

210. Horizontal Gene Transfer (3)

Lecture/discussion—3 hours. Prerequisite: background in basic microbiology and genetics required; introductory course in 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.—F. (F.)

211. Concepts in Human Genetics and Genomics (3)

Lecture/discussion—3 hours. Prerequisite: course 201A 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 genetic 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 the equivalent. Integration of modern biotechnology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Also covers molecular markers, 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 variation, 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. (S.) Anderson

250. Functional Genomics: From Bench to Bedside (3)

Lecture/discussion—3 hours. Prerequisite: course 201C, 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. (S.) 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 in alternate years.—S. (S.)

290A. Graduate Student Conference in Genetics (1)

Conference—1 hour. Restricted to Genetics Graduate Group students. Student-given 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: course 201A or consent of instructor. Emphasis on recent advances in the field of animal genetics, ranging 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 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.—W. Seldin

295. Seminar in Molecular Genetics (1-3)

Seminar—1-3 hours. Prerequisite: course 201A 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 conduct, manuscript preparation, grant writing, seminar presentations, and time management. Emphasis on responsibilities of scientists to factually and thoughtfully communicate results.—F. (F.) Yoder

297. Seminar in Plant Genetics (1-3)

Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Current topics in plant genetics will be examined in student-conducted seminars and discussion format. The integration of 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, preparing for and conducting discussion or laboratory sections, formulating examinations 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

Group Office. 5218, Vet Med 3A
530-752-3737; <http://www.vetmed.ucdavis.edu/integrativepath/>

Faculty

Verena Affolter, D.V.M., Ph.D., Professor
(Pathology, Microbiology and Immunology)

Kyriacos Athanasiou, 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)

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(Pathology, Microbiology, and Immunology)

Andreas Baumler, Ph.D., Professor

(Microbiology and Immunology)

Peter A. Barry, Ph.D., Associate Professor

(Pathology and Oncology)

Nicole Baumgarth, D.V.M., Ph.D., Professor

(Pathology, Microbiology, and Immunology)

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(Pathology, Microbiology and Immunology)

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(Pathology, Microbiology, and Immunology)

Robert J. Brosnan, D.V.M., Ph.D., Professor

(Surgical and Radiological Sciences)

Barbara A. Byrne, D.V.M., Ph.D., Professor

(Pathology, Microbiology, and Immunology)

Kermit 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)

Bruno B. Chomel, D.V.M., Ph.D., Professor

(Population Health and Reproduction)

Brett Chromy, Ph.D., Assistant Adjunct Professor

(Pathology and Laboratory Medicine)

Lark L A Coffey, D.V.M., Ph.D., Assistant Professor

(Pathology, Microbiology, and Immunology)

Patricia A. Conrad, D.V.M., Ph.D., Professor

(Pathology, Microbiology, and Immunology)

Beate Crossley, D.V.M., Ph.D., M.P.V.M., Professor

(Department of Medicine and Epidemiology)

James S. Cullor, D.V.M., Ph.D., Professor

(Population Health and Reproduction)

Satya Dandekar, Ph.D., Professor

(Microbiology and Immunology)

Wenbin Deng, Ph.D., Associate 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)

Janet Foley, MS, D.V.M., Ph.D., Assistant Professor

(Medicine and Epidemiology)

Rodrigo Gallardo, D.V.M., Ph.D., Assistant Professor

(Population Health and Reproduction)

Damian Genetos, B.A., M.S., Ph.D., Assistant

Professor (Anatomy, Physiology and Cell Biology)

Laurel J. Gershwin, D.V.M., Ph.D., Professor

(Pathology, Microbiology, and Immunology)

Paramita Ghosh, Ph.D., Associate Professor

(Biochemistry and Molecular Medicine)

Ralph 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 Kapatkin, 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)

Imran Khan, Ph.D., M.B.A. Associate Adjunct

Professor (Pathology and Laboratory Medicine)

Kit S. Lam, M.D., Ph.D., Professor

(Hematology/Oncology)

Michael Lairmore, D.V.M., Ph.D., Professor and

Dean (Pathology, Microbiology and Immunology)

Kent Leach, Ph.D., Professor

(Biomedical Engineering)

Jian-Jian Li, M.D., Ph.D., Professor

(Radiation Oncology)

