210. Horizontal Gene Transfer (3)
Lecture/discussion—3 hours. Prerequisite: background in basic microbiology and genetics required; introduction to molecular biology, biotechnology and microbial and animal/plant genetics recommended. Transfer of genes between unrelated organisms in nature. Dissemination of foreign DNA from genetically engineered organisms, including plants and animals. Mechanisms by which genes are transferred horizontally, and between kingdoms. —W.

211. Concepts in Human Genetics and Genomics
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; familial cloning, application of linkage, association, and haplotypes; quantitative trait loci analysis; integrative genetic studies of gene families; 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. The development of integrative modern biotechnology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Covers molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits. (Same course as Plant Sciences 220.) —W. (W.) Neale

223. 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 variation, human genetic 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 A 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.) Diao, 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.) Anderson

290A. Graduate Student Conference in Genetics (1)
Conference—1 hour. Restricted to Genetics Graduate Group students. Student-presented 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, (J.) 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: course 201 A or consent of instructor. Emphasis on recent advances in the field of animal genetics from quantitative genetics to molecular biology as it relates to animals. Offered in alternate years. —S.

294. Seminar in Human Genetics (2)
Seminar—2 hours. Prerequisite: course 201 A 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. —F.

295. Seminar in Molecular Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201 A or 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 and academic integrity, grant application anduteurpreparation, grant writing, seminar presentations, and time management. Emphasis on responsibilities of scientists to factually and thoughtfully communicate results. —F.

297. Seminar in Plant Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201 A or consent of instructor. Current topics in plant genetics will be examined in student-conducted seminars and discussion format. Core emphasis on the manipulation of molecular organisinal 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. Involves analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion or laboratory sections, formulating examination questions under supervision of instructor. 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


Faculty

Verena Al follter, D.V.M., Ph.D., Professor (Pathobiology, 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)

Danika Bannasch, D.V.M., Ph.D., Professor (Population Health and Reproduction)
Chris Barker, Ph.D., Associate Professor (Pathobiology, Microbiology, and Immunology)
Andreas Baumler, Ph.D., Professor (Pathobiology, Microbiology and Immunology)
Peter A. Barry, Ph.D., Associate Professor (Pathology and Oncology)
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Barbara A. Byrne, D.V.M., Ph.D., M.S., Ph.D., Professor (Pathology, Microbiology, and Immunology)
Kermitt Carraway, Ph.D., Professor (Biochemistry and Molecular Medicine)
Hongwu Chen, Ph.D., Associate Professor (Cancer Center, Basic Sciences)
Xinbin Chen, B.V.M., Ph.D., Professor (Surgical and Radiological Sciences)
Simon Cherry, Ph.D., Professor (Biomedical Engineering)
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Satai Dandekar, Ph.D., Professor (Microbiology and Immunology)
Wenbin Deng, Ph.D., Assistant Professor (Biochemistry and Molecular Medicine)
Peter Dickinson, D.V.M., Ph.D., Assoc. Professor (Neurology/Neurosurgery)
Carol Erickson, Ph.D., Distinguished Professor Emeritus (Molecular and Cellular Biology)
Thomas B. Farver, Ph.D., Professor (Population Health and Reproduction)
Carrie Finno, D.V.M., Ph.D., Assistant Professor (Population Health and Reproduction)
Rodrigo Gallardo, D.V.M., Ph.D., Assistant Professor (Population Health and Reproduction)
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Laurel J. Gershwin, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)
Paramita Ghosh, Ph.D., Associate Professor (Biochemistry and Molecular Medicine)
Ralph D. Green, M.D., Ph.D., Professor (Medical Pathology and Laboratory Medicine)
Fuzheng Guo, Ph.D., Assistant Professional Researcher (Neurology)
James H. Jones, D.V.M., Ph.D., Professor (Surgical and Radiological Sciences)
Amy Kapatin, B.S., D.V.M., M.S. Associate Professor (Surgical and Radiological Sciences)
Kevin Keel, D.V.M., Ph.D., Associate Professor (Pathology, Microbiology, and Immunology)
Ismail Khan, Ph.D., M.B.A, Associate Adjunct Professor (Pathology and Laboratory Medicine)
Kim S. Lam, M.D., Ph.D., Professor (Hematology/Oncology)
Michael Laimire, D.V.M., Ph.D., Professor (Pathology, Microbiology and Immunology)
Kent Leach, Ph.D., Professor (Biomedical Engineering)
Jianian Liu, M.D., Ph.D., Professor (Radiation Oncology)
Kent C. Lloyd, D.V.M., Ph.D., Professor (Anatomy, Physiology and Cell Biology)
Su Hao Lo, Ph.D., Professor (Biochemistry and Molecular Medicine)
International Agricultural Development

(College of Agricultural and Environmental Sciences)

International Agricultural Development is an interdis-
ciplinary major in the Plant Sciences department.

Faculty. Includes members from various depart-
ments across colleges.

B.S. Major Requirements:

Preparatory Subject Matter ............... 36-38

International Agricultural Development...

10 ........................................ 4
Plant Sciences 2 .......................... 4
Soil Sciences 10 or 100 ................... 3-5
Economics 1A and 1B ................. 8
Statistics 13 or Sociology 468 or Plant
Sciences 120 ............................. 4
Math 16A ................................ 3
Community and Regional Development 1 . . 4
Six units from: Agricultural and Resource
Economics 15, Animal Science 41, 41L,
Community and Regional Development 20,
Nutrition 10, Plant Sciences 15, 49, 6

Depth Subject Matter ....................... 32

Agricultural and Resource Economics 147 or
Plant Sciences 101 ........................ 3
Economics 115A .......................... 4
Five units from International Agricultural
Development 142, 160, Plant Sciences
110A, 110C, 110L, 112, 130 ........... 5
International Agricultural Development 103
and International Agricultural Development
170 ........................................ 8
Sociology 170 or Community and Regional
Development 141 or 162 .............. 4
Community and Regional Development 142
or 149 or 152 ......................... 13
Political Science 123 or 124 or Sociology
145A or Anthropology 126A or 126B or
131A .................................... 4

Foreign Language Requirement ............ 0-15

Students must complete three sequenced
quarters (15 units) of courses in one foreign
language or its equivalent. Passing a foreign
language proficiency examination, a score of
5, 4, or 3 on a foreign language Advanced
Placement examination (except Latin), or a
score of 550 on the SATI. Subject Test will
also satisfy this requirement.

Internship Requirement ................. 4

Students must complete one unit of
internship. Internships can be chosen in
consultation with an adviser. Internship
requirement waived for students enrolled in
the UC Education Abroad Program.

Areas of Specialization ................. 44-45

Agricultural Production Option ........... 45
Biological Sciences 2A and 2B .......... 10
Chemistry 2A and 2B ................... 10
10 units from: Animal Science 118, 124,
136A, 136B, 143, 144, 145, 146,
Avian Sciences 121, Entomology 110, 135,
Environmental Horticulture 100, 133,
Environmental Science and Management 100,
Hydrology 124, International
Agricultural Development 142, 160,
Plant Pathology 120, Plant Sciences 110A,
110C, 110L, 112, 113, 114, 120, 150,
170A, 170B, 172, 176, Soil Sciences
109, 118 ................................. 15
Restricted Electives: Courses selected in
consultation with an adviser ........... 10
Trade and Economic Development
Option .................................. 44-45
Mathematics 168 .......................... 3
Sociology 1 or Anthropology 2 .......................... 4-5