Undergraduate Advising Handbook

Department of

Biological Science

California State University

Fullerton

Fall 2017

CALIFORNIA STATE UNIVERSITY, FULLERTON

Department of Biological Science
College of Natural Sciences & Mathematics
McCarthy Hall-282
800 N. State College Blvd., Fullerton, CA 92831 / T 657-278-3614 / F 657-278-3426 / http://biology.fullerton.edu

Dear Biology Major,

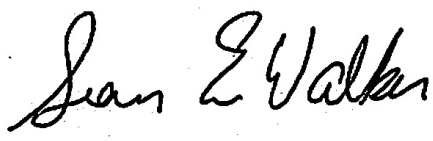
Welcome to the Department of Biological Science at Cal State Fullerton! Many of you have chosen Biology as a major because of a strong interest in science and in pursuing a biology-related career (e.g. biotechnology, health care, environmental management and conservation, research, teaching) or in continuing to professional or graduate school. Your aspirations require you to set high expectations for yourself and to embrace the challenges of being a science major: difficult classes, long labs or field trips, and lots of time studying! Make the effort to engage with department faculty when you have questions about course content or your path to graduation. Also, give yourself the best opportunity to graduate and to reach your career goals by making good choices about how you spend your time, engaging in meaningful internship/research/volunteer opportunities related to your career, and taking advantage of the resources that are here for you at CSUF (e.g. the Career Center, the Academic Advising Center, the CNSM Student Success Team, the CNSM Opportunity Center, Supplemental Instruction, and Faculty Advisors – see the last few pages of this handbook).

This handbook is intended to help you navigate the requirements for your bachelor's degree in biological science. Please review its contents and make it part of your permanent records.

As part of our mandatory advising program, which is designed to help you make efficient progress toward graduation, you will participate in group advising sessions for at least your first two semesters, and thereafter will be assigned to meet with a Biology faculty adviser. Each semester (usually in April and October/November) these meetings will allow you to evaluate progress toward your degree objectives and to remove your advising hold. Please bring a current copy of your Titan Degree Audit when attending academic advising sessions. In addition, I recommend that you establish a strong relationship with your adviser so that you have someone whom you know well and who can write letters of recommendation for you when needed.

If you need additional assistance at any time, please stop by the Department office (MH 282) or email bioladvising@fullerton.edu to ask for help. We look forward to meeting you and working with you.

Sincerely,



Sean E. Walker, Ph.D.
Professor and Chair
Department of Biological Science
June 1, 2017

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III. General Education Courses (see University Catalog or Academic Advisement Center Web site http://www.fullerton.edu/aac): 51 units required. Some courses above in core and supporting courses count for all 12 units in GE category #B.5. Total remaining GE units (51 units -12 units = 39 units)

IV. Upper Division Writing Requirement (0-3 units)

V. Free Electives (to reach a total of **120 units**)

BACHELOR'S DEGREE REQUIREMENTS

To track your progress in fulfilling the following requirements access your Titan Degree Audit *(http://www.fullerton.edu→Portal login→Student Academics→TITAN degree audit).*

A. Major requirements:

- ☐ 40 units of Biology courses, including:
  - The Biology Core courses (minimum grade of C in each course)
  - At least 23 units of upper division Biology electives required by one of the concentrations (minimum grade of C in each course)
  - 5 of the 23 units of upper division Biology must be laboratory/fieldwork
- ☐ 34 units of supporting courses (minimum grade of C in each course)
- ☐ Minimum GPA of 2.0 in all attempted Biology courses

B. University requirements:

- ☐ General education requirements (at least 51 GE units) including:
  - At least **9** units of upper division GE (300-400 level courses)
  - At least **9** units of GE taken at CSUF
  - At least **3** units of Cultural Diversity coursework
  - Limited to either 9 units or 3 courses from a single department, excluding courses in GE Category A, Core Competencies
  - No units from the department of your major (except BIOL 151 or 171 for Life Science requirement)
  - Complete at least 40 units of upper division coursework (300 and 400 level). (Note: Completion of the major and 9 required units of upper division GE usually fulfills this requirement, if O-chem is taken at CSUF).
- ☐ Complete at least 30 units at CSUF
  - At least 9 units must be GE courses
  - At least 24 of the 30 units must be upper division
  - At least 12 of the 24 upper division units must be in your major
- ☐ No more than 36 "credit/no credit" units
- ☐ No more than 24 units taken through Extended Education
- ☐ No more than 9 units of internship (495 courses in any department)
- ☐ No more than 4 units of reading skills courses
- ☐ Satisfy the University upper-division writing requirement (ENGL 301, ENGL 363, or 6 units of BIOL courses that meet this requirement) (minimum grade of C)
- ☐ Apply for a **graduation check** approximately one year (two semesters) before graduation, but only **AFTER** completing all Biology Core courses **AND** declaring your concentration.
  - In Titan Online, choose "Graduation:Apply/Pay Fee" from the dropdown menu in your Student Center.
  - Be careful to choose the correct anticipated graduation term; choosing an incorrect term can have negative consequences on advising, enrollment, and financial aid. If you are unsure about what is a realistic graduation date, discuss with your adviser or the CNSM Graduation Specialist (see last page of this Handbook) before applying for the grad check.
  - To advance to "Candidate" status, your grad check must be approved by the Biology Department and you must pay a $115 graduation fee to CSUF. Complete information about the graduation check process for undergraduates is available at http://admissions.fullerton.edu > Current Students > Apply for Graduation
  - To "walk" in the commencement ceremonies in May of a given calendar year, students must have graduated the previous Fall (which has a January graduation date), or be graduating in Spring or Summer of that calendar year.
- ☐ Finish with at least at 2.0 (C) grade point average in all courses at CSU Fullerton and elsewhere.
- ☐ Complete at least 120 total units for your degree.