Kent C.C. Lloyd, D.V.M., Ph.D., Professor

(Anatomy, Physiology and Cell Biology)

Su Hao Lo, Ph.D., Professor

(Biochemistry and Molecular Medicine)

Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences;

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Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses

Paul A. Luciw, Ph.D., Professor
(Pathology and Oncology)

Bruce G. Lyeth, Ph.D., Professor
(Neurological Surgery)

N. James MacLachlan, B.V.Sc., Ph.D., Professor
(Pathology, Microbiology, and Immunology)

John E. Madigan, M.S., D.V.M., Professor
(Medicine and Epidemiology)

Verónica Martínez-Cerdeño, Ph.D., Assistant Professor
(Pathology and Laboratory Medicine)

Jonna A.K. Mazet, D.V.M., M.P.V.M., Ph.D., Professor
(Medicine and Epidemiology)

Stephen McSorley, Ph.D., Professor
(Anatomy, Physiology and Cell Biology)

Matthew Mellema, Associate Professor
(Surgical and Radiological Sciences)

Stuart Meyers, D.V.M., Ph.D., Professor
(Anatomy, Physiology and Cell Biology)

Michael Mienaltowski, Ph.D., Assistant Professor
(Animal Science)

Chris J. Miller, D.V.M., Ph.D., Professor
(Pathology, Microbiology, and Immunology)

Lisa Miller, Ph.D., Professor
(Anatomy, Physiology and Cell Biology)

Suzanne Miyamoto, Ph.D., Assistant Research
Biochemist (Internal Medicine)

F. Charles Mohr, D.V.M., Ph.D., Professor of Clinical
Anatomic Pathology (Pathology, Microbiology,
and Immunology)

Arta Monjazebe, M.D., Ph.D., Assistant Professor
(Radiation Oncology)

Peter F. Moore, B.V.S.C., Ph.D., Professor
(Pathology, Microbiology, and Immunology)

Brian Murphy, D.V.M., Associate Professor
(Pathology, Microbiology & Immunology)

William Murphy, M.D., Professor (Dermatology)

Jorge Nieto, M.V.Z., Ph.D., Professor
(Surgical and Radiological Sciences)

Jan Nolte, Ph.D., Professor
(School of Medicine, Internal Medicine)

Joanne Paul-Murphy, D.V.M., Professor
(Medicine and Epidemiology)

Niels C. Pedersen, D.V.M., Ph.D., Professor
(Medicine and Epidemiology)

Patricia Pesavento, D.V.M., Ph.D., Professor
(Pathology, Microbiology & Immunology)

Kent E. Pinkerton, Ph.D., Professor (Anatomy,
Physiology and Cell Biology) Distinguished
Teaching Award-Graduate/Professional

David E. Pleasure, M.D., Professor
(Neurology and Pediatrics)

Jerry S. Powell, M.D., Professor
(Anatomy, Physiology and Cell Biology)

Katherine Rauen, M.D., Ph.D., Professor
(Pediatrics)

William Reisen, Ph.D., Professor
(Pathology, Microbiology and Immunology)

Robert Rebhun, D.V.M., Ph.D., Associate Professor
(Surgical and Radiological Sciences)

Alexander Revzin, Ph.D., Associate Professor
(Biomedical Engineering)

Jeroen Saeij, Ph.D., Associate Professor
(Pathology, Microbiology, and Immunology)

Edward Schelegle, Ph.D., Professor
(Anatomy, Physiology, and Cell Biology)

Jared Shaw, Associate Professor (Chemistry)

Christina Sigurdson, Associate Professor
(Pathology, Microbiology and Immunology)

Scott Simon, Ph.D., Professor
(Biomedical Engineering)

David Smith, Ph.D., Professor (Anthropology)

Woutrina Smith, D.V.M., M.P.V.M., Ph.D., Associate
Professor (Medicine and Epidemiology)

Esteban Soto Martinez, D.V.M., Ph.D., Associate
Professor (Medicine and Epidemiology)

Ellen Sparger, D.V.M., Ph.D., Associate Professor
(Medicine and Epidemiology)

Joshua Stern, B.S., D.V.M., Assistant Professor
(Medicine and Epidemiology)

Jeffrey L. Stott, Ph.D., Professor
(Pathology, Microbiology, and Immunology)

Susan M. Stover, D.V.M., Ph.D., Professor
(Anatomy, Physiology and Cell Biology)

