



***UNDERGRADUATE MAJORS:  
MOLECULAR, CELL, & DEVELOPMENTAL BIOLOGY***

***2009-2010***

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## PREPARATION FOR THE MAJOR :

The following series of classes is taken to prepare you for the upper division classes of your major:

### General and Organic Chemistry

Chem 14A, B, BL, C, CL, D

**OR**

Chem 20A, B, L, 30A, B, AL, BL

### Calculus

Math 3A, B, C

**OR**

Math 31A, B, 32A

### Calculus-based Physics

Physics 6A, B, C

**OR**

Physics 6A(H), B(H), C(H) \*\*Only for students who already know the physical laws.

**OR**

Physics 1A, 1B, 1C, 4AL, 4BL

### Life Science

LS 1 (Evolution, Ecology, and Biodiversity)

**AND**

LS 2 w/lab (Cells, Tissues, and Organs)

**AND**

LS 3 w/lab (Intro to Molecular Biology)

**AND**

LS 4 w/lab (Genetics)

Please note:

- ◆ LS 3 and LS 4 (and/or any other lower division prerequisites) must be completed prior to taking ANY upper division MCDB course.
- ◆ All prep courses, as well as the courses taken to satisfy the Major requirements, **MUST be taken for letter grades.**
- ◆ In each prep course, students must earn a grade of C – or better.
- ◆ 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.**

# MOLECULAR, CELL, & DEVELOPMENTAL BIOLOGY MAJOR REQUIREMENTS

*MCDB students must fulfill all three categories of requirements for the major: 1) Required Courses; 2) Electives; 3) Upper Division Laboratory Experience. Depending upon the unit values of specific courses completed for major electives and upper division lab requirement, the MCDB major totals approximately 53 units, as detailed below:*

❖ The following courses are **REQUIRED**: **Units** **Qtr(s) Taught**

**Required Biochemistry Courses (both are required):**

<b>Chem 153A</b>	<i>Biochemistry</i>	4	All
<b>Chem 153 L</b>	<i>Biochemistry Lab</i>	4	All

**Required MCDB Lab Course (Choose One):**

<b>MCDB 104</b>	<i>Cell and Molecular Biology Laboratory</i>	6	Winter, Spring
<i>or</i>			
<b>MCDB 187A</b>	<i>Principles &amp; Practices of Genomic Research</i>	5	Fall, Spring

**Required Cell Biology Course (Choose One):**

<b>MCDB 165A</b>	<i>Biology of the Cell.</i>	5	Fall
<i>or</i>			
<b>MCDB M140</b>	<i>Cell Biology: Cell Cycle</i>	5	Spring

**Required Developmental Biology Course (Choose One):**

<b>MCDB 138</b>	<i>Developmental Biology</i>	5	Fall, Winter
<i>or</i>			
<b>MCDB C141</b>	<i>Molecular Basis of Plant Differentiation and Development</i>	5	Spring

**Required Molecular Biology Course (Choose One):**

<b>MCDB 144</b>	<i>Molecular Biology</i>	5	Fall, Spring
<i>or</i>			
<b>MCDB 165B</b>	<i>Molecular Biology of the Cell Nucleus</i>	5	Winter

*Required Courses Total Units: 29*

*(Major Requirements continued on next page...)*

# Molecular, Cell, & Developmental Biology

## MAJOR REQUIREMENTS (cont.)

- ❖ **ELECTIVES:** At least twenty (20) upper division major elective units, of which at least 10 units MUST be MCDB courses.
  - See MCDB Departmentally Approved List of Courses for eligible elective courses outside the Department.
  - See IMPORTANT NOTES PERTAINING TO MAJOR ELECTIVES for how specific courses count (or do not) toward major electives.

*Elective Courses Total Units: 20*

❖ **LABORATORY:** At least four units from the following courses:

<b>MCDB 150L</b>	<i>Plant Communication Laboratory</i>	4 units	Winter
<b>MCDB 198A-B,C,D</b>	<i>Honors Research in MCDB (Formerly numbered 190HA-HB, HC, HD)</i>	4 units/qtr	F, W
<b>MCDB 199A-B,C,D</b>	<i>Directed Research in MCDB (Formerly numbered 190A-D.)</i>	4 units/qtr	F,W
<b>MCDB 199</b>	<i>Independent Research</i>	4 units	F,W,S
<b>MCDB 187A</b>	<i>Principles &amp; Practices of Genomic Research</i>	5 units	F, S
<b>MIMG 103L</b>	<i>Lab Methods in Modern Microbiology &amp; Immunology</i>	5 units	W, S
<b>MIMG 121A</b> (MIMG 121A <b>Not offered in 2009-2010</b> )	<i>Microbial Molecular Biology Lab</i>	4 units	
<b>EE BIOL 162</b>	<i>Plant Physiology</i>	6 units	Spring/ Summer
<b>PHY SCI 166</b>	<i>Animal Physiology</i>	6 units	Summer

*Upper Division Lab Courses Total Units: 4*

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- **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.**
  - **MCDB majors are required to earn at least a 2.0 (C) GPA for all upper division courses applied toward the major.**
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## MCDB DEPARTMENTALLY APPROVED LIST OF COURSES

Dept.	Crs #	Course Title	Units	Qtr(s) Taught
MCDB	150L	<i>Plant Communication Laboratory</i>	4	Winter
	138	<i>Developmental Biology</i>	5	F, W
	C141	<i>Molecular Basis of Plant Differentiation and Development</i>	5	Spring
	143	<i>Developmental Biology: Genetic Control of Organogenesis</i>	5	Spring
	144	<i>Molecular Biology</i>	5	Fall, Spring
	C150	<i>Plant Communication</i>	4	Fall
	CM156	<i>Human Genetics</i>	4	Winter
	162	<i>Genetic Control of Animal Behavior</i>	5	Winter
	<b>Note: MCDB 162 <u>not offered in 2009-2010</u></b>			
	165B	<i>Molecular Biology of the Cell Nucleus</i>	5	Winter
	168	<i>Stem Cell Biology</i>	5	Spring
	CM169	<i>Cell Structure, Signaling, and Differentiation (need <math>\geq 3.7</math>major GPA)</i>	6	Winter
	172	<i>Genomics and Bioinformatics</i>	5	Winter
	M175A	<i>Neuroscience: From Molecules To Mind</i>	5	Fall
	M175B	<i>Neuroscience: From Molecules To Mind</i>	5	Winter
	M175C	<i>Neuroscience: From Molecules To Mind</i>	5	Spring
	M181	<i>Biological Bases of Psychiatric Disorders</i>	4	Fall
	191	<i>Variable Topics in Molecular, Cell, and Developmental Biology (Formerly numbered 197)</i>	2	W,S
	198A-B,C,D	<i>Honors Research in Molecular, Cell, and Developmental Biology (Formerly numbered 190HA-HB, HC, HD)</i>	4/qtr	**
	199A-B,C,D	<i>Directed Research in Molecular, Cell, and Developmental Biology (Formerly numbered 190A-D)</i>	4/qtr	**

\*\* MCDB 198A-B or MCDB 199A-B are each a two-quarter course which can be started in Fall or Winter Quarter ONLY.

