

# An Introduction to the Cell and Molecular Biology (CMB) Subprogram

## SoLS Research Faculty Affiliated with the Cell and Molecular Biology (CMB) Graduate Subprogram

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## Required Courses for All Degrees

- **Biol 701**—*Ethics in Scientific Research* (1 credit).  
Required class for all students in both degree programs.
- **Biol 790**—*Research Colloquium in Life Sciences*  
Students may take this course for credit (1-2 credits/semester for a maximum of 9 credits toward the degree), but all students (including non-enrolled) must participate each semester.

## Core Courses for MS and PhD

MS students must take at least ONE and PhD students must take at least THREE of the following Core Classes:

- **Biol 607**—*Molecular Biology* (3 credits)
- **Biol 625**—*Genomics* (3 credits)
- **Biol 645**—*Cell Physiology* (3 credits)
- **Chem 772**—*Nucleic Acid Chemistry* (3 credits)

## Elective Courses for MS and PhD

- MS students must take TWO of the following electives.
- PhD Students must take THREE of the following electives.

### Note:

- For students whose research topic focuses predominantly on a cell biological topic, the advisory committee may choose a relevant elective course to replace one of the core courses.
- Core courses (above) that are not being used to satisfy Core Requirements may be taken as Electives.
- Elective courses must be approved in advance by the student's Research Advisory Committee.
- The Research Advisory Committee may require the student to take specific courses, depending on the person's academic background and research objectives.

## Elective Course Lists

- **Biol 604**—*Principles of Neurobiology* (3 credits)
- **Biol 609**—*Virology* (3 credits)
- **Biol 611**—*Molecular Evolution* (3 credits)
- **Biol 616**—*Bioinformatics* (3 credits)
- **Biol 626**—*Plant Anatomy* (3 credits)

- **Biol 628**—*Biometry* (3 credits)
- **Biol 642**—*Principles of Plant Physiology* (3 credits)
- **Biol 648**—*Endocrinology* (3 credits)
- **Biol 653**—*Immunology* (3 credits)
- **Biol 658**—*Stem Cells and Regenerative Biol* (3 credits)
- **Biol 664**—*Bacterial Pathogenesis* (3 credits)
- **Biol 666**—*Developmental Biology* (3 credits)
- **Biol 669**—*RNA Biology* (3 credits)
- **Biol 678**—*Cancer Cell Genetics* (3 credits)
- **Biol 680**—*Introduction to Biological Modeling* (3 credits)
- **Biol 685**—*Microbial Genetics* (3 credits)
- **Biol 702**—*Biology Graduate Core* (3 credits)
- **Biol 792**—*Advanced Topics in Cell & Molecular Biology* (3 credits)
- **Biol 794**—*Molecular Biology Techniques* (3)
- **Chem 770**—*Protein Chemistry* (3 credits)
- **Chem 771**—*Metabolism and Energetics* (3)
- **Stat 691**—*Statistics for Scientists I* (3 credits)
- **Stat 692**—*Statistics for Scientists II* (3 credits)

### Research Courses

- MS students must complete **18 credits** of 700-level courses.
- PhD students must complete **24 credits** of 700-level credits (excluding Biol 799).

The following “research based” classes may be used to satisfy 700-level requirements.

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

### Seminar Requirements

- MS students must complete **4 credits** of seminar-style classes, either Biol 793 or Biol 796.
- PhD students must complete **6 credits** of seminar-style classes, either Biol 793 or Biol 796.
- **Biol 796**—*Graduate Seminar in Life Sciences* or **Biol 793**—*Advanced Topics in Life Sciences*  
Students may take these courses for credit (1-2 credits/semester for a maximum of 9 credits toward the degree). All MS students and all PhD students, who have yet to take their comprehensive exam, should take this course every semester. Seminar style classes involve discussion of a research paper at each class meeting. Biol 793 focuses on a specific topic selected by the instructor. Biol 796 involves a broad survey of the current literature.

### Graduate Program Policies: All Students

- The online Graduate Catalog [and](#) the SoLS Graduate Programs Handbook that was available at the time of matriculation will be the source for the enforced graduate policies for each student.
- All students must form a Research Advisory Committee within the first semester after matriculation.
- All students must meet with his/her Research Advisory Committee at least once during Jan. through Oct. of each calendar year and submit a written report to the GOC.
- **Note:** A more thorough description of Graduate Program Policies is provided in the SoLS Graduate Programs Handbook.

### MS Students

1. MS students must form a Research Advisory Committee consisting of at least **four** experts in their field of study. A typical committee consists of:

- Primary Research Mentor & Academic Chair (Note: these are not always the same person<sup>1</sup>)
  - Two SoLS Graduate Faculty (Should include the SoLS Academic Chair if the Primary Research Mentor's primary appointment is not in SoLS)
  - Graduate College Representative who has official graduate faculty status within another academic unit on campus
2. MS students must complete a minimum of 30 credit hours beyond the baccalaureate degree.
    - Credits for the MS degree will be obtained from courses at the 600 and 700 level.
    - MS students must take **Biol 701**— Ethics in Scientific Research (1 credit) during their first semester in the program and either attend the Ethics components of Biol 702 or complete UNLV RCR training.
    - MS students must take at least 4 credits of **Biol 796**—*Graduate Seminar* or **Biol 793**—*Advanced Topics in Life Sciences*. Students may enroll for more credit (up to 9 credits can count toward the degree), but they must participate each semester even if not enrolled.
    - MS students must take 6 credits of **Biol 797**: *Thesis*. Students can enroll for more credits of Biol 797, but only 6 will count toward the degree.
    - MS students must participate in **Biol 790**: *Research Colloquium in Life Sciences*. Students not enrolled must also participate each semester.
  3. The student's Research Advisory Committee will determine the course of action and coursework for each individual MS student.
  4. The MS within SoLS is a Research Degree. Many credits will be earned in "research-oriented" courses that include summer work.
  5. Students must complete a written thesis and publicly defend their work.

### Typical Timeline for the MS Degree

Enroll in a minimum of 6 credits each semester to fulfill course and research requirements.

Year 1:

- Biology Graduate Core (3 credits)
- Seminars (1-2 credits)
- Colloquium (1-2 credits)
- Two didactic courses (6 credits)
- Research credits (1-6 credits)
- Spend full time in the laboratory or field over summer.

Year 2:

- Seminars (2 credits)
- Colloquium (2 credits)
- Research credits (2 credits)
- Thesis credits (6 credits)
- MS students in the CMB subprogram typically write and defend their Thesis during the summer or fall following their 4<sup>th</sup> semester.

### Sample Program of Study: MS Student

	<u>Credits</u>
3 didactic courses at the 600- or 700-level	9
Biol 701—Ethics in Scientific Research	1
Biol 793 or 796—Graduate Seminars	4
Biol 789—Independent Study (Pre-thesis)	2
Biol 790—Research Colloquium	2
Biol 791—Research Lab. Discussions	3
<u>Biol 797—Thesis</u>	<u>6</u>
<b>TOTAL</b>	<b>30</b>

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<sup>1</sup> for clarification of these terms, see SoLS Graduate Programs Handbook

## PhD Students

1. PhD students must form a Research Advisory Committee consisting of at least five experts in their field of study. A typical committee consists of:
  - Primary Research Mentor & Academic Chair (Note: these are not always the same person<sup>2</sup>)
  - Two or three SoLS Graduate Faculty (Should include the SoLS Academic Chair if the Primary Research Mentor's primary appointment is not in SoLS)
  - Graduate College Representative who has official grad faculty status within another academic unit on campus
  - Outside University Member, who must be granted conditional Grad Faculty status
2. Doctoral students are required to complete a minimum of 60 credit hours of graduate work.
  - Credits for the PhD degree will be obtained from classes at the 600 and 700 level.
  - PhD students must enroll in **Biol 701—Ethics in Scientific Research** (1 credit) during their first semester in the program and either attend the Ethics components of Biol 702 or complete UNLV RCR training.
  - PhD students are required/highly recommended to take **Biol 702—Biology Graduate Core** (3 credits) during their first fall semester in the program (waivers granted on an *ad hoc* basis from SoLS Grad Coordinator, upon request from the SoLS Academic Chair of their advisory committee).
  - PhD students must take at least 6 credits of **Biol 796—Graduate Seminar** or **Biol 793—Advanced Topics in Life Sciences**. Students may enroll for up to 9 credits, but they must participate each semester even if they are not enrolled.
  - PhD students must participate in **Biol 790—Research Colloquium in Life Sciences** each semester even if they are not enrolled in the class for credit.
  - PhD students are required to take **Biol 767—Dissertation Grant Proposal Writing** (3 credits) one year after passing their comprehensive exam. The culmination of this class is the approval by their Research Advisory Committee of a written “plan of action” for the completion of their dissertation. Syllabus available upon request from Dr. Wing.
  - 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.
3. The student's Research Advisory Committee will determine the course of action and coursework for each individual PhD student.
4. All PhD students are required to instruct one lab or discussion sections of a UNLV biology class.
5. All PhD students must pass a comprehensive exam before being admitted to candidacy. PhD students are required to take this exam prior to the beginning of the sixth semester in their graduate program. In CMB, the comprehensive examination is administered once each academic year, typically at the end of spring semester. The comprehensive exam is administered by a separate Examination Committee that must exclude the student's research mentor. The exam consists of a written portion in the form of a mock, graduate research proposal and an oral defense of the work to the Exam Committee.
6. The PhD within SoLS is a Research Degree. Many credits will be earned in “research-oriented” courses that include summer work.
7. Students must complete a written dissertation and publicly defend their work.

## Typical timeline for the PhD Degree

Enroll in a minimum of 6 credits/semester to fulfill course and research requirements.

Year 1:

- Biology Graduate Core (3 credits)
- Ethics (1 credit)
- Seminars (3 credits)
- Colloquium (3 credits)
- Two didactic courses (6 credits)

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<sup>2</sup> for clarification of these terms see SoLS Graduate Programs Handbook

- Spend full time in the laboratory or field over summer.

Year 2:

- Seminars (3 credits)
- Colloquium (3 credits)
- Three didactic courses (9 credits)
- Spend full time in the laboratory or field over summer.
- Take Comprehensive exam over the summer.

Year 3-6:

- Colloquium (3 credits)
- Research credits (18 credits)
- Dissertation Proposal Writing (3 credits)
- Dissertation credits (12 credits)
- Work full time on research project, including the summer.
- Write and defend Dissertation.

### Sample Program of Study: PhD Student

	<u>Credits</u>
6 didactic courses at the 600- or 700-level	18
Biol 701—Ethics in Scientific Research	1
Biol 702—Intro to the Grad Core	3
Biol 793/796—Graduate Seminars	6
Biol 789—Independent Study (Pre-thesis)	4
Biol 790—Research Colloquium	8
Biol 791—Research Lab. Discussions	5
Biol 767—Dissertation Proposal Grant Writing	3
<u>Biol 799—Dissertation</u>	<u>12</u>
<b>TOTAL</b>	<b>60</b>