Julie Sutcliffe, Ph.D., Associate Professor
(Biomedical Engineering)

Colleen Sweeney, Ph.D., Professor
(Biochemistry and Molecular Medicine)

Jane E. Sykes, B.V.Sc., Ph.D., Professor
(Medicine and Epidemiology)

Fern Tablin, V.M.D., Ph.D., Professor
(Anatomy, Physiology and Cell Biology)

Alice F. Tarantini, Ph.D., Professor (Pediatrics)

Sara Thomas, D.V.M., Ph.D., Associate Researcher
(Surgical and Radiological Sciences)

Jose V. Torres, Ph.D., Professor (Microbiology)

Nam Tran, Ph.D., Assistant Professor
(Department of Pathology and Laboratory
Medicine)

Renee M. Tsohis, Ph.D., Professor
(Microbiology and Immunology)

Francisco Uzal, D.V.M., Ph.D., Professor of Clinical
Diagnostic Pathology (Pathology, Microbiology,
and Immunology)

Laura Van Winkle, Ph.D., Adjunct Professor
(Anatomy, Physiology and Cell Biology)

William Vernau, D.V.Sc., Ph.D., Associate Professor
(Pathology, Microbiology and Immunology)

Sebastian Wachsmann-Hogiu, M.D., Associate
Professor (Pathology)

Aijun Wang, Ph.D., Assistant Professor
(Surgery)

Johanna L. Watson, D.V.M., Ph.D., Associate
Clinical Professor and Chair (Medicine and
Epidemiology)

Bart Weimer, Ph.D., Professor
(Population Health and Reproduction)

Robert H. Weiss, M.D., Professor
(Internal Medicine, Division of Nephrology)

Dennis W. Wilson, D.V.M., Ph.D., Professor
(Pathology, Microbiology, and Immunology)

Erik R. Wisner, D.V.M., Professor
(Surgical and Radiological Science)

Kevin Woolard, D.V.M., Ph.D., Assistant Professor
(Pathology, Microbiology and Immunology)

Jian Wu, M.D., Ph.D., Assistant Adjunct Professor
(Internal Medicine)

Reen W. Wu, Ph.D., Professor (Internal Medicine)

Clare Yellowley, Ph.D., Professor
(Anatomy, Physiology and Cell Biology)

Chengji Zhou, Ph.D., Associate Professor
(Biochemistry and Molecular Medicine)

Graduate Study. The Graduate Group in Integra-
tive Pathobiology offers the M.S. and Ph.D. degrees
for graduate study in disciplines concerned with dis-
ease processes. The group's focus is the study of the
causes and nature of disease processes in animals
and humans, with major emphasis on the mecha-
nisms responsible for the development of diseases at
the level of organ systems, the cell, or subcellular
mechanisms. The group brings a wide array of sci-
entific knowledge to this study, so that students with
divergent interests can be accommodated in pro-
grams designed for individual needs. Beyond core
courses selected from disciplines such as anatomy,
bacteriology, genetics, immunology, parasitology,
pathology, physiology, and virology, course pro-
grams are intentionally flexible.

Preparation. This program is primarily for students
who have a professional medical degree; e.g.,
D.V.M., M.D., D.D.S. Students without a profes-
sional degree will be considered if they have an
especially strong background in basic biomedical
sciences.

Graduate Adviser. Jeffrey Stott (Pathology, Micro-
biology, and Immunology)

Interior Design

See Design, on page 233.

Internal Medicine

See Medicine, School of, on page
427.

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:

	UNITS
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 46B 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 1, 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.....	4
Political Science 123 or 124 or Sociology 145A or Anthropology 126A or 126B or 131.....	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 SATII: Subject Test will
also satisfy this requirement.

Foreign Language Requirement.....0-15

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

Internship Requirement.....4

Students must complete at least four units 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 Specialization44-45

<i>Agricultural Production Option</i>	45
Biological Sciences 2A and 2B.....	10
Chemistry 2A and 2B.....	10
15 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, 130, 150, 170A, 170B, 172, 176, Soil Sciences 109, 118.....	15
Restricted Electives: Courses selected in consultation with an adviser.....	10
<i>Trade and Economic Development Option</i>	44-45
Mathematics 16B.....	3
Sociology 1 or Anthropology 2.....	4-5

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