College of Letters and Science
Program Office, 200 Social Sciences and Humanities Building (Undergraduate Education and Advising office); http://www.ls.ucdavis.edu/

Student Proposal. An Individual Major may be organized by a student having a specific academic interest not represented by an established major. Each student wishing an Individual Major should submit a proposal to the Dean’s Office, prior to reaching 120 units, for review by the Student Action and Individual Major Subcommittee. This proposal must include (1) an essay describing the special educational aims of the student, including a statement indicating why the educational objectives cannot be met by existing majors; (2) a list of planned courses; and (3) faculty adviser recommendations. It is critical that students contact a college counselor in the Dean’s Office for consultation and development of the proposal.

Preparatory Subject Matter......... (variable)
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.

Depth Subject Matter ............... 45-54
Upper division course work must include:
(a) Interrelated courses of 45 upper division units from two or more areas of study;
(b) At least one of the two or more areas of study must be within the College of Agricultural and Environmental Sciences;
(c) At least 30 of the 45 upper division units that are required in the program must be from courses provided by the College of Biological Sciences in the major field of emphasis. Secondary Majors (selected by student).

Unrestricted Electives ................. (variable)
Total Units for the Major ......... 45-54
Master Adviser. Thomas Gordon, Ph.D. (Plant Pathology)

College of Biological Sciences
Program Office. Biology Academic Success Center; 1023 Sciences Laboratory Building; 530-752-0410

Student Proposal. A student who wishes to propose an individual major must submit the proposal to the Committee on Undergraduate Student Petitions prior to reaching 120 units. It is important for the student to make arrangements to speak with an adviser in the Biology Academic Success Center early in the development of his/her major so that the individual major will be approved after a student has completed 120 units.

A.B. and B.S. Major Requirements:
Preparatory Subject Matter........... (variable)
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.

Depth Subject Matter ............... 45-54
Upper division units must include:
(a) Interrelated and complementary courses from two or more departments which provide a unified pattern and focus;
(b) At least 30 units from Letters and Science teaching departments or programs;
(c) no more than 10 units in courses numbered 194H, 198 and 199;
(d) for the B.A. degree, a maximum of 80 units toward the major, for the B.S. degree, a maximum of 110 units toward the major.

Total Units for Degree ................ 180

Major Advisers (selected by student). Principal Adviser: a faculty member in a teaching department or program in the College of Letters and Science in the major field of emphasis. Secondary Adviser: a faculty member from a secondary area of interest.

Honors Program. By the fourth week of the last quarter of the junior year, students potentially eligible for high or highest honors at graduation (see College section), may petition the Individual Majors Committee for tentative acceptance into an honors program.

Final admission will depend upon the Committee’s approval of a senior thesis prospectus that has been agreed upon by the student and faculty adviser. The prospectus must be presented to the Committee by the end of the fourth full week of instruction of the first quarter of the senior year. Graduation with high or highest honors will be conditional upon both the maintenance of the required grade point average and the satisfactory completion of the senior thesis project. Students who anticipate doing a senior honors thesis should allow up to three units of independent study in the program during each of two quarters in the senior year as course options.

Formerly Genetics
Fred Chedin, Ph.D., Chairperson of the Group
Group Office. 227A Life Sciences 530-752-4863; http://www.ggc.ucdavis.edu/

