MOLECULAR, CELL & DEVELOPMENTAL BIOLOGY MAJOR 2026 – 2027

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 <u>one</u> from #1 – 5)
1. MCDB 104AL – Research Immersion Lab in Developmental Biology (5 units)
2. MCDB 114AL – Research Immersion Lab in Plant Molecular Biology and Biotechnology (5 units)
3. MCDB 187AL – Research Immersion Lab in Genomic Biology (5 units)
4. MCDB 196B – Research Apprenticeship II in MCDB (4 units) OR **MCDB 198B, 198C, or 198D** – Honors Research in MCDB (4 units) • Must be taken concurrently with **MCDB 180B** – Scientific Analysis and Communication II (2 units) to fulfill Lab Requirement • **MCDB 180A** – Scientific Analysis and Communication I (2 units) is prerequisite for MCDB 180B
5. MCDB 198C – Honors Research in MCDB (4 units) • Students completing the Biomedical Research Minor may satisfy the Lab Requirement with MCDB 198C without taking MCDB 180A-B

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 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 180A-B and 196A-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-180-and-196/.
    - 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.
    - If you are entering your fourth year and would like to fulfill your Lab Requirement with independent research, but you also want to be eligible for Departmental Honors, which requires MCDB 198A-C, then you may take MCDB 180A and 180B alongside MCDB 198A and 198B, 198B and 198C, or 198C and 198D, instead of MCDB 196A and 196B.
- 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 48-49 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	5
MCDB 120	Reproductive Science and Health	5
MCDB 125	Undergraduate MCDB Education Research	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 C142	Design Principles of Biological Circuits	5
MCDB 146	Metabolism and Disease	5
MCDB CM156	Human Genetics and Genomics	5
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
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

Course #	Course Name	Units
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 100	Introduction 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 a department's own majors during a specific period of time. For example, MIMG 101 is restricted to MIMG Majors only until a specified day and time. Check the Class Notes on the Schedule of Classes to find out when electives open to MCDB majors.

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 C142	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.