UCDAVIS ANIMAL SCIENCE

GENETICS: Suggested Courses for 2020-2021

Course	Title	Description	Offered	Units	Prerequisites
ANG 105	Horse Genetics	Coat color, parentage testing, medical genetics, pedigrees, breeds, the gene map and genus Equus. Emphasis on understanding horse genetics based on the unity of mammalian genetics and making breeding decisions based on fundamental genetic concepts.	W, EOY odd	3	ANS 15 and BIS 101
ANG 185	Science of Captive Breeding and Reintroduction	Explore peer-reviewed literature surrounding the latest advances in captive breeding and reintroduction biology. Effective: 2019 Fall Quarter.	F, W, S	1	BIS2ABC
ANS 140	Management of Laboratory Animals	Laboratory animal management procedures in view of animal physiology, health and welfare, government regulations, experimental needs. Clinical techniques using rodents and rabbits as models.	F	4	NPB 101/ANS 100
ANS 142	Companion Animal Care and Management	Management and production of companion animals. Integration of the disciplinary principles of behavior, genetics, nutrition, and physiology as related to the care of companion animals.	F	4	ANS 42, BIS 101, NPB 101/ANS 100; ABI 102, ABI 103 rec.
ANS 143	Pig and Poultry Care and Management	Care and management of swine, broilers and turkeys as related to environmental physiology, nutrition and metabolism, disease management and reproduction.	F, EOY odd	4	ANS 41, NUT 115, NPB 101/ANS 100
ANS 144	Beef Cattle and Sheep Production	Genetics, physiology, nutrition, economics and business in beef cattle and sheep production. Resources used, species differences, range and feedlot operations. Emphasis on integration and information needed in methods for management of livestock enterprises.	S	4	ANS 41, NUT 115, and ANG 107 rec.
ANS 146	Dairy Cattle Production	Scientific principles from genetics, nutrition, physiology, and related fields applied to conversion of animal feed to human food through dairy animals. Management and economic decisions are	S	5	ANS 124, NUT 115, and ANG 107 rec.

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		related to animal biology considering the environment and animal well-being.			
AVS 103	Avian Development and Genomics	Unique features of avian development and genetics. Development topics: gametogenesis, fertilization, pre- and post-oviposital development, morphogenesis, sex differentiation, specialized organ systems, incubation, hatching. Genetic topics: genome organization, inheritance, sex determination, avian models. Laboratory exercises: embryology, genetics, model systems	F	3	BIS 2AB
BIS 180L	Genomics Laboratory	Computational approaches to model and analyze biological information about genomes, transcriptomes, and proteomes. Topics include genome assembly and annotation, mRna and small RNA profiling, proteomics, protein-DNA and protein-protein interactions, network analysis, and comparative genomics. Computer programming experience not required.	S	5	BIS 181, BIS 183 (concurrent ok); MCB 182
BIS 181	Comparative Genomics	Comparison of genomes at the population and species level. Genomic techniques for mapping disease (and other) genes, reconstruction of evolutionary history and migration patterns, determination of gene function, prediction of organismal traits, and metagenomics; determination of community composition and function.	F	3	BIS 101
BIS 183	Functional Genomics	Overview of genomic methodologies and key biological findings obtained using genome-wide analyses. RNA profiling, small RNAs, epigenomics, chromatin immunoprecipitation, protein-DNA interactions, proteomics and network analysis.	S	3	BIS 101; ABI102/BIS102
BIT 150	Applied Bioinformatics	Concepts and programs needed to apply bioinformatics in biotechnology research. Sequence analysis and annotation and use of plant and animal databases for students in biological and agricultural sciences. Limited enrollment.	F	4	BIS 101, PLS21/ECS15, PLS120/STA100, or consent
BIT 161A	Genetics and Biotechnology Laboratory	Techniques of genetic analysis at the molecular level including recombinant DNA, gene mapping and basic computational biology.	W	6	PLS 152 or BIS 101 or consent