## MCDB DEPARTMENTALLY APPROVED LIST OF COURSES (cont.)

### Courses from other departments which may be applied to the MCDB Major :

Dept.	Course #	Course Title	Units	Qtr(s) Taught
<b>BIOL CH</b>				
	<b>CM153G</b>	<i>Macromolecular Structure</i>	6	Fall
<b>BIOSTAT</b>	<b>100A</b>	<i>Intro to Biostatistics</i>	4	Fall, Spring, Summer
<b>CHEM</b>				
	<b>153C/153CH</b>	<i>Biochemistry: Biosynthetic &amp; Energy Metabolism &amp; Its Regulation</i>	4	All
	<b>154</b>	<i>Biochemical Methods II</i>	4	All
	<b>156</b>	<i>Physical Biochemistry</i>	4	All
	<b>C159A</b>	<i>Mechanisms in the Regulation of Transcription I</i>	2	Spring
	<b>C159B</b>	<i>Mechanisms in the Regulation of Transcription II</i>	2	Spring
	<b>CM160A</b>	<i>Introduction to Bioinformatics</i>	4	Fall
<b>EEB</b>				
	<b>110</b>	<i>Vertebrate Morphology</i>	6	Fall, Winter, Summer
	<b>121</b>	<i>Molecular Biology and Evolution</i>	4	Spring
	<b>162</b>	<i>Plant Physiology</i>	6	Winter, Summer
<b>HUM GEN</b>				
	<b>M102W</b>	<i>DNA: Promise and Peril</i>	5	Spring
	<b>C144</b>	<i>Genomic Technology</i>	4	Fall
<b>MIMG</b>				
	<b>101</b>	<i>Introductory Microbiology</i>	4	F, S Summer
	<b>102</b>	<i>Virology</i>	4	Winter
	<b>100L</b>	<i>Microbiology Lab for Professional Schools</i>	2	Fall & Summer
	<b>121A</b>	<i>Microbial Molecular Biology Lab</i>	4	Winter
	<b>106</b>	<i>Bacterial Pathogenesis</i>	4	Spring
	<b>CM133</b>	<i>Principles, Practices &amp; Policies in Biotechnology</i>	2	Winter
	<b>158</b>	<i>Advanced Molecular Genetics</i>	5	Winter
	<b>168</b>	<i>Molecular Parasitology</i>	4	Fall
	<b>174</b>	<i>Advanced Topics in Molecular Parasitology</i>	2	Spring
	<b>185A</b>	<i>Immunology</i>	5	Fall
<b>PHY SCI</b>				
	<b>C126</b>	<i>Biological Clocks</i>	4	Winter
	<b>166</b>	<i>Animal Physiology</i>	6	Summer
<b>STATS</b>	<b>100A</b>	<i>Introduction to Probability Theory</i>	4	Fall

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## IMPORTANT NOTES PERTAINING TO MAJOR ELECTIVES:

- ❖ Any upper division MCDB course will be accepted as an MCDB elective, **excluding** MCDB 100, 187B, 187C, 190A-C; 192A,B; 193; 194A and 199.
- ❖ MCDB Major credit is not granted for MCDB 187B or 187C
- ❖ **A maximum of four units (4u) of approved seminar course credit may be applied to the ELECTIVES requirement.**
- ❖ **A maximum of 12 units of Directed Research (MCDB 199A-B,C) or Honors Research (MCDB 198A-B, C) may be applied to the major requirements** (4 of the 12 units are used to fulfill the upper division laboratory requirement...the other 8 units is applied toward the ELECTIVES requirement).
- ❖ **Either MCDB 165A or M140** may be completed to fulfill the required cell biology course. The other course **may not** be completed as an ELECTIVE
- ❖ **Either MCDB 144 or 165B** may be completed to fulfill the required molecular biology course. The other course **may** be completed as an ELECTIVE
- ❖ **Only two of the three developmental biology courses (MCDB 138, C141, 143)** may be completed for MCDB major credit (One as Required Course; One as ELECTIVE).
- ❖ Elective credit is granted for **either** Biostats 100A or Stats 100A, but not both

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## REGARDING SCHEDULING YOUR COURSES:

- ❖ **Not all electives are offered every year.** Do consult the Schedule of Classes or the appropriate department.
- ❖ **When making a course plan to meet your major requirements, please make sure you have planned for all prerequisites for any upper division course in which you plan to enroll.** For example, to enroll in Phy Sci C126, you must have already completed the neuroscience series (Phy Sci M180A-B-C, which is the same as MCDB M175A-B-C). To enroll in MCDB 168, you must have already completed MCDB 165A and MCDB 138. Courses listed here, which count on the MCDB major, may have upper division prerequisites.
- ❖ Some electives are restricted to the home department's own majors during the first pass. If you want to get into, for example, MIMG 185A, you will need to wait until your second pass because you are not an MIMG major.
- ❖ MCDB Major credit is not granted for MCDB 187B or 187C.
- ❖ MCDB Elective credit is granted for **either** Biostats 100A or Stats 100A, but not both