Faculty
Sharon Aviran, Ph.D., Assistant Professor (Biomedical Engineering)
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Jacqueline Barlow, Ph.D., Professor (Microbiology and Molecular Genetics)
Diane Beckles, Ph.D., Associate Professor (Plant Sciences)
David Begun, Ph.D., Professor (Evolution and Ecology)
Rebecca Bellone, Ph.D., Associate Adjunct Professor (Plant Sciences)
Alan B. Bennett, Ph.D., Professor (Plant Sciences)
Linda F. Bisson, Ph.D., Professor (Viticulture and Enology)
Simeon Boyd, Ph.D., Associate Professor (Pediatrics Medicine)
Siobhan M. Brady, Ph.D., Associate Professor (Plant Biology)
Anne B. Britt, Ph.D., Professor (Plant Biology)
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Sean Burgess, Ph.D., Professor (Molecular and Cellular Biology)
Judy Callis, Ph.D., Professor (Molecular and Cellular Biology) Academic Senate Distinguished Teaching Award
Dario Cantu, Ph.D., Assistant Professor (Viticulture and Enology)
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Frederic Chedin, Ph.D., Professor (Molecular and Cellular Biology)
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Roger Chetelat, Ph.D., Agronomist (Plant Sciences)
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Megan Dennis, Ph.D., Assistant Professor (Biophysics of A Molecular Medicine)
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Jorge Dubcovsky, Ph.D., Professor (Plant Sciences)
Jan Dvorak, Ph.D., Professor (Plant Sciences)
Jonathan Eisen, Ph.D., Professor (Ecology, Medical Microbiology and Immunology)
JoAnne Engerbretch, Ph.D., Professor (Molecular and Cellular Biology)
Thomas R. Famula, Ph.D., Professor (Animal Science)
Nann A. Fangue, Ph.D., Assistant Professor (Wildlife, Fish and Conservation Biology)
Carrie Finna, Ph.D., Assistant Professor (Wildlife, Fish and Conservation Biology)
Paul Gepts, Ph.D., Professor (Plant Sciences)
Courses in Genetics (GGG)

Graduate

201A. Advanced Genetic Analysis (5)
Lecture/discussion—5 hours. Prerequisite: Biological Sciences 101, Statistics 100 or the equivalent, graduate standing. Fundamental and genetic analysis of chromosome structure using model organisms including mutation, transmission, complementation, suppression, and enhancement as well as epigenetic phenomena at the whole organism and molecular levels. (F)

201B. Genomics (5)
Lecture—3 hours; discussion—2 hours. Prerequisite: course 201A, course 201C or equivalents that provide a basic understanding of genetics and molecular biology. Class limited to 40 students; priority to Genetics Graduate Group students. Prokaryotic and eukaryotic genomes. Experimental strategies and analytical challenges of modern genomics research and the theory and mechanics of data analysis. Structural, functional, and comparative genomics. Related issues in bioinformatics. —W (W)

201C. Molecular Genetic Mechanisms in Disease (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 101 or the equivalent. Pass One restricted to graduate students in genetics, microbiology or biochemistry and molecular biology graduate groups. Exploration of how basic mechanisms of molecular biology contribute to health and disease. Diseases related to animals, plants, and microbes will be studied. —S (S/U grading only).—W, F, W, S. (F, W, S.)
210. Horizontal Gene Transfer (3)
Lecture/discussion—3 hours. Prerequisite: background in basic microbiology and genetics required; introduction to the field of molecular biology, biotechnology and microbial and animal/plant genetics recommended. Transfer of genes between unrelated organisms in nature. Dissipation of foreign DNA from genetically engineered organisms, including plants and animals. Mechanisms by which genes are transferred horizontally, and between kingdoms. —S

211. Concepts in Human Genetics and Genomics (3)
Lecture/discussion—3 hours. Prerequisite: course 201 A or the equivalent; course 201B, 201C or the equivalent recommended. Pass One restricted to graduate students enrolled in the Human Genetics Focus Group; Pass Two restricted to graduate students enrolled in Genetics Graduate Group; after that, open enrollment for graduate students up to 12 students, then undergraduates. Human genomic organization; genetic structure of populations; positional cloning, application of linkage, association, and haplotypes; quantitative trait loci analyses; integrative genetic studies of gene expression; DNA repair mechanisms in genetic disease; mutation analyses; epigenetics; mitochondrial disease; gene manipulation and therapy. Offered in alternate years. —(W)

220. Genomics and Biotechnology of Plant Improvement (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 or permission of instructor. Application of modern bio- technology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Topics include model organisms, plant transformation, hybrid production, disease resistance, and novel output traits. (Same course as Plant Sciences 220.) —W (W) Neale

