be allowed two opportunities to pass the examination within the above time frame and if the examination is not passed, the student will be recommended for termination of graduate study.

UCLA is accredited by the Western Association of Schools and Colleges and by numerous special agencies. Information regarding the University's accreditation may be obtain from the Office of Academic Planning and Budget, 2107 Murphy Hall.
FIRST, SECOND, AND FINAL ORAL EXAMINATIONS

Students are required to prepare two short research proposals broadly related to the field of human genetics.

The Departmental Written Qualifying Examination (also known as the 'First Exam') and the University Oral Qualifying Examination (also known as the 'Second Exam') must be passed before students are advanced to candidacy for the doctoral degree. The two examinations are distinct and cannot be combined into a single examination. Prior to the examinations, students nominate a doctoral committee composed of at least four faculty members following university guidelines which must be approved by the Graduate Division. The faculty mentor is excused from participating in the Departmental Written Qualifying Examination, which is administered by the remaining members of the doctoral committee. All members of the doctoral committee, including the faculty mentor, administer the University Oral Qualifying Examination.

The Departmental Written Qualifying Examination takes place during early stages of the student's dissertation research project, preferably during the second year, and must be passed by the end of the fourth year in order to avoid a recommendation for termination from the program. The goal of the Departmental Written Qualifying Examination is to evaluate the student's ability to think as a scientist, i.e., to propose and critically evaluate experiments or method developments that would potentially expand knowledge in the principal field of study. To this end, the student writes a proposal following the style of the National Institutes of Health (NIH) National Research Service Award (NRSA) applications, and, one or two weeks after submission of the written proposal to the doctoral committee, defends the proposal in an oral presentation. The topic of the proposal is related to the ongoing research project of the student in the laboratory of the faculty mentor. However, in the Departmental Written Qualifying Examination the project itself is not under evaluation, as it is expected to be in its early stages. The oral part of the examination consists of a discussion of the proposal and of any additional questions posed by the committee to probe the student's general knowledge and understanding of human genetics.

The University Oral Qualifying Examination should take place before the end of the fourth year in the graduate program, preferably one year earlier. The goal of this examination is to evaluate the dissertation research project, i.e., whether it represents original, independent research and constitutes a distinct contribution to knowledge in the principal field of study, as well as whether it is feasible for the students to complete the project within the expected time-to-degree. To this end, the student submits a written proposal that clearly states the title and specific aims of the doctoral dissertation and explains the significance, progress to date, and the approach(es) and time line to bring the project to completion. One or two weeks after submission of the written component, the student defends the proposal in an oral presentation before the doctoral committee.

The doctoral committee determines whether the student passes each of the two exams, and determines whether a student who fails an exam is allowed to repeat it. Only one re-examination per exam is allowed.
Written Proposal
Copies should be distributed to the doctoral committee member’s two weeks before the oral exam and student should reference the NRSA format proposal guidelines. Each written proposal must include specific aims, the scientific rationale, experimental methods, anticipated results and interpretations, potential future directions, and bibliography. Students will be evaluated on their understanding of the proposed research, on their ability to devise appropriate and original experimental strategies, and on their ability to write clearly and concisely.

Students are encouraged to discuss the proposals with the thesis advisor and other members of the lab, but should write the proposals independently. Criticism of the written proposals may be sought from anyone except the thesis advisor.

Advancement to Candidacy and Subsequent Committee Meetings
Students are advanced to candidacy following satisfactory completion of course requirements and the written and oral qualifying examinations. Advancement occurs when a successful “Report on the Qualifying Oral Exam” is received by the Graduate Division, which is submitted by the department SAO. **Students are responsible for the $90.00 fee (subject to change) that is billed to your BAR Account.**

Once students pass the Oral Qualifying Exam, the student should schedule an annual meeting (Midstream) with the thesis committee so that the committee can assess the student’s progress and provide advice. At each meeting, the student should take 20-30 minutes to present the status of the thesis work, including both positive and negative results.

Timely Progress to Degree
As a policy of the department students are required to meet with their thesis committee at a minimum of once per year for one of the above mentioned exams or to discuss the progress of student’s degree requirements. It is the responsibility of the student to set up these meetings and report them to the SAO and Graduate Student Advisor after they have taken place.

Failure to comply with the time schedule may result in disqualification from the Ph.D. program. Decision to advance the student to candidacy, to allow a student to repeat the oral, or to disqualify a student will be based on the quality of the written proposal, the adequacy of the oral presentation, the student’s overall academic record as reflected in coursework and examinations, and the student’s research ability and productivity.
PREPARING FOR ORALS

Preparing for the First Exam:
1. Obtain a “Nomination of Doctoral Committee” worksheet from HG graduate affairs office.

2. Select at least four committee members (see requirements on back of form).

3. Return completed worksheet to graduate affairs office at least three weeks before the date of the first oral exam.

4. Await approval of the committee from the Graduate Division. The exam cannot take place until the committee has been approved by the Graduate Division.

5. Schedule the exam. Coordinate a time with the committee members and reserve a room (see the Student Affairs Officer).

6. It is strongly suggested that the student remind the committee members one or two days before the exam. The exam cannot proceed if any members are not present at the exam.

7. The SAO prepares the student’s academic file, including the “Report on the Oral Preliminary Exam” form, to be signed by committee members after the exam and returned to the SAO.

Preparing for the Second (Oral Qualifying) Exam:
1. If changes to the committee membership are needed, a “Reconstitution of Doctoral Committee” form must be completed, signed by committee members and submitted to Graduate Division for approval. The Graduate Division requires at least three weeks to process these changes. See SAO for forms and assistance.

2. Coordinate a date/time with the committee members. Notify the SAO of the date/time of the exam has soon as one is proposed. The SAO will help you reserve a room. It is strongly suggested that the student remind the committee members one or two days before the exam. The Oral Qualifying Exam is open to committee members and the student only.

3. The SAO prepares the student’s academic file, including the “Report on the Oral Qualifying Exam” form, to be signed by committee members after the exam and returned to the SAO.

After the Second (Oral Qualifying) Exam:
1. The Report on the Qualifying Examination will be forwarded to Graduate Division by the SAO.

2. The student “advances to candidacy” when a successful “Report on the Oral Qualifying Exam” is received and processed by the Graduate Division. A $90.00 fee will be billed to your BAR Account (in two charges of $45.00). Students are responsible for this fee.

Oral Defense – Required. See Graduate Student Advisor for details.

Complete this form online at: http://www.gdnet.ucla.edu/gasaa/library/docnomin.pdf to nominate your doctoral committee. Once completed bring to the SAO in Gonda 6506.
Important Reminders

Domestic, Non-resident
Non-resident tuition will be provided for all out-of-state U.S. citizens and permanent residents for the first year of graduate study ONLY. Any U.S. citizen or permanent resident who has not qualified for California residency by the beginning of the Fall quarter of the second year will be personally responsible for payment of any non-resident tuition charges incurred in years two and beyond (currently $15,102 per annum for the 16-17 academic year). Information on procedures required for establishing California residency, distributed by the Graduate Division to all entering students at the time of acceptance, appears in the General Catalogue. All non-resident students (International students excluded) should familiarize themselves with these requirements and begin the necessary steps to qualify immediately. All inquiries concerning residency requirements should be directed to the Residence Deputy (1113 Murphy Hall).

eRA Commons Account
Email erahelp@research.ucla.edu to request for an eRA Commons ID. They will need the following:

- First and last name
- UID
- Email
- Role (here is the list of eRA commons user roles: https://era.nih.gov/files/eRA_Commons_Roles.pdf)
<table>
<thead>
<tr>
<th><strong>Who to See in the Department of Human Genetics</strong></th>
</tr>
</thead>
</table>
| **Jenny Luna**  
Student Affairs Officer  
6506 Gonda  
(310) 206-0920  
mpluna@mednet.ucla.edu | ⇒ When in doubt, see your Student Affairs Officer!  
⇒ Administrative actions in conjunction with Graduate Division.  
⇒ Distribution of information regarding important dates, deadlines, fellowships and grants.  
⇒ Information regarding academic records, enrollment, advising, written and oral exams and financial support.  
⇒ Academic apprentice appointments; payroll questions.  
⇒ Scheduling conference rooms |
| **Dr. Paivi Pajukanta**  
Director, Genetics and Genomics  
Home Area  
6335B Gonda  
(310) 267-2011 | ⇒ Home area related questions  
⇒ Rotation related questions |
| **Dr. Esteban Dell’Angelica**  
Faculty Graduate Adviser  
6554A Gonda  
(310) 206-6749  
edellangelica@mednet.ucla.edu | ⇒ Academic Advising  
⇒ Conflict resolution |
| **Charina McDonald**  
Assistant to the Chair  
cmcdonald@mednet.ucla.edu  
**Sylvia Ortiz**  
Administrative Assistant  
sortiz@mednet.ucla.edu  
6506 Gonda  
(310) 794-5423 | ⇒ General Office Services  
⇒ Copy machine; fax machine  
⇒ Gonda building access; room keys  
⇒ Mail distribution  
⇒ Parking |
| **Clifford Kravit or Sharon Tang**  
User Support Specialist  
4558 Gonda  
(310) 267-2453  
ckravit@mednet.ucla.edu  
sharontang@mednet.ucla.edu  
**IT Help Requests:**  
http://helpdesk.genetics.ucla.edu/request | ⇒ Computing Support  
⇒ Troubleshooting  
⇒ Bioinformatics Labs |
<table>
<thead>
<tr>
<th>Name</th>
<th>E-mail Address</th>
<th>Advisor</th>
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<td>Wayne Grody</td>
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