CSUF Undergraduate Repeat Policy and Withdrawal Policy

Students can check their "Repeated" or "W" units at CSUF by choosing "Withdrawals/Repeats" in the dropdown menu of their Student Center in Titan Online.

CSUF Repeat policy

- A student can repeat a maximum of 16 units at CSUF (for the entire CSUF record) with "Grade forgiveness." **Grade forgiveness** means that the GPA calculation is adjusted to remove the effect of the initial grade, and the GPA will include only the repeated grade (but BOTH grades remain listed on transcripts). Grade forgiveness is applied to the first 16 units that a student repeats at CSUF.

- A student can repeat a maximum of 12 units at CSUF (from Fall 2009 onward) with "Grades averaged." **Grades averaged** means that the GPA calculation includes the grades of both the initial attempt and the repeat of the class (and BOTH grades remain listed on transcripts).

- A single class may be taken a maximum of 3 times. (Does not apply to classes noted in the University Catalog "may be repeated for credit.)

- The "Repeat policy" is applied automatically at the end of each term.

- Petitions to exceed the repeated unit limits can be filed at the Admissions and Records Office, but are rarely granted. For example, petitions to repeat a course are denied if the equivalent course can be taken at a community college. For the College of NSM, students must have a letter of support from the Department Chair.

- Detailed FAQ on the CSUF repeat policy can be found by scrolling down to "REPEAT POLICY-Undergraduate" and clicking on the "frequently asked questions" link at http://admissions.fullerton.edu/prospectivestudent/regulations.php

CSUF Withdrawal policy

- An undergraduate student can have a maximum of 18 "W" (**Withdrawal**) units at CSUF, from Fall 2009 onward.

    - During the first 2 weeks of class, drop via Titan Online (no "W" on transcript); after 2 weeks, a "Request for Withdrawal" form (from Admissions and Records) must be signed by instructor and Department to withdraw with "W".

    - After 2 weeks and prior to the last 3 weeks of instruction, withdrawals with a "W" are possible only for documented serious and compelling reasons.

    - During the final 3 weeks of instruction, a complete withdrawal (from all classes) may be allowed only in cases of a documented serious accident or illness.

    - Petitions for Retroactive Withdrawals can only be filed for courses with WU (Withdrawal Unauthorized) and NC (No Credit) grades.

- Detailed information on withdrawals can be found in the registration guide for the semester in which you are enrolled on the Admissions and Records website (http://admissions.fullerton.edu/currentstudent/registration.php).

Academic probation and disqualification

- Undergraduate students are placed on academic probation when their **CSUF grade point average (GPA) or Cumulative GPA** (GPA for all college work attempted) falls below 2.0 (a "C" average).

- Biology majors on Probation have a Hold placed by the College of Natural Sciences and Math (CNSM) and must be advised by a member of the CNSM Student Success team (see below) to release this hold. The CNSM Probation hold is SEPARATE from the Biology department advising hold; students on Probation must also attend Biology advising during advising period to release their Biology hold.

- Undergraduates on academic probation are subject to disqualification if their **CSUF or cumulative GPA** falls below the following levels:

Class Level	Units	GPA Level
Seniors	90 or more	1.95
Juniors	60 - 89	1.85
Sophomores	30 - 59	1.70
Freshmen	0 - 29	1.50

For example, if you are junior on probation (60-89 units) and your GPA falls below 1.85 at the end of the semester, you will be dismissed from the university.

- Online resources for students on probation and disqualification:
    - Probation and Disqualification tutorials http://www.fullerton.edu/aac/
    - GPA calculator to help you determine your GPA (before and after grade forgiveness) http://www.fullerton.edu/aac/AACTool/gpacalguide.asp

- Tutoring and other campus resources are listed on the last page of this handbook.

- Students with a Probation Hold from the College of NSM must meