BIOLOGY MAJOR—Genetics Option 2018-2019

The Genetics option emphasizes the application of genetics theory and methods to evolutionary questions. It is an excellent way to prepare for graduate programs in genetics and evolutionary biology. It is not designed for students interested in genetic counseling.

Courses used to satisfy the Genetics option also count for the Physiology, Writing Intensive, the Physics/Computer Science/ Quantitave and additional upper division science electives for the Biology major. The statistics courses in the Genetics option also completes half of the Biology major statistics requirement (ST 411 and 412 are taken instead of ST 352).

It is strongly recommended that students interested in genetics research gain experience in an appropriate laboratory setting, and up to three credits of approved BI 401 Research or 410 Internship credit may be used as electives in the option. Other coursework taken abroad may be approved by Brock McLeod. Previous versions of this option are different and tracked in MyDegrees. **All courses and prerequisites are subject to change.**

Required Core Coursework (30 credits)			
Course	**Pre(Co)requisites**	**Term**	**Credits**
BI 315 Molecular Biology Laboratory (recommended) **OR** BB 493 Biochemistry Laboratory in Molecular Techniques I	BB 314 (C-) BB 450, 451	SP F	3 3
BB 494 Biochemistry Laboratory in Molecular Techniques II	BB 493 or BB 315	W	3
BI 483 Population Biology	BI 370 or BI 311, ST 351, 352 or 411, MTH 251	W	3
CS 161 Introduction to Computer Science I	MTH 112 (C)	F, SP, SU	4
CS 162 Introduction to Computer Science II	CS 161 (C)	F, W, SU	4
ST 411 Methods of Data Analysis (instead of ST 352)	ST 351	F, W, SU	4
ST 412 Methods of Data Analysis (instead of ST 352)	ST 411	W, SP	4
Z 425 Embryology and Development	BI 311, BB 314, Junior Standing	F	5
Writing Intensive Course (select one course from the following)			
BI 317 Scientific Theory and Practice	BI 211, 212, 213 (C–)	F, W?, SP?	3
BI 319 Critical Thinking & Communication in the Life Sciences	BI 211, 212, 213; ST 351	F?, W?, SP	3
Evolutionary Genetics (select one course from the following)			
BB 486 Advanced Molecular Genetics	BB 314 and BB 315 or BB 492, **or** instructor approval	SP	3
BI 456 Phylogenetics	ST 351 and (ST 352 or 411) and (BI 311 or BI 445)	Alt. W	4
BOT 460 Functional Genomics	BI 311, BB 314, and instructor permission	SP	3
BOT 475 Comparative Genomics	BI 311 (or CCS 430), BB 314	Alt. W	4
Bioinformatics (select one course from the following)			
BB 485 Applied Bioinformatics	BB 314	W	3
BOT 476 Introduction to Computing in the Life Sciences	BI 311 or BB 314	SP	3
Upper Division Elective (select three credits from Track I or one course from Track II)			
Track I: Experiential Learning Credits (complete any combination of three credits below)			
BI 401 Research and Scholarship	Departmental Approval	All terms	1-3
BI 410 Internship	Departmental Approval	All terms	1-3
Track II: Complete one 3+ credit, upper division (300-400 level) science elective courses not used above: Courses from BB, BHS, BI, BOT, CH, MB, MTH, PH, ST, & Z including double major, minor and Bacc. Core Synthesis may be used with the exception of courses listed as excluded below. Other science courses outside of COS and courses taken internationally may be used by approval. **Excluded:** Courses from departments above between 401-410 (except as outlined above or by approval), as well as BB 350, BB 490-492, BI/Z 331-333/341-343, CH 334-336, ST 314, Z 361/Z 362, Z 461 and any 399 or 499 courses not specifically approved).			

OSU Genetics and Evolution Resources

Professional Experience

Students are strongly encouraged to use the information below early in their careers as a starting point for exploring their interests in genetics and evolutionary biology.

Undergraduate Research

Students can get involved with research in any department at OSU, and research in genetics and evolution takes place in Integrative Biology and many other units on campus. The best way to get involved in research is to approach a faculty member you would like to work with after reviewing their website. Faculty research interests can be found on all department websites, though it is easier to find on some than others. Positions generally require volunteering initially, but they can develop in to paid opportunities and BI 401 Research credit is also available for approved projects. See http://ib.oregonstate.edu/professional/research-internships for more information on how to find a mentor, as well as possible departments to look in for faculty mentors.

Students can also find excellent opportunities for research at other institutions. The NSF REU (Research Experiences for Undergraduates) program is an excellent and nationally competitive program that generally requires students have some experience. See http://www.nsf.gov/home/crssprgm/reu/ for details.

Volunteering and Internships

Genetics opportunities exist in a variety of contexts in both the government and private sectors, though many of them are outside of Corvallis. For opportunities beyond campus, students should see the Biomedical, Cell and Molecular Biology, Genetics and Genomics section of the Integrative Biology website at http://ib.oregonstate.edu/professional/internship-research/intern-volunteer-list. Students can receive BI 410 Internship credit for approved projects – see http://ib.oregonstate.edu/professional/research-internships.

Genetics Careers

Genetics is an expanding field with varied employment opportunities in the public and private sectors. Because genetic techniques and theory can be applied to many areas in biotechnology, agriculture, medicine and the other life sciences, students interested in genetics are advised to explore diverse experiences as undergraduates.

Students serious about a genetics career should consider graduate work to increase opportunities, particularly if they are interested in a focus on evolutionary biology where fewer opportunities exist for students with bachelors degrees.

Computing and quantitative expertise is increasingly important in genetics and many other areas of biology. Additional background in math, statistics and computer science is advantageous, and students interested in genetics can consider additional OSU coursework or minors in these areas to complement their Genetics option.

International Opportunities

Many international programs are available through OSU, some of which include specific genetics opportunities in the form of internships. These programs can be integrated into a four year plan with the Genetics option. http://ib.oregonstate.edu/professional/international.

Career Resources

Genetics Professional Societies:
http://www.kumc.edu/gec/prof/soclist.html

Oregon Biosciences Association:
https://www.oregonbio.org/

Society for the Study of Evolution:
http://www.evolutionsociety.org/

Society for Integrative and Comparative Biology:
http://www.sicb.org

Integrative Biology careers website:
https://ib.oregonstate.edu/professional/careers