

**An Introduction to the
Graduate Programs in
the *Quantitative Biology
and Bioinformatics*
(QBB) Subprogram**

SoLS Research Faculty Affiliated with the Quantitative Biology and Bioinformatics (QBB) Subprogram

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Who should apply

The QBB subprogram is aimed at students interested in pursuing a graduate degree in areas such as biological modeling, bioinformatics, biostatistics, or other quantitative disciplines. We recognize that not all applicants to our graduate program will have developed skills in both quantitative science and biology. Accordingly, we encourage applications from students with backgrounds either in quantitative science or biology, and the desire to learn the other. We particularly encourage applications from disciplines such as mathematics, computer science, physics, engineering and chemistry. The QBB subprogram is geared towards facilitating the inclusion of students from such backgrounds into the SoLS graduate program. Applicants to the program should have taken **at least two semester courses of college-level Biology** prior to admittance to the program.

Required Courses for All Degrees:

- **Biol 701**—*Ethics* (1 credit) All SoLS students must enroll in Biol 701.
- **Biol 790**—*Research Colloquium in Life Sciences*
Students may take this course for credit (1-2 credits/semester for a maximum of 10 credits toward the degree), but all students (including non-enrolled) must participate each semester

Didactic Courses Requirements for the MS and PhD Degrees

- MS and Ph.D. students must take at least TWO classes from the following list:
- **Biol 611** — *Molecular Evolution* (3 credits)
- **Biol 625** — *Genomics* (3 credits)
- **Biol 616** — *Bioinformatics* (3 credits)
- **Biol 628** — *Biometry* (3 credits)
- **Biol 680** — *Intro. to Biological Modeling* (3 credits)
- **Biol 714** — *Population genetics* (3 credits)

Didactic Courses Requirements for the MS and PhD Degrees

MS students take a total of THREE and Ph.D. students must take a total of SIX 600-level or 700-level didactic courses in SoLS or other departments, to be determined by their advising committee. The non-SoLS courses may come from, but are not limited to, the following list

Suggested Didactic Courses for the MS and PhD Degrees

- **STAT 691** — *Statistics for Scientists I* (3 credits)
- **STAT 692** — *Statistics for Scientists II* (3 credits)
- **ME 616** — *Intro. To Biomech. Engr.* (3 credits)
- **ME 710** — *Transp. Phenom. Bioengr.* (3 credits)
- **CS 617** — *Intr. Comp. Simulation* (3 credits)
- **CS 677** — *Analysis of Algorithms* (3 credits)
- **CS 717** — *Adv. Comp. Simulation* (3 credits)
- **EAB 703** — *Biostat. Meth. Life Sci.* (3 credits)
- **EAB 795** — *Special Topics Int. Biostat* (3 credits)

Research Courses

- MS students must complete 15 credits of 700-level courses
- PhD students must complete 30 700-level credits
- The following “research based” classes may be used to satisfy 700-level requirements

Research Courses

- **Biol 789**—*Independent Graduate Study in Life Sciences* (1-3 credits/semester; may be repeated for a max. of 9)
- **Biol 790**—*Research Colloquium in Life Sciences* (1-2 credits/semester; repeated for a maximum of 10 credits)
- **Biol 791**—*Research Laboratory Discussion in Life Sciences* (1-2 credits/semester; may be repeated for a maximum of 10 credits toward the degree). Can be taken to receive credit for participating in Mentor's lab meeting.

Seminar Requirements

- MS students must take 4 credits of seminar-style courses (Biol 796)
- PhD students must take 6 credits of seminar classes (Biol 796)
- **Biol 796**—*Graduate Seminar* (2 credits/semester; may be repeated for a maximum of 10). Papers for this class are selected from a broad survey of the current literature. QBB MS students must take at least one semester, and QBB Ph.D. students must take at least two semesters of the QBB Graduate Seminar (Biol 796 section 1005)

Graduate Program Policies:

All Students

1. Each student must form a Research Advisory Committee within the first semester after matriculation
2. Each student must meet with his/her Research Advisory Committee at least once during the calendar year, and submit a written report to the GOC

Graduate Program Policies: Master's Students

1. MS students must form a Research Advisory Committee consisting of at least four experts in a related field of study:
 - A typical committee consists of:
 - Research Mentor (Chair)
 - Two SoLS Graduate Faculty
 - Graduate College Representative who has official grad faculty status within another academic unit on campus
2. MS students must complete a minimum of 30 credit hours beyond the baccalaureate degree.

