Genetics and Genomics Ph.D. Requirements

The requirements outlined below are effective for the matriculating class of Fall 2019 for the Doctor of Philosophy in Molecular and Cell Biology, with concentration in Genetics and Genomics. Students who matriculated prior to Fall 2019 have the option to use these newly implemented requirements or requirements previously applied to graduate students in the Genetics and Genomics AOC (found here for students that matriculated before 2018, and here for students that matriculated in 2018).

General requirements for Ph.D. students enrolled in the Genetics and Genomics AOC within MCB (note that the Graduate School requirements are in bold):

1. **Organize your committee (five faculty) and submit your plan of study by the end of the Spring semester of your first year.**

2. You must take your qualifying exam by the end of August of your third year.

3. **You must have a total of 30 MCB credits (15 minimum credits of didactic classwork-as outlined in Courses requirements and timeline) and 15 minimum credits of research and/or special topics. You must register for a minimum of 6 credits each semester to remain in good standing; MCB 6897 and GRAD 6950 may be used for this purpose. You need a minimum of 15 credits of GRAD 6950 before submitting your final dissertation.**

4. No class may be repeated towards the 15 minimum didactic credits.

More details about the MCB Ph.D requirements for the first year can be found here.
Information about the Ph.D. milestones for MCB can be found here.
Information on the General exam (dissertation proposal) can be found here.

Course requirements and timeline:

**1st semester (Fall), you must register for:**
- MCB 5896-038 MCB Introduction to Research (3 credits)
- MCB 5896-013 Rotations in MCB (3 credits)
- MCB 5896-001 Graduate seminar (1 credit)

**2nd semester (Spring), you must register for:**
- MCB 5801 (Scientific Writing and Project Development for MCB Graduate Students)
- GRAD 5910 (Responsible Conduct in Research).
- MCB 6897 (Research, 3 credits; this can be served with your newly chosen faculty advisor or with the advisor overseeing a fourth, semester-long rotation if you opted for an extra rotation).

In addition to one course selected from above, you may register for:
- MCB 5499 Current Topics in Genetics (1 credit)
- MCB 5896-001 Graduate seminar (1 credit)

Prior to registering for courses for your third semester, you must discuss planned coursework with the AOC head and/or your faculty advisor.

Foundational Genetics and Genomics courses highly recommended are highlighted in red.

**3rd semester (Fall), pick one didactic course:**
- MCB 5445 Genome Dynamics and Epigenetics (3 credits)
MCB 5452 Problems in Genetics of Eukaryotes (3 credits)
MCB 5217 Biosynthesis of Nucleic Acids and Proteins (3 credits)
MCB 5621 Molecular Biology and Genetics of Prokaryotes (3 credits)

In addition to one course selected from above, you may register for:
MCB 5499 Current Topics in Genetics (1 credit)
MCB 5896-001 Graduate seminar (1 credit)

From the 4th semester onward:

Between years 2 and 4, all students must take MCB 5893 (Special Topics in Cellular & Molecular Biology) Additionally, students may choose from didactic courses not previously taken from the above lists and from the following:

Spring Semester

MCB 5426 Genetic Engineering and Functional Genomics (3 credits)
MCB 5219 Developmental and Regenerative Biology (3 credits)
MCB 5896 Footprints of Natural Selection in the Genome (3 credits)
EEB 4100 Big Data science for Biologists (3 credits)

Didactic coursework choice alternatives:
For students needing a more basic background in genetics and functional genomics you may instead take one of these courses following discussion with your advisor and/or AOC head:
MCB 5896-063 Gene Expression (3 credits)
MCB 5896-037 Concepts of Genetic Analysis (3 credits)

Fall Semester

MCB 5430 Analysis of Eukaryotic Functional Genomic Data (3 credits)
MCB 5243 Molecular Analysis of Development (3 credits)

Optional courses for students with a research focus on molecular evolution/microbial genetics:
MCB 5471 Current Topics in Molecular Evolution (1 credit)
MCB 3637 Practical Methods in Microbial Genomics (3 credits)
EEB 6486 Systematics Seminar (1 credit)

The following Intensive didactic courses are recommended for students with a research focus on molecular evolution/population genetics (note that these are not offered every year):
MCB 5472 Computer Methods in Molecular Evolution (3 credits)
EEB 5348 Population Genetics (3 credits)
EEB 5349 Phylogenetics (3 credits)

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