225. Gene Therapy (3)
Lecture/discussion—3 hours. Prerequisite: Genetics 201C, Molecular and Cellular Biology 214, or equivalent. Gene therapy from basic concepts to clinical applications. Topics include the human genome and genetic variations, human diseases, methods to manipulate gene expression, viral and non-viral delivery vectors, history and progress of gene therapy, case studies, and ethical issues. [Same course as Pharmacology & Toxicology 225.]—S (J) Anderson

250. Functional Genomics: From Bench to Bedside (3)
Lecture/discussion—3 hours. Prerequisite: course 201 B, Molecular and Cellular Biology 214, or equivalent. Functional genomics (how genetic variation and epigenomics affect gene expression), with an emphasis on clinical relevance and applications. Topics include genetic variation and human disease, cancer therapeutics, and biomarker discovery. (Same course as Pharmacology & Toxicology 250.)—S (J) Diaz, LaSalle, Segal

290. Seminar in Evolutionary Developmental and Population Genetics (1)
Seminar—1 hour. Topics of current interest in evolutionary, population, and developmental genetics. May be repeated for credit. (S/U grading only.) Offered alternate years. —S (J)

290A. Graduate Student Conference in Genetics (1)
Conference—1 hour. Restricted to Genetics Graduate Group students. Student-generated seminars on topics in genetics, with critiques by instructor and peers. May be repeated for credit. (S/U grading only.)—F, W, S (F, W, S)

291. Seminar in History of Genetics (2)
Seminar—2 hours. Prerequisite: Biological Sciences 101. The development of modern genetic theories beginning with Mendel. —F (F) Quiros

292. Seminar in Genomics and Epigenomics (1)
Seminar—1 hour. Topics of current interest in genomics and epigenomics. May be repeated for credit. Offered in alternate years. (S/U grading only.)—F

293. Seminar in Animal Genetics (1-3)
Seminar—1-3 hours. Prerequisite: consent of instructor. Emphasis on recent advances in the field of animal genetics. Offered in alternate years. —S

294. Seminar in Human Genetics (2)
Seminar—2 hours. Prerequisite: course 201A and consent of instructor. May be repeated for credit up to five times if topic differs. Topics of current interest in human genetics and genomics. Offered in alternate years. —S

295. Seminar in Molecular Genetics (1-3)
Seminar—1-3 hours. Prerequisite: consent of instructor. Topics of current interest related to the structure, modification and expression of genes. Offered in alternate years. —F

296. Scientific Professionalism and Integrity (2)
Lecture—1 hour; seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Review of basic skills required of contemporary scientists. Topics include scientific manuscript preparation, literature search, grant writing, seminar presentations, and time management. Emphasis on responsibilities of scientists to factually and truthfully communicate results. —F

297. Seminar in Plant Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A and consent of instructor. Current topics in plant genetics will be examined in student-conducted seminars and discussion format. Topics include molecular organismal and population genetics to address questions in plant biology will be emphasized. —(W)

298. Group Study (1-5)
Prerequisite: consent of instructor. Group study of selected topics in genetics. (S/U grading only.)—F, W, S (F, W, S)

299. Research (1-12)
(S/U grading only.)—F, W, S (F, W, S)

Professional

300. Methods in Teaching Genetics (1-3)
Lecture/discussion. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching genetics. Includes analysis of texts and supporting material, discussion of teaching techniques, and pre-conducting and conducting discussion or laboratory sections, formulating syllabi and examinations of instruction. May be repeated for credit up to 3 times or 9 units if teaching in different genetics related course. (S/U grading only.)—F, W, S (F, W, S)

Integrative Pathobiology (A Graduate Group)

Patricia Pesavento, D.V.M., Ph.D., Chairperson of the Group
Brian Murphy, D.V.M., Ph.D., Co-chairperson of the Group

Group Office. 5218, Vet Med 3A

Faculty
Verena Alfert, D.V.M., Ph.D., Professor (Pathology, Microbiology and Immunology)
Kyriacos Athanassios, Ph.D., Professor and Chair (Biomedical Engineering)
Robert Atwill, D.V.M., M.P.V.M., Ph.D., Professor (Population Health and Reproduction)

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