Graduate Program Policies: Master's Students (cont)

3. Credits for the MS degree will be obtained from didactic classes at the 600 and 700 level.
4. MS students must take at least 4 credits of **Biol 796**—*Graduate Seminar* (2 of which must be the QBB Graduate seminar, **Biol 796 section 1005**)
5. MS students must take 6 credits of **Biol 797: Thesis**. Students can enroll for more credits of Biol 797, but only six will count toward the degree.

Graduate Program Policies: Master's Students (cont)

6. MS students must participate in **Biol 790—*Research Colloquium in Life Sciences***. Students not enrolled must also participate each semester
7. The student's Research Advisory Committee will determine the course of action and coursework for each individual MS student
8. The MS within SoLS is a Research Degree: Many credits will be earned in “research-oriented” courses that include summer work
9. Students must complete a written thesis and publically defend their work

Typical Timeline for the MS Degree:

Year 1 (Fall and Spring semesters):

Enroll in at least 6 credits each semester to fulfill course and research requirements

- Seminar and Colloquium (3 credits)
- Two didactic courses (6 credits)

Year 1 (Summer):

- Spend full time in the laboratory or field
- Take research credits (3-6 credits)

Typical Timeline for the MS Degree:

Year 2 (Fall and Spring semesters):

- Finish Coursework (6 credits)
- Finish thesis credits & defend (6 credits)

Year 2 (Summer, if necessary):

- Finish thesis credits; defend

Sample Program of Study: MS Student

	<u>Credits</u>
3 didactic courses at the 600- or 700-level	9
Biol 796—Graduate Seminar	6
Biol 789—Independent Study (Pre-thesis)	2
Biol 790—Research Colloquium	5
Biol 791—Research Lab. Discussions	2
<u>Biol 797—Thesis</u>	<u>6</u>
TOTAL	30

Graduate Program Policies: Doctoral Students

1. PhD students must form a Research Advisory Committee consisting of at least five experts in a related field of study
 - A typical committee consists of:
 - Research Mentor (Chair)
 - Two or three SoLS Graduate Faculty
 - Graduate College Representative who has official grad faculty status within another academic unit on campus
 - Optionally, an Outside University Member, who is to be granted conditional Grad Faculty status

Graduate Program Policies: Doctoral Students (cont)

2. Doctoral students are required to complete a minimum of 60 credit hours beyond the baccalaureate degree
3. Credits for the PhD degree will be obtained from didactic classes at the 600 and 700 level
4. PhD students must take at least 6 credits of **Biol 796—*Graduate Seminar*** (4 of which must be the QBB Graduate seminar, **Biol 796 section 1005**)

Graduate Program Policies: Doctoral Students (cont)

5. PhD students are required to take 12 credits of **Biol 799**—*Dissertation*. Students may enroll for more credits of Biol 799, but no more than 18 will count toward the degree
6. PhD students must participate in **Biol 790** — *Research Colloquium in Life Sciences*
7. The student's Research Advisory Committee will determine the course of action and coursework for each individual PhD student
8. All PhD students are required to instruct one lab or discussion section of a UNLV biology class

Graduate Program Policies: Doctoral Students (cont)

9. All PhD students must pass a comprehensive exam before being admitted to candidacy
 - Students must take the comprehensive exam before the first day of their 6th semester in the program
 - The comprehensive exam is administered by the student's advisory committee
 - The exam consists of a written portion in the form of either answers to questions posed by the committee, or a mock funding proposal and an oral defense of the work

Graduate Program Policies:

Doctoral Students (cont)

10. The PhD within SoLS is a Research Degree:
Many credits will be earned in research- oriented courses that include summer work
11. Students must complete a written dissertation and publicly defend their work

Timeline for the PhD Degree:

Year 1:

- Enroll in 6 credits/semester to fulfill course and research requirements
 - Seminar and Colloquium (3 credits)
 - Two didactic courses (6 credits)

Year 2:

- Didactic courses (6 credits)
- Seminar and Colloquium (6 credits)

Timeline for the PhD Degree (cont):

Year 3:

- Didactic courses (6 credits)
- Seminar and Colloquium (6 credits)
- Take and pass the comprehensive exam before the start of the 6th semester

Years 4, 5, and 6:

- Enroll in 6 credits/semester for research/dissertation
- Participate in Research Colloquium
- Write Dissertation and defend

Sample Program of Study: PhD Student

	<u>Credits</u>
6 didactic courses at the 600- or 700-level	18
Biol 796—Graduate Seminar	6
Biol 789—Independent Study (Pre-thesis)	6
Biol 790—Research Colloquium	9
Biol 791—Research Lab. Discussions	6
<u>Biol 799—Dissertation</u>	<u>15</u>
TOTAL	60