

GENETICS AND GENOMICS

AGR 6322 Advanced Plant Breeding 3 Credits

Grading Scheme: Letter Grade

Theory and use of biometrical genetic models for analytical evaluation of qualitative and quantitative characteristics, with procedures applicable to various types of plant species. Offered spring term in even-numbered years.

Prerequisite: AGR 3303, 4231, AGR 6311, and STA 6167.

ANG 6532 Molecular Genetics of Disease 3 Credits

Grading Scheme: Letter Grade

Examines the molecular genetics of human disease. Discusses a range of diseases from single-gene recessive defects (such as cystic fibrosis) to complex diseases (such as alcoholism and diabetes). Also discusses detection and treatment.

ANG 7979 Advanced Research 1-12 Credits

Grading Scheme: S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ANG 7980 Research for Doctoral Dissertation 1-15 Credits

Grading Scheme: S/U

Research for Doctoral Dissertation

BCH 6415 Advanced Molecular and Cell Biology 3 Credits

Grading Scheme: Letter Grade

Molecular biology of pro- and eukaryotic organisms. Emphasizes understanding the experimental approaches that led to recent developments. Chromosome structure and organization, advances in recombinant DNA technology, DNA replication, RNA transcription and protein synthesis, and selected aspects of molecular regulation of gene expression.

Prerequisite: BCH 4024, CHM 4207, MCB 4303, or consent of instructor. PCB 3063 or a similar course in genetics recommended. One of three core biochemistry courses.

BCH 7410 Advanced Gene Regulation 1 Credit, Max 3 Credits

Grading Scheme: Letter Grade

Literature-based assessment of the most recent advances in factors governing eukaryotic gene regulation.

Prerequisite: GMS 6001 or consent of instructor.

CAP 5510 Bioinformatics 3 Credits

Grading Scheme: Letter Grade

Basic concepts of molecular biology and computer science. Sequence comparison and assembly, physical mapping of DNA, phylogenetic trees, genome rearrangements, gene identification, biomolecular cryptology, and molecular structure prediction.

Prerequisite: CIS 3020 or equivalent.

CIS 6930 Special Topics in CIS 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Special Topics in CIS

Prerequisite: vary depending on topics.

COT 5405 Analysis of Algorithms 3 Credits

Grading Scheme: Letter Grade

Introduction and illustration of basic techniques for designing efficient algorithms and analyzing algorithm complexity.

Prerequisite: COP 3530.

FOR 6934 Topics in Forest Resources and Conservation 1-4 Credits, Max 10 Credits

Grading Scheme: Letter Grade

Selected topics in forestry and natural resources.

FOR 7979 Advanced Research 1-12 Credits

Grading Scheme: S/U

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FOR 7980 Research for Doctoral Dissertation 1-15 Credits

Grading Scheme: S/U

Research for Doctoral Dissertation

GMS 6012 Human Genetics 1 Credit, Max 3 Credits

Grading Scheme: Letter Grade

Theoretical framework for understanding the fundamentals of human genetics. Advanced technical tools used for research.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6013 Developmental Genetics 1 Credit, Max 3 Credits

Grading Scheme: Letter Grade

Theoretical framework for understanding the fundamentals of developmental genetics. Advantages and limitations of several model systems and their application to the study of development.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6014 Applications of Bioinformatics to Genetics 1 Credit

Grading Scheme: Letter Grade

Storage, retrieval, and analysis of information related to genetics.

Prerequisite: GMS 6001; consent of instructor.

GMS 6920 Genetics Journal Colloquy 1 Credit, Max 12 Credits

Grading Scheme: S/U

Critical presentations and discussions of recent original articles.

Prerequisite: consent of instructor.

GMS 7979 Advanced Research 1-12 Credits

Grading Scheme: S/U

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HOS 6201 Breeding Perennial Cultivars 3 Credits

Grading Scheme: Letter Grade

Methods of breeding perennial fruit and ornamental cultivars using mutations, cell and tissue culture, polyploidy, recurrent selection, and wide hybridization. Conservation and domestication of wild plants. Offered odd-numbered years in fall.

Prerequisite: AGR 3303.

PCB 5065 Advanced Genetics 4 Credits

Grading Scheme: Letter Grade

Examines genetic principles including gene and gene function; recombination and linkage; molecular markers, multipoint linkage analysis, and positional cloning; and quantitative, population, developmental, and non-Medalian genetics. Offered in fall term.

Prerequisite: AGR 3303 or PCB 3063 and BCH 4024 or BCH 5045. For graduate students in any life science discipline.

PCB 5615 Molecular Evolution and Systematics 4 Credits

Grading Scheme: Letter Grade

Patterns and processes of change at the molecular level in populations, species, and higher taxonomic groups, and their systematic implications.

Prerequisite: PCB 3063, graduate standing, or consent of instructor.

PCB 6528 Plant Cell and Developmental Biology 3 Credits**Grading Scheme:** Letter Grade

Cellular and developmental biology of plants. Lecture format with frequent discussion of recent papers. Topics include signal transduction, organelles, protein trafficking, and developmental mechanisms. Offered in spring term.

Prerequisite: PCB 5530 and PCB 5065 or equivalent.**PCB 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

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PCB 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

STA 5325 Fundamentals of Probability 3 Credits**Grading Scheme:** Letter Grade

Topics in probability and statistics, particularly discrete and continuous random variables, sampling distributions, estimation, and hypothesis testing. Applications to engineering and natural science.

Prerequisite: grade of C or better in MAC 2313 and STA 3032 or equivalent.**STA 5328 Fundamentals of Statistical Theory 3 Credits****Grading Scheme:** Letter Grade

Direct continuation of STA 4321/STA 5325. Basic material for distribution theory, sampling distributions, properties of estimators, hypothesis testing, linear regression analysis, and analysis of variance. A good knowledge of calculus is helpful.

Prerequisite: STA 4321 or equivalent.**STA 6166 Statistical Methods in Research I 3 Credits****Grading Scheme:** Letter Grade

Statistical methods based on t, F, and Chi² tests. Analysis of variance for basic experimental designs. Factorial experiments. Regression analysis and analysis of covariance.

Prerequisite: STA 2023 or equivalent.**STA 6167 Statistical Methods in Research II 3 Credits****Grading Scheme:** Letter Grade

Analysis of covariance and general linear model. Factorial, nested, split-plot, and incomplete block designs. Analysis of count data.

Prerequisite: STA 6166.**STA 6208 Basic Design and Analysis of Experiments 3 Credits****Grading Scheme:** Letter Grade

Focusing on the principles of experimental design, completely randomized design (analysis, contrasts, diagnostics), random effects models, factorial experiments (fixed, random, and mixed effect), block designs, Latin squares, split plots, and full and fractional factorial experiments.

Prerequisite: STA 6207**STA 6329 Matrix Algebra and Statistical Computing 3 Credits****Grading Scheme:** Letter Grade

Basic theory of determinants, inverses and generalized inverses, eigenvalues and eigenvectors; applications of partitioned matrices; diagonalization and decomposition theorems; applications in least squares.

Prerequisite: MAC 3313.**STA 6934 Special Topics in Statistics 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Special Topics in Statistics

Prerequisite: permission of graduate adviser.**STA 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

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STA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ZOO 6927 Special Topics in Zoology 1-4 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Special Topics in Zoology

ZOO 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been admitted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ZOO 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation