MOLECULAR, CELL & DEVELOPMENTAL BIOLOGY
NEW STUDENT ORIENTATION 2024

Congratulations on your acceptance to UCLA!

Major Information

Undergraduate Advisor: Maggie Schmall
Website: https://www.mcdb.ucla.edu/
Email: mschmall@lifesci.ucla.edu or undergradmcdb@lifesci.ucla.edu
Office: 128 Hershey Hall
Phone: (310) 267-5908

Department Emails – Sign Up Today!

The MCDB major uses Google Groups to send important information to students. By joining the MCDB listserv, you will receive announcements regarding major requirements, scheduling updates, career and internship opportunities, etc.

We recommend that you use a "g.ucla.edu" or "gmail.com" account to sign up for the listserv.

To subscribe to MCDB: Send an email to **MCDBIO-L+subscribe@lists.ucla.edu**

You will receive an email from the group. Open the email and select "Join the Group". You will be directed to the Google Groups website. A box will appear that says "Apply to join the group." Check the settings options, and hit the "Apply to join this group" button. After joining the group, you will receive an email confirmation that your request has been approved.

UCLA LIFE SCIENCES
ADVISOR CONTACT INFORMATION

Biomedical Research Minor
Undergraduate Advisor: Enika Tumanov
Website: https://www.biomedresearchminor.ucla.edu/
Email: bmdresminor@lifesci.ucla.edu
Office: Hershey Hall 220B
Phone: (310) 825-0237

- Biomedical Research Minor

Computational and Systems Biology
Undergraduate Advisor: Brian Flores
Website: https://casb.ucla.edu/
Email: casb@lifesci.ucla.edu
Office: 102 Hershey Hall
Phone: (310) 825-5152

- Computation and Systems Biology Major
- Mathematical Biology Minor
- Structural Biology Minor
- Systems Biology Minor

Ecology and Evolutionary Biology
Undergraduate Advisors: Jessica Angus and Wendy Ramos
Website: https://www.eeb.ucla.edu/
Email: Please use Message Center via MyUCLA
Office: 101 Hershey Hall
Phone: (310) 825-1680

- Biology Major
- Ecology, Behavior, and Evolution Major
- Marine Biology Major
- Conservation Biology Minor
- Evolutionary Medicine Minor

Institute of the Environment and Sustainability
Undergraduate Advisor: Royce Dieckmann
Website: https://www.ioes.ucla.edu/
Email: rdieckmann@ioes.ucla.edu
Office: La Kretz Hall, Suite 300
Phone: (310) 206-9193

- Environmental Systems and Society Minor

Institute for Society & Genetics
Undergraduate Advisor: Frenz Cabison
Website: https://socgen.ucla.edu/
Email: isgacademics@g.ucla.edu
Office: Life Science Building 3360C

- Human Biology and Society, B.A. or B.S.
- Society and Genetics Minor

Integrative Biology & Physiology
Undergraduate Advisor: Inna Gergel
Website: https://physci.ucla.edu
Email: gergel@physci.ucla.edu
Office: 125 Hershey Hall
Phone: (310) 825-8482

- Physiological Science Major

Microbiology, Immunology & Molecular Genetics
Undergraduate Advisor: Dr. Jenesis Fonseca and Sierra Dwyer
Website: https://www.mimg.ucla.edu/
Email: undergrad@microbio.ucla.edu
Office: 1602B Molecular Sciences Building
Phone: (310) 825-8482

- MIMG Major

Molecular, Cell & Developmental Biology
Undergraduate Advisor: Maggie Schmall
Website: https://www.mcdb.ucla.edu/
Email: mschmall@lifesci.ucla.edu or undergradmcdb@lifesci.ucla.edu
Office: 126 Hershey Hall
Phone: (310) 267-5908

- MCDB Major

Neuroscience
Undergraduate Advisor: Aftin Whitten
Website: https://nerosci.ucla.edu
Email: neurosci@ucla.edu
Office: 1339 Gonda Center
Phone: (310) 206-2349

- Neuroscience Major
- Neuroscience Minor

Psychology
Undergraduate Advisor: Jaclyn Robbin
Website: https://psych.ucla.edu
Email: Please use Message Center via MyUCLA
Office: 1530 Pritzker Hall

- Psychology Major
- Psychobiology Major
- Cognitive Science Major
- Cognitive Science Minor
- Applied Developmental Psychology Minor

Science Education Minor
Website: http://www.cateach.ucla.edu/content/science-education-minor
Email: cateach@chem.ucla.edu
Office: Young Hall 1037 and 1039
Phone: (310) 794-2191

- Science Education Minor

Semel Institute
Website: https://education.semel.ucla.edu/brain-behavioral-health-minor/
Email: bbhminor@mednet.ucla.edu

- Brain and Behavioral Health Minor

Each of these majors requires all, or most of, the **Life Science Core Curriculum**, detailed on the next three pages.

LIFE SCIENCE CORE CURRICULUM

LIFE SCIENCES (All Courses Required)
LS 7A – Cell & Molecular Biology (5)
LS 7B – Genetics, Evolution & Ecology (5) Prerequisite: 7A
LS 7C – Physiology & Human Biology (5) Prerequisite: 7B
LS 7L – Intro to Laboratory and Scientific Methodology (3) Prerequisite: 7B

CHEMISTRY		
Life Science Series		**Physical Science Series**
14A(E) – General Chemistry for Life Scientists I (Enhanced) (4) Co-requisite: LS 30A or MATH 3A or 31A, or place into MATH 3A/31A by taking the Math Diagnostic Test		**20A(H) - Chemical Structure (4) (Honors)** Prep: Min 1 yr high school (HS) chemistry, 3.5 yrs HS math, (recommended) HS physics Co-req: MATH 31A
14B(E) - General Chemistry for Life Scientists II (Enhanced) (4) Prerequisite: CHEM 14A or 20A (grade of C- or better; Co-Req: LS 30B or MATH 3B or 31B (grade of C- or better)		**20B(H) - Chemical Energetics and Change (Honors) (4)** Prerequisites: CHEM 20A(H) and MATH 31A (grades of C- or better)
14BL - General and Organic Chemistry Lab I (3) Prereq: CHEM 14A or 20A(H) (grade C- or better) Pre- or Co-requisite: CHEM 14B	**OR**	**20L - General Chemistry Laboratory (3)** Prerequisite: CHEM 14A or 20A (grade of C- or better) Pre- or Co-requisite: CHEM 14B or 20B
14C – Structure of Organic Molecules (4) Prerequisite: CHEM 14B (grade of C- or better)		**30A – Organic Chemistry I: Structure & Reactivity (4)** Prerequisite: CHEM 20B (grade of C- or better)
14D – Organic Reactions & Pharmaceuticals (4) Prerequisite: CHEM 14C (grade of C- or better)		**30AL - General Chemistry Laboratory II (4)** Prerequisites: CHEM 20B(H), 20L, 30A(H) (grades of C- or better)
		30B – Organic Chem II: Reactivity, Synthesis, & Spectroscopy (4) Prerequisite: CHEM 30A (grade of C- or better)

ADDITIONAL CHEMISTRY (Not Required for the Major)		
These courses are recommended for students planning to attend professional school.		
Life Science Series		**Physical Science Series**
14CL - General & Organic Chemistry Lab II (4) Prerequisites: CHEM 14B, 14BL or 20B, 20L (grades of C- or better) Pre- or Co-requisite: CHEM 14C	**OR**	**30BL - Organic Chemistry Laboratory I (3)** Prerequisites: CHEM 30A(H), 30AL, 30B (grades C- or better)
		30C - Organic Chemistry III: Reactivity and Synthesis, and Biomolecules (4) Prerequisite: CHEM 30B (grade C- or better)

IMPORTANT NOTE: After completing Chem 20A, students can move to the 14 Series starting with 14B, or after taking Chem 20A, 20B, students can take 14BL, 14C, 14CL*, 14D or after taking 20A, 20B, 20L may take Chem 14C, 14CL, 14D. Students who transfer chemistry credit from another school for 20A, 20L can take 14B, 14C, 14CL*, 14D. Students who wish to switch from the 14 series to the 20/30 series after taking Chem 14A, 14B, and 14BL, can take Chem 30A, 30AL, 30B.

LIFE SCIENCE CORE CURRICULUM, Continued

MATHEMATICS

The Life Science Core Office manages and teaches the Life Science courses (7A/B/C, 7L), as well as Mathematics for Life Scientists, which is acceptable for professional schools.

Mathematics for Life Scientists (Recommended)
Life Science 30A – Mathematics for Life Scientists (4)
Life Science 30B - Mathematics for Life Scientists (4) Prerequisite: LS 30A
Life Science 40 – Statistics of Biological Systems (5) Prerequisite: LS 30A **OR** **Stats 13** – **Introduction to Statistical Methods for Life and Health Sciences (5)**
Note: The math diagnostic test is NOT required to start this series.

OR

If you do not choose the LS series detailed above, you can choose from one of the math series, offered by the Math department:

Mathematics (Offered by the Math Department)		
Life Science Series		**Physical Science Series**
MATH 3A – Calculus for Life Science Students (4) Preparation: 3.5 years of HS math (including trigonometry) Requisite: Math Diagnostic Test Score of 48 or better or Course 1 (grade of C- or better)		**MATH 31A(L) – Differential & Integral Calculus (Laboratory) (4)** Preparation: 3.5 years of HS math (including coordinate geometry and trigonometry) Requisite: Successful completion of Math Diagnostic Test or Course 1 (grade of C- or better)
MATH 3B – Calculus for Life Science Students (4) Prerequisite: Math 3A or 31A (grade C- or better)	**OR**	**MATH 31B(H) – Integration & Infinite Series (Honors) (4)** Prerequisite: MATH 31A (grade of C- or better)
MATH 3C – Ordinary Differential Equations with Linear Algebra for Life Science Students (4) Prerequisite: Math 3B or 31B (grade C- or better)		**MATH 32A(H) – Calculus of Several Variables (Honors) (4)** Prerequisite: MATH 31A (grade of C- or better)
STATS 13: Required for MIMG majors ONLY		**STATS 13:** Required for MIMG majors ONLY
Note: AP Calculus may give you credit for either MATH 31A or 31A & 31B – see below.		

Course Credit for AP Calculus (math courses offered by the math department ONLY):

Score	AB Exam	BC Exam
5	Credit for MATH 31A • **Enroll in Math 3B or 31B**	Credit for MATH 31A, 31B • **Enroll in Math 3C or 32A**
4	No credit for Math 3 or 31 series	Credit for Math 31A • **Enroll in Math 3B or 31B**

LIFE SCIENCE CORE CURRICULUM, Continued

PHYSICS		
Life Science Series		**Physical Science Series**
5A – Physics for Life Science Majors: Mechanics and Energy (5) Prerequisite: MATH 3A, 3B, 3C(3C may be taken concurrently) or MATH 31A, 31B, 32A or LS 30A, 30B		**1A(H) - Physics for Scientists and Engineers: Mechanics (Honors) (5)** Prerequisites: MATH 31A and 31B Pre- or Co-requisite: MATH 32A
5B – Physics for Life Science Majors: Thermodynamics, Fluids, Waves, Light and Optics (5) Prerequisite: PHYSICS 5A		**1B(H) - Physics for Scientists and Engineers: Oscillations, Waves, Electric and Magnetic Fields (Honors) (5)** Prerequisites: PHYSICS 1A, MATH 31B, 32A Pre- or Co-requisite: MATH 32B
5C – Physics for Life Science Majors: Electricity, Magnetism, and Modern Physics (5) Prerequisite: PHYSICS 5A	**OR**	**1C(H) - Physics for Scientists and Engineers: Electrodynamics, Optics, and Special Relativity (Honors) (5)** Prerequisites: PHYSICS 1A, 1B, MATH 32A, 32B Pre- or Co-requisite: MATH 33A
Labs: Each course in the 5 series includes both lecture and laboratory.		**Labs:** **4AL - Physics Lab for Scientists and Engineers: Mechanics (2)** Prerequisite: PHYSICS 1A(H) Co-Req: PHYSICS 1B(H) **4BL - Physics Lab for Scientists and Engineers: Electricity and Magnetism (2)** Prerequisite: PHYSICS 1A(H), 1B(H) Co-Requisite: PHYSICS 1C

Notes:

- All Life Science Core Curriculum courses, as well as the courses taken to satisfy major requirements, **MUST be taken for letter grades and passed with grades of C- or better.**

- A considerable amount of the Life Science series must be completed prior to taking any upper division MCDB courses, but there are a few exceptions.

- Physics may be completed in the third year.

SCHEDULING TIPS FOR FIRST-YEAR STUDENTS

First Quarter Recommendations: We recommend that you take no more than two science courses in your first quarter. You can take any combination of Chemistry, Math, or Life Sciences – CHEM 14A and LS 30A (or another math course), or LS 7A and LS 30A (or another math course). In addition, you will take one non-science class (ENG COMP 3 or a GE, for example).

If you feel unprepared for college-level chemistry, please consider…

- Taking a self-diagnostic test: https://bruinlearn.ucla.edu/enroll/LL3PBN. It will help you to determine if you are prepared for CHEM 14A, CHEM 14AE, or CHEM 17 – Chemical Principles.

If you feel unprepared for college-level calculus, please consider…

- Taking a diagnostic test: https://ww3.math.ucla.edu/math-diagnostic-test/. Or take MATH 1 – Precalculus.

The sample schedules on the next page are intended to help you plan your science classes in order to graduate within four years. That being said, they are not meant to be followed exactly. There is not a single, "right" class plan.

UCLA College Life Sciences

CURRICULUM OPTIONS FOR BIOLOGICAL SCIENCES MAJORS

Biology First Path

For students generally interested in a biological sciences major, preferably with at least two AP or honors courses in math, biology or chemistry

Fall	Winter	Spring
LS 30A (or MATH 3A or MATH 31A) LS 7A Plus other courses	LS 30B (or MATH 3B or MATH 31B) LS 7B Plus other courses	STATS 13 or LS 40 LS 7C LS 23L
Fall	**Winter**	**Spring**
CHEM 14A LS 110 or upper div biology class Plus other courses	CHEM 14B CHEM 14BL Plus other courses	CHEM 14C PHYSICS 5A Plus other courses
Fall	**Winter**	**Spring**
CHEM 14D LS 107 Plus other courses	CHEM 153A PHYSICS 5B Plus other courses	PHYSICS 5C Plus other courses
Fall	**Winter**	**Spring**
Electives and remaining requirements as needed for graduation	Electives and remaining requirements as needed for graduation	Electives and remaining requirements as needed for graduation

Biology Exploration Path

For students considering a biological sciences major with one AP or honors course in math, biology, or science

Fall	Winter	Spring
LS 20 * Non-majors biology class Plus other courses	LS 30A (or MATH 3A or MATH 31A) LS 7A Plus other courses	LS 30B (or MATH 3B or MATH 31B) LS 7B Plus other courses
Fall	**Winter**	**Spring**
LS 7C CHEM 17 LS 23L	CHEM 14A STATS 13 or LS 40 LS 110	CHEM 14B CHEM 14BL Plus other courses
Fall	**Winter**	**Spring**
CHEM 14C LS 107 Plus other courses	CHEM 14D PHYSICS 5A Plus other courses	CHEM 153A or CHEM 14D PHYSICS 5B Plus other courses
Fall	**Winter**	**Spring**
PHYSICS 5C Electives and remaining requirements as needed for graduation	Electives and remaining requirements as needed for graduation	Electives and remaining requirements as needed for graduation

* LS 15, EEB 25, EEB 87, PHYSCI 7, MCDB 40, MIMG 5

Chemistry Early Path

For biological sciences majors with a strong interest in chemistry and with at least two AP classes in chemistry/math.

Fall	Winter	Spring
CHEM 14A LS 30A (or MATH 3A or MATH 31A) Plus other courses	CHEM 14B LS 30B (or MATH 3B or MATH 31B) Plus other courses	CHEM 14BL LS 7A STATS 13 or LS 40
Fall	**Winter**	**Spring**
CHEM 14C LS 7B Plus other courses	CHEM 14D LS 7C LS 23L	PHYSICS 5A CHEM 153A LS 107
Fall	**Winter**	**Spring**
PHYSICS 5B Electives and remianing requirements as needed for graduation	PHYSICS 5C Electives and remaning requirements as needed for graduation	Electives and remaining requirements as needed for graduation
Fall	**Winter**	**Spring**
Electives and remaining requirements as needed for graduation	Electives and remaining requirements as needed for graduation	Electives and remaining requirements as needed for graduation

Physics Early Path

For biological sciences majors with a strong interest in physics and with at least two AP classes in physics, chemistry or math.

Fall	Winter	Spring
LS 30A (or MATH 3A or MATH 31A) LS 7A Plus other courses	LS 30B (or MATH 3B or MATH 31B) LS 7B Plus other courses	CHEM 14A PHYSICS 5A (or LS 40 or STATS 13) Plus other courses
Fall	**Winter**	**Spring**
CHEM 14B LS 40 or STATS 13 (or PHYSICS 5A) Plus other courses	LS 7C LS 23L CHEM 14C	CHEM 14BL PHYSICS 5C *(pre-req for Neurosci M101A)** Plus other courses
Fall	**Winter**	**Spring**
PHYSICS 5B CHEM 14CL Plus other courses	CHEM 14D Plus other courses	CHEM 153A Plus other courses
Fall	**Winter**	**Spring**
Electives and remaining requirements as needed for graduation	Electives and remaining requirements as needed for graduation	Electives and remaining requirements as needed for graduation

* Physics does not require 5B as a pre-requisite for Physics 5C

ENROLLMENT PROBLEMS YOU MAY ENCOUNTER

If you want to enroll in a class that has a requisite class that you took somewhere other than UCLA, you may be prevented from enrolling. This is because the enrollment system does not always recognize transfer coursework. Before your enrollment appointment begins, check the requisites for a course. If you are blocked from enrolling, you will need to contact the advisor of the department offering the course for help enrolling. Please note that advisors can only enroll students in courses offered by their department.

YOUR MCDB ADVISOR:

- CAN enroll any student, from any major, in an MCDB course (ex: MCDB 138)
- CANNOT enroll any student (not even an MCDB student) in a class offered by ANOTHER dept (ex: LIFE SCIENCE 107)

YOUR MIMG ADVISOR:

- CAN enroll any student, from any major, in an MIMG course (ex: MIMG 101)
- CANNOT enroll any student (not even an MIMG student) in a class offered by ANOTHER dept (ex: LIFE SCIENCE 107)

Chemistry

Website: https://www.chemistry.ucla.edu/
Email: ugrad@chem.ucla.edu

Life Sciences

Website: https://www.lscore.ucla.edu/
Email: lscore@lifesci.ucla.edu
Online Form: https://www.lscore.ucla.edu/enrollmentrequest/

Mathematics

Website: https://ww3.math.ucla.edu/
Email: ugrad@math.ucla.edu

Physics

Website: https://www.pa.ucla.edu/index.php
Email: mtran@physics.ucla.edu
Online Form: https://computing.pa.ucla.edu/webform/contact-physics-astronomy-undergraduate-office

TIPS FOR NEW STUDENTS

The Quarter System

The quarter system is very different from the semester system. It moves a lot faster and more is required of students in a relatively short period of time. Transitioning from the semester to the quarter system requires time to adjust. Don't be discouraged if you find that it takes some time to get used to the faster pace. Being organized and planning your study time helps with the adjustment.

Course Load – *How many classes should I enroll in for my first quarter?*

Not more than three. As you are just starting out at UCLA, it is a good idea to begin with a conservative schedule until you get your bearings. We recommend two classes for the major and one non-science class (ENGCOMP 3 or a GE, for example). Don't take more than two major classes in your first quarter! And do not take more than three classes in total. (But if you like, you can take three classes plus a Fiat Lux seminar or University Studies 10 or 20). Once you get a feel for the kind of course load you can handle, you can adjust your schedule accordingly for future quarters.

Prerequisites & Sequence of Courses – *Do classes have to be taken in a particular order?*

Pre-requisites, also called simply "requisites", are courses that you must take *before* taking a particular course. For example, you must take LS 7A before you can take LS 7B, so LS 7A is a *requisite* for LS 7B. It is essential that you familiarize yourself with the requisites for all courses you plan to take. Requisites are established for a reason and are strictly enforced. You must have the proper requisites completed before taking any MCDB classes! The UCLA General Catalog and the Schedule of Classes contains course descriptions with requisites. It is your responsibility to assure that required classes are completed before trying to enroll in a particular course.

When to Seek Advice – *When should I see an advisor?*

Your best source for obtaining important (and accurate) information about degree or major requirements is from an academic advisor. It is recommended that you visit your MCDB departmental advisor to go over your Degree Audit Report at least once per year, more often if needed. Questions can also be emailed to undergradmcdb@lifesci.ucla.edu.

College vs. Departmental Advisors – *Which advisor should I go to?*

For any questions or concerns you may have regarding the requirements pertaining to the **major***,* see your departmental advisor (Maggie Schmall for MCDB). For any other concerns (IGETC, the American History and Institutions requirement, the English Composition requirement, GEs, etc.), please check with College Academic Counseling, an Honors advisor if you are in College Honors, or an AAP counselor if you are in the Academic Advancement Program (AAP).

Professors' Office Hours – *Why should I go to office hours?*

Attending professors' office hours is an excellent way to supplement your class notes. Not only will it serve as a useful aid in preparing for exams, but it can give you and the professor an opportunity to get to know each other on a more individual basis.

Keeping the University Updated – *Why is my current contact info important?*

It is crucial that you maintain up-to-date records with the Registrar's Office. If any of your contact information (address, phone number, email address, etc.) changes, be sure to update it via MyUCLA.

Be Your Own Person! – *Should I constantly compare myself to my classmates?*

A competitive edge can be just the thing one needs to stay on top of his or her studies and to excel academically. However, it is equally important to keep things in perspective. The only person you really need to compete with is you. Try not to compare yourself with others too much (easier said than done, we know). Oftentimes, one's perception of their own progress compared to friends, roommates, or classmates can be skewed. Try to concentrate primarily on your own goals and do what you need to do for yourself to attain those goals.

MEDICAL SCHOOL REQUIREMENT GUIDELINES

Please note that these guidelines are subject to change at any time and are based on the UCLA School of Medicine requirements. The admissions offices of your top five or ten medical schools are the best sources for updated requirements.

"Pre-Health at UCLA" is a campus-wide initiative aimed to improve the pre-health experience at UCLA by bringing together information and opportunities for pre-health students:

1. http://prehealth.ucla.edu – Information about pre-health services, application timelines and processes, and health professions.
2. http://facebook.com/prehealthUCLA (@PreHealthUCLA) – Follow for upcoming events and opportunities on and off campus.
3. Pre-Health at UCLA Newsletter – Sign up for this bi-weekly newsletter by creating a Handshake account with the UCLA Career Center and indicating "Healthcare" as one of your Industry Interests when setting up your profile.

Students planning to apply to medical school should take:

- Three quarters of **English** at the college level (AP does not apply). Two quarters should be English composition (WI & WII, or 2 WII's) and at least one course should be a literature course.
- At least 3 quarters of **Math** at the college level (AP does not apply), including one course in statistics (lower or upper division). If an additional quarter of math is needed, any college-level course will fulfill the requirement. You do not need to take an extra calculus course.
- The Life Science series fulfills the requirement for one year of **Biology with Lab** at the college level (AP does not apply). This is covered by Life Sciences 7A, 7B, 7C, and 7L.
- The 14 or the 20/30 series plus CHEM 153A fulfills the **Chemistry with Lab** requirement at the college level (AP does not apply). Some schools do not specifically require a biochemistry lab, but all of these courses are what medical schools expect to see from UCLA applicants.
- **Physics** is covered by your major.
- **Spanish** is highly recommended. (This does not need to be taken at the college level. If you take it at UCLA, you should complete it through Spanish 3). Other foreign languages will also fulfill this requirement.

Students should also be able to show a commitment to the following:

- **Community service and/or experience in a health care setting.** This is an indication of your commitment to helping others. Your community service doesn't have to be through UCLA. It can be in your home community, through a church group, etc., but your record of service should show a genuine commitment.
- **Knowledge as to how healthcare is delivered and/or financed in the United States**.
- **Research.** Some admissions committees don't consider this absolutely necessary, but most schools will expect you to have done some kind of research if you were an undergraduate at UCLA. There is no minimum number of quarters of research required. Research in the Humanities is also acceptable.

GETTING INVOLVED IN RESEARCH

The MCDB major allows students to apply up to 12 units (three quarters) of upper division independent research (MCDB 196, 199A-C, 198A-C) to their major requirements.

The MCDB department has unique rules as to how and when these research courses are completed, as well as our own list of approved faculty research mentors. **It is important that you meet with the MCDB Undergraduate Advisor to discuss the details.**

There is also information on our department's website:

MCDB: https://www.mcdb.ucla.edu/undergraduate/undergraduate-research

Here are some organizations or opportunities on campus related to independent research:

Biomedical Research Minor

This minor is designed to help students to become involved in laboratory research from an early point in their college career. After initial training courses, students are placed in a laboratory in the College or Medical School for a minimum of four quarters of research. In addition to their research, students complete courses in analysis of research literature, oral presentation of research data, science policy and ethics, and history or philosophy of science. Students who complete the Biomedical Research Minor should be well trained in both the process of scientific research and the social issues facing science today. Entrance into the Minor is competitive. Students should apply no later than the first quarter of their junior year. Students from any major with a UCLA GPA of at least 3.0 are eligible to apply. Before applying to the minor, students must take one of three introductory courses: BMD RES 5HA or 10H, or Honors Collegium 70A.

The Life and Physical Sciences Undergraduate Research Center (URC)

The URC administers undergraduate research-related programs, including the Student Research Program (SRP), which enables undergraduates to begin working with faculty members on research projects. UCLA's Student Research Program is one of the largest programs of its kind in American higher education. The Undergraduate Research Center also provides workshops for students interested in participating in SRP; helps students identify faculty mentors; provides research stipends for some undergraduates; sponsors *The Undergraduate Science Journal;* and maintains an undergraduate research website at https://sciences.ugresearch.ucla.edu/.

MOLECULAR, CELL & DEVELOPMENTAL BIOLOGY

Major Packet 2024-2025

MOLECULAR, CELL & DEVELOPMENTAL BIOLOGY MAJOR 2024 – 2025

Preparation for the Major			
	Life Science Series		**Physical Science Series**
Chemistry	14A or 14AE, 14B or 14BE, 14BL, 14C, 14CL*, 14D	**OR**	20A, 20B, 20L, 30A, 30AL, 30B, 30BL*
Math	3A, 3B, 3C **or** **LIFESCI 30A, 30B, STATS 13 or LIFESCI 40**		31A, 31B, 32A
Physics	5A, 5B, 5C		1A, 1B, 1C, 4AL, 4BL
Life Science	7A**,** 7B, 7C, 7L (Formerly 23L)		

IMPORTANT NOTES – Preparation for the Major

Students must earn a grade of C- or better in each prep course and achieve an overall GPA of 2.0 in the major prep. Students receiving grades of below C- in two prep courses, either separate courses or repetitions of the same course, are subject to dismissal from the major.

- Students who complete Chem 20A can move to the 14 series starting with 14B, or after taking 20A, 20B, students can take 14BL, 14C, 14CL*, 14D or after taking 20A, 20B, 20L may take 14C, 14CL*, 14D. Students who transfer chemistry credit from another school for 20A, 20L can take 14B, 14C, 14CL*, 14D.
- The Chemistry 14 series is unique to UCLA – there are no equivalents at other schools and must be taken in its entirety at UCLA.

*Chem 14CL and Chem 30BL are not required for the major, but most professional schools and possibly some graduate schools require an organic chemistry lab.

UPPER DIVISION MAJOR REQUIREMENTS

Upper-Division Core Requirements	
Biochemistry	**CHEM 153A** – Biochemistry: Intro to Structure, Enzymes, and Metabolism (4 units)
Genetics	**LIFESCI 107** – Genetics (5 units)
Cell Biology	**MCDB 165A** – Biology of Cells (5 units)
Developmental Biology	**MCDB 138** – Developmental Biology (5 units)
Molecular Biology	**MCDB 144** – Molecular Biology of Cellular Processes (5 units)

Laboratory Requirement (Choose one from #1 – 6)
1. MCDB 104AL – Research Immersion Lab in Developmental Biology (5 units)
2. MCDB 187AL – Research Immersion Lab in Genomic Biology (5 units)
3. MCDB 150AL – Research Immersion Lab in Plant-Microbe Ecology (5 units)
4. MCDB 196B – Research Apprenticeship II in MCDB (4 units) • Must be taken concurrently with **MCDB 180B** – Scientific Analysis and Communication II (2 units) to fulfill Lab Requirement • **MCDB 196A** – Research Apprenticeship I in MCDB (4 units) and **MCDB 180A** – Scientific Analysis and Communication I (2 units) are prerequisites for MCDB 196B and MCDB 180B
5. MCDB 198C – Honors Research in MCDB (4 units) • Limited to students completing the Biomedical Research Minor
6. MCDB 196B, 198B/C, or 199B/C (4 units) • Must be taken concurrently with **MCDB 145** – Appreciation and Critical Review of Biomedical Research (4 units) to fulfill Lab Requirement

Upper-Division Elective Requirement for the Major	
20 units of upper-division electives List of approved electives on page 3	5 units must be taken from Category 1
	5 units may be taken from Category 1 or 2
	10 units may be taken from Category 1, 2, or 3

See the next page for important notes about course restrictions and how courses apply towards major requirements.

IMPORTANT NOTES – Major Requirements

Students must receive a grade of C or better in each required Core course (LIFESCI 107, CHEM 153A, MCDB 138, 144, 165A) and must achieve a minimum overall GPA of 2.0 in the major. Students receiving grades below C in two required core courses, either in separate courses or repetitions of the same course, are subject to dismissal from the major.

- Any single course can be used in only one category on the major.
- Courses applied toward the prep and major requirements must be taken for a letter grade.
- Any upper-division MCDB course will be accepted as an MCDB elective, *excluding* MCDB 100, 104AL, 138, 144, 150AL, 165A, 187AL, 187C, 187D, 190A-C, 192A, 192B, 193, 194A, and 199.
- A maximum of 4 units of approved seminar courses may be applied to the upper-division elective requirement for the major (e.g., MCDB 145, 180A, 180B, 191).
- Elective credit is granted for either BIOSTAT 100A or STATS 100A, but not both.
- The MCDB department does not approve Biochemistry/MCDB or MIMG/MCDB double major petitions.

IMPORTANT NOTES – Applying Independent Research towards MCDB Major Requirements

- To enroll in MCDB 196A-B, 198A-D, or 199A-D, students must be conducting research in an MCDB-approved lab. The list of approved faculty research mentors is available on our website: https://www.mcdb.ucla.edu/undergraduate-research/.
- A maximum of 12 units of MCDB research (MCDB 196A-B, MCDB 199A-C, MCDB 198A-C) may be applied towards major requirements.
- **Applying Independent Research towards the Lab Requirement**
    - **MCDB 196A/B and MCDB 180A/B**
        - Students may apply for these courses during their third or fourth year. Application instructions can be found here: https://www.mcdb.ucla.edu/mcdb-196a-and-196b/.
        - MCDB 196B fulfills the Lab Requirement. MCDB 196A, 180A, and 180B (total 8 units) apply towards the 20 units of upper-division electives required for the major.
    - **MCDB 196B, 198B/C, or 199B/C and MCDB 145**
        - MCDB 145 is only offered in Spring quarter. Students must apply for the course in Winter quarter.
        - MCDB 145 must be taken concurrently with an MCDB upper-division research course. The research course fulfills the Lab Requirement. MCDB 145 (4 units) applies towards the 20 units of upper-division electives required for the major.
- If you take MCDB 104AL, 187AL, or 150AL to fulfill the Lab Requirement, up to 12 units of MCDB research (MCDB 198A-C or MCDB 199A-C) apply towards the 20 units of upper-division electives required for the major.

Requirements for the B.S. degree established by the College of Letters & Science are listed in the UCLA General Catalog. A total of 180 quarter-units are required for the degree. 60 of the 180 units must be upper division (courses numbered 100-199). Please note that the MCDB major requirements satisfy 49 upper-division units.

APPROVED LIST OF UPPER-DIVISION ELECTIVES FOR THE MCDB MAJOR

The categories below correspond to the categories on your Degree Audit Report.

CATEGORY 1		
Five Units of MCD Biology Upper Division Electives		
Course #	**Course Name**	**Units**
MCDB 104BL	Advanced Research Analysis in Developmental Biology	4
MCDB 120	Reproductive Science and Health	5
MCDB M130	Fundamentals of Digital Imaging and Image Processing	5
MCDB M140	Cancer Cell Biology	5
MCDB C141	Molecular Basis of Plant Differentiation and Development	5
MCDB 142	Design Principles of Biological Circuits	5
MCDB 145	Appreciation and Critical Review of Biomedical Research	4
MCDB 146	Metabolism and Disease	5
MCDB C150	Plant Communication	4
MCDB CM156	Human Genetics and Genomics	5
MCDB 160	Principles of Light Microscopy	4
MCDB 167	Genetic Engineering: History, Science, and Applications in Medicine, Agriculture and Law	6
MCDB 168	Stem Cell Biology	5
MCDB M175A	Neuroscience: From Molecules to Mind – Cellular and Systems Neuroscience	5
MCDB M175B	Neuroscience: From Molecules to Mind – Molecular and Developmental Neuroscience	5
MCDB M175C	Neuroscience: From Molecules to Mind – Behavioral and Cognitive Neuroscience	5
MCDB 180A	Scientific Analysis and Communications I	2
MCDB 180B	Scientific Analysis and Communications II	2
MCDB 191	Variable Topics in Molecular, Cell, and Developmental Biology	2
MCDB 196A	Research Apprenticeship I	4
MCDB 198A-C	Honors Research in MCDB	4/qtr
MCDB 199A-C	Directed Research in MCDB	4/qtr

CATEGORY 2		
Five Units of Upper Division Electives from MCD Biology and Acceptable List of Outside Electives		
Select from any Category 1 courses listed above or acceptable outside electives listed below.		
Course #	**Course Name**	**Units**
Chemistry and Biochemistry		
CHEM C100	Genomics and Computational Biology	5
CHEM 153B	**NOT ACCEPTED ON THE MAJOR – DO NOT TAKE THIS COURSE**	
CHEM 153C	Biochemistry: Biosynthetic & Energy Metabolism & Its Regulation	4
CHEM 153L	Biochemistry Laboratory	4
CHEM C159	Mechanisms in the Regulation of Transcription	4
Computer Science/Computational and Systems Biology		
COM SCI C121	Probabilistic Models in Computational Genomics	4
COM SCI C124	Machine Learning Applications in Genetics	4
COM SCI CM186	Computational Systems Biology: Modeling & Simulation of Biological Systems	5

Course #	Course Name	Units
Ecology & Evolutionary Biology		
EE BIOL 184	Evolution, Development, and Disease	**4**
Microbiology, Immunology & Molecular Genetics		
MIMG 100L	Microbiology Lab for Professional Schools	3
MIMG 101	Introductory Microbiology	4
MIMG 102	Virology	4
MIMG 105	Biological Microscopy	4
MIMG 132	**NOT ACCEPTED ON THE MCDB MAJOR**	
MIMG 158	Microbial Genomics	4
MIMG 168	Molecular Parasitology	4
MIMG 170	Cell and Gene Therapy	4
MIMG M178	Quantitative Regulatory Biology and Signal Transduction	4
MIMG C185A	Immunology	5
Physiological Sciences		
PHY SCI 121	Disease Mechanisms and Therapies	5
PHY SCI 125	Molecular Systems Biology	5
PHY SCI C130	Sex Differences in Physiology and Disease	4
PHY SCI 174	Cell Biophysics in Physiology and Disease	5

CATEGORY 3		
TEN UNITS OF UPPER DIVISION ELECTIVES FROM MCD BIOLOGY AND ACCEPTABLE LIST OF ADDITIONAL OUTSIDE COURSES		
Select from any Category 1 or 2 courses listed above or additional outside electives listed below.		
Course #	**Course Name**	**Units**
Biostatistics		
BIOSTAT 100A	Intro to Biostatistics	4
Ecology & Evolutionary Biology		
EEB 110	Vertebrate Morphology	6
EEB 121	Molecular Biology and Evolution	4
EEB C146	Conservation Genetics	4
EEB 162	Plant Physiology	4
Human Genetics		
HUM GEN C144	Genomic Technology	4
Physiological Sciences		
PHY SCI 166	Animal Physiology	6
Statistics		
STATS 100A	Introduction to Probability Theory	4

Course Number Designations

- **C** = Course is offered concurrently to undergraduate and graduate students in the same class.
- **M** = Course is listed under multiple departments (and may have different course numbers in each department).

SCHEDULING TIPS

- Not all electives are offered every year. Please consult the Schedule of Classes or the appropriate department.
- When planning your classes, please make sure you have accounted for all prerequisites for any upper-division class in which you plan to enroll. Courses may even have upper-division prerequisites.
- Some electives are restricted to the department's own majors during first pass enrollment appointments. For example, you must wait until your second pass to enroll in MIMG 101, because it is restricted to MIMG majors during first pass.

Fall	Units	Winter	Units	Spring	Units

Fall	Units	Winter	Units	Spring	Units

Fall	Units	Winter	Units	Spring	Units

COMPUTING SPECIALIZATION IN MCDB

MCDB majors may receive a Specialization in Computing by:

1. Satisfying all requirements for a bachelor's degree in the MCDB major and;
2. Completing the following course requirements:

Course Requirements
1. COMPTNG 10A – Introduction to Programming (5 units)
2. COMPTNG 10B – Intermediate Programming (5 units)
3. COMPTNG 10C – Advanced Programming (5 units)
4. COMPTNG 16A – Python with Applications I (5 units)
5. STATS 13 – Introduction to Statistical Methods for Life and Health Sciences **OR** **LIFESCI 40** – Statistics of Biological Systems (5 units)
6. One upper-division course from the approved list below.

APPROVED UPPER-DIVISION COURSES		
Course #	**Course Name**	**Units**
CHEM C100	Genomics and Computational Biology	5
COM SCI C121	Probabilistic Models in Computational Genomics	4
COM SCI C124	Machine Learning Applications in Genetics	4
COM SCI CM186	Computational Systems Biology: Modeling & Simulation of Biological Systems	5
MCDB M130	Fundamentals of Digital Imaging and Image Processing	5
MCDB 142	Design Principles of Biological Circuits	5
MCDB 187AL*	Research Immersion Lab in Genomic Biology	5
MIMG M178	Quantitative Regulatory Biology and Signal Transduction	4
PHYSCI 125	Molecular Systems Biology	5

IMPORTANT NOTES – Computing Specialization

Students must earn a letter grade of C or better in each required course for the Computing Specialization and a combined GPA of at least 2.0 in these courses to graduate with the Specialization in Computing.

- Students may overlap the upper-division course for the Specialization with an elective or Lab Requirement for the major.

*Space in MCDB 187AL is limited and students are <u>not</u> guaranteed a space in MCDB 187AL simply because they are pursuing the Computing Specialization.