## Faculty in the Department of Molecular, Cell, and Developmental Biology, 2009-10

The area code for the entire UCLA Campus is (310) Building Key: Bot = Botany Building; CHS = Center for Health Sciences; LS = Life Sciences; Boyer Hall = MBI/Molecular Biology Institute; BSRB = Biomedical Sciences Research Building. Our department's mailing address is Department of Molecular, Cell and Developmental Biology, UCLA, Box 951606, Los Angeles, CA 90095-1606. Check online UCLA directory for updates and for e-mail addresses: WWW.UCLA.EDU

**Utpal Banerjee.** The molecular basis of neuronal pattern formation. (Boyer 356, 206-5439/825-2980)

**Jau-Nian Chen.** Development of vertebrate cardiovascular system. (BSRB 450C, 206-4513/206-4512)

**Amander T. Clark.** Molecular Regulation of Human Germ Cell Derivation, Function and Transformation (BSRB 451C, 794-4201/794-5042)

**Andrew Diener.** Molecular genetics of host-pathogen interaction. (LS 4217, 267-4832)

**John H. Fessler.** Drosophila molecular development, matrix structure, (Boyer 455A, 825-4267/825-5267)

**Robert B. Goldberg.** Molecular and genetic dissection of plant development. (LS 2832, 825-9093/825-3270)

**Volker Hartenstein.** Neuronal development in Drosophila. (Boyer 555A, 206-7523/206-7376)

**Ann M. Hirsch.** Molecular analysis of plant-microbe interactions; Role of flavonoids and other plant compounds in human health. (Bot 316, 206-8673/206-5418)

**Luisa Iruela-Arispe.** Vascular biology; Angiogenesis. (BSRB 447F, 794-5763/794-5785).

**David K. Jacobs.** Evolution/Development of Invertebrate Body Plans, Paleobiology and Marine Speciation. (LS 5127B, 206-7885)

**Steve Jacobsen.** Genetic and molecular studies of DNA and histone methylation and their role in the control of gene expression. (LS 3229, 825-0182)

**Harumi Kasamatsu.** Morphogenesis of DNA tumor viruses. (Boyer 456, 825-3048/206-6808)

**James A. Lake.** Genomics and bioinformatics, including the evolution of genomes. (Boyer 242, 825-2546/825-2545)

**Frank Laski.** Regulation of Development in Drosophila. (Boyer 556, 206-3640/206-3890)

**Chentao Lin.** Photoreceptors and plant development. (LS 3323B, 206-9576/825-6298)

**Shou Lin.** Hematopoiesis, Organogenesis and Functional Genomics (BSRB 490C, 267-4970/267-4972)

**William Lowry.** Stem Cell Self-renewal and Differentiation (BSRB 451C, 794-5175/794-4812)

**Karen M. Lyons.** Growth factor signaling in mammalian development and disease. (MRL 2641, 825-5480)

**John R. Merriam.** Genetics of tissue differentiation in development. (LS 4325, 825-2256)

**Hanna Mikkola.** Molecular regulation of hematopoietic stem cell development. (BSRB 477A, 825-2565)

**Austin (Atsushi) Nakano** Stem Cell and Developmental Biology of the Heart (BSRB 490D, 267-1897)

**Matteo Pellegrini.** Computational methods to interpret genomic data. (LS 4219, 825-0012)

**Alvaro Sagasti.** Development of complex cell shapes in zebrafish touch-sensing neurons. (BSRB 450B, 206-6147/825-9625)

**Elaine Tobin.** Molecular basis of Circadian rhythms in plants. (LS 3313A, 825-7700/825-0130)