BIT 171	Professionalism and Ethics in Genomic and Biotechnology	Real and hypothetical case studies to illustrate ethical issues in genomics and biotechnology. Training and practice in difficult ethical situations and evaluating personal and social consequences.	F, W, S	3	Upper Division Standing
EVE 102	Population and Quantitative Genetics	Evolution as caused by random mating, genetic drift, natural selection, inbreeding, migration, and mutation in theory and actuality. The resemblance between relatives and consequences of selection of quantitative traits. Application of these ideas to topics such as the evolution of sex.	F, EOY even	4	BIS 101, STA 100, EVE 100
EVE 131	Human Genetic Variation and Evolution	Introduction to genome-wide nucleotide sequence variation in human populations and computational methods for its analysis. Topics to include forensics, disease gene mapping, and studies of human evolutionary history. Misuses, such as eugenics, and ethical/legal issues will be discussed.	F, EOY odd	3	BIS 2B
EVE 150	Evolution of Animal Development	Comparative analysis of animal development and the genetic basis of morphological diversification.	NCO	3	BIS 101; EVE 100
GDB 103	The Microbiome of People, Animals, Plants	Examination of the structure and function of microbial communities that live inside and on host organisms. Introduction to general concepts of the microbiome and microbiota, and their relationship to host health and disease.	W	3	BIS2ABC
MIC 115	Recombinant DNA Cloning and Analysis	Cloning and analysis of recombinant DNA, with emphasis on Escherichia coli host-vector systems. DNA-modifying enzymes, vectors and their use; manipulation and expression of insert DNA; polymerase chain reaction; and sequence annotation.	F	3	BIS 101 or equivalent
MCB 121	Advanced Molecular Biology	Structure, expression, and regulation of eukaryotic genes. Chromosome structure and replication; gene structure, transcription, and RNA processing; protein synthesis and translation control; development, immune system, and oncogenes. Not open in MCB 161 already taken.	F, W, S	3	BIS 101, BIS102/ABI 102 (conc. ok)
MCB 144	Mechanisms of Cell Division	The molecules and mechanisms that allow eukaryotic cells to coordinate cell growth, DNA replication, segregation of chromosomes and cell division.	F	3	BIS 101, ABI 102/BIS102, and BIS 104
MCB 162	Human Genetics and Genomics	Human molecular genetic variation, molecular basis of metabolic disorders, chromosome aberrations and consequences, analysis	F	3	BIS 101

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		of the human genome, and computational techniques of genetic & genomic analysis.			
MCB 163	Developmental Genetics	Current aspects of development genetics. Historical background and current genetic approaches to the study of development of higher animals.	S	3	MCB 121 (conc. ok)
MCB 164	Advanced Eukaryotic Genetics	The five basic operations of genetic analysis: mutation, segregation, recombination, complementation, and regulation. Emphasis on the theory and practice of isolating and analyzing mutations, as well as understanding mechanisms underlying both Mendelian and epigenetic inheritance.	W	3	MCB 121
MCB 182	Principles of Genomics	Fundamentals of genomics, including structural genomics, functional genomics, proteomics, and bioinformatics, focusing on the impact of these disciplines on research in the biological sciences. Social impacts of genomic research.	W, S	3	BIS 101
MIC 102	Introductory Microbiology	Essentials of microbial biology, emphasizing phylogeny, physiology, genetics, ecology, and pathogenesis. Interactions with other microbes, humans, and the biosphere. Uses of microbes in agriculture and biotechnology	F, W, S	3	BIS 2A, CHE 2B
MIC 103L	Introductory Microbiology Laboratory	Introduction to principles and laboratory methods employed in working with microorganisms. Designed for students requiring microbiology for professional school admission.	F, W, S	2	MIC 102, CHE2B
NPB 132	Nature vs. Nuture: Physiological Interactions Among Genes, Nutrients and Health	Biochemical, physiological, genetic, and nutritional causes of important medical problems such as obesity, anorexia, heart disease and diabetes.	F	3	BIS2A or consent
PMI 128	Biology of Animal Viruses	Fundamental physical and chemical properties of animal viruses; methods of propagation, purification and assay. Mechanisms of viral replication and pathogenesis of viral infections in man and animals. Immunity to virus diseases and oncogenic properties of animal viruses. Only 2 units of credit for students who have completed MCB 162.	S	3	BIS102/ABI 102