GENETICS (GEN)

Courses primarily for undergraduates:

GEN 110: Genetics Orientation
(1-0) Cr. 1. F.
This course is intended for first year students and others new to the genetics major. Discussion of university policies and resources, requirements of the major, career opportunities, and other topics related to the first year experience.

GEN 298: Cooperative Education
Cr. R. F.S.SS.
Prereq: Permission of department cooperative education coordinator; sophomore classification
Required of all cooperative education students. Students must register for this course prior to commencing each work period.

GEN 313: Principles of Genetics
(Cross-listed with BIOL). (3-0) Cr. 3. F.S.SS.
Prereq: BIOL 211, BIOL 211L, BIOL 212, and BIOL 212L
Introduction to the principles of transmission and molecular genetics of plants, animals, and bacteria. Recombination, structure and replication of DNA, gene expression, cloning, quantitative and population genetics. Students may receive graduation credit for no more than one of the following: Gen 260, Gen 313 and 313L, Gen 320, Biol 313 and 313L, and Agron 320.

GEN 313L: Genetics Laboratory
(Cross-listed with BIOL). (0-3) Cr. 1. F.S.
Prereq: Credit or enrollment in BIOL 313
Laboratory to accompany 313. Students may receive graduation credit for no more than one of the following: Biol 313 and 313L, Gen 260, Gen 313, Gen 320, and Agron 320.

GEN 320: Genetics, Agriculture and Biotechnology
(Cross-listed with AGRON). (3-0) Cr. 3. F.S.
Prereq: BIOL 212
Transmission genetics with an emphasis on applications in agriculture, the structure and expression of the gene, how genes behave in populations and how recombinant DNA technology can be used to improve agriculture. Credit for graduation will not be allowed for more than one of the following: Gen 260, 313, 320 and Biol 313 and 313L.

GEN 322: Introduction to Bioinformatics and Computational Biology
(Cross-listed with BCBIO, BIOL). (3-0) Cr. 3. F.
Prereq: BIOL 212
Genome sequencing, assembly, structural and functional annotation, and comparative genomics. Investigating these topics will develop skills in programming and scripting (Perl and/or Python), the use of biological databases, sequence alignment, homology search, identification of sequence patterns, construction of phylogenetic trees, and comparative genomics.

GEN 340: Human Genetics
(3-0) Cr. 3. F.S.SS.
Prereq: BIOL 313 or GEN 313
Fundamental concepts and current issues of human genetics. Human chromosome analysis, pedigree analysis, gene mapping, the human genome project, sex determination, genetics of the immune system, genetics of cancer, gene therapy, the genetic basis of human diversity, eugenics.

GEN 349: The Genome Perspective in Biology
(Cross-listed with BIOL, MICRO, V PTH). (2-0) Cr. 2. S.
Prereq: GEN 313 or GEN 320
Analysis of genome, RNA, and protein data using computer technology to answer biological questions on topics ranging from microbial diversity to human health. An introduction for students in the life sciences to the fields of genomics, bioinformatics and systems.

GEN 398: Cooperative Education
Cr. R. F.S.SS.
Prereq: Permission of department cooperative education coordinator; junior classification
Required of all cooperative education students. Students must register for this course prior to commencing each work period.

GEN 409: Molecular Genetics
(3-0) Cr. 3. F.
Prereq: BIOL 313
The principles of molecular genetics: gene structure and function at the molecular level, including regulation of gene expression, genetic rearrangement, and the organization of genetic information in prokaryotes and eukaryotes.

GEN 410: Analytical Genetics
(3-0) Cr. 3. S.
Prereq: GEN 409
The principles and practice of genetic analysis. Mendelian genetic analysis, mutational, transgenic, and genomic analysis of gene function, linkage and gene mapping, chromosomal aberrations, aneuploidy and polyploidy, extrachromosomal inheritance, analysis of genetic pathways.

GEN 444: Bioinformatic Analysis
(Cross-listed with BCB, BCBIO, BIOL, COM S, CPR E). (4-0) Cr. 4. F.
Prereq: MATH 165 or STAT 401 or equivalent.
Broad overview of bioinformatics with a significant problem-solving component, including hands-on practice using computational tools to solve a variety of biological problems. Topics include: bioinformatic data processing, Perl programming, genome assembly, database search, sequence alignment, gene prediction, next-generation sequencing, comparative and functional genomics, and systems biology.

GEN 462: Evolutionary Genetics
(Cross-listed with BIOL). (3-0) Cr. 3. F.
Prereq: BIOL 315
The genetic basis of evolutionary processes in higher organisms. The role of genetic variation in adaptation, natural selection, adaptive processes, and the influence of random processes on evolutionary change.

GEN 490: Independent Study
Cr. 1-5. Repeatable, maximum of 9 credits.
Prereq: GEN 313, junior or senior classification, permission of instructor
Independent study in any area of genetics. Students may use no more than 9 credits of university-wide 490 credits (including Gen 490) toward the total of 120 credits required for graduation.

GEN 491: Undergraduate Seminar
(1-0) Cr. 1. F.S.
Prereq: GEN 409
Communication within the discipline based on comprehension, discussion, presentation, and critical evaluation of original research literature; survey of career paths within the genetics disciplines and approaches to obtaining positions; exposure to research publication and grantsmanship processes; ethical issues in genetics research; outcomes assessment activities.

GEN 492: Laboratory Teaching Experience
Cr. 1-2. Repeatable, maximum of 9 credits. F.S.
Prereq: GEN 313, junior or senior classification, permission of instructor
For students registering to be undergraduate laboratory assistants. Offered on a satisfactory-fail basis only. No more than 2 credits of GEN 490U or GEN 492 may be applied toward the Genetics advanced course requirement.

GEN 495: Special Topics in Genetics
(1-0) Cr. 1-3. Repeatable, maximum of 3 credits. F.S.
Prereq: GEN 313; permission of instructor
Content varies from year to year. Genetics students may use no more than 9 credits of university-wide 490-499 credits toward the total of 120 credits required for graduation.

GEN 496: Attendance and Critique of Genetics Seminars
Cr. 1. Repeatable, maximum of 3 credits. F.S.
Prereq: GEN 313, junior or senior classification, permission of instructor
Attendance and critique of departmental seminars in BBMB, GDCB, or EEOB. Offered on a satisfactory-fail basis only. Genetics students may use no more than 9 credits of university-wide 490 - 499 credits toward the total of 120 credits required for graduation.

GEN 498: Cooperative Education
Cr. R. F.S.SS.
Prereq: Permission of department cooperative education coordinator; senior classification
Required of all cooperative education students. Students must register for this course prior to commencing each work period.

GEN 499: Genetics Research
Cr. 1-5. Repeatable, maximum of 9 credits. F.S.SS.
Prereq: GEN 313, junior or senior classification, permission of instructor
Independent research in any area of genetics. Genetics students may use no more than 9 credits of university-wide 490-499 credits toward the total of 120 credits required for graduation.

GEN 499H: Genetics Research for Honors
Cr. 1-5. Repeatable, maximum of 9 credits. F.S.SS.
Prereq: GEN 313, junior or senior classification, permission of instructor
Independent research in any area of genetics; for Honors students only. Genetics students may use no more than 9 credits of university-wide 490-499 credits toward the total of 120 credits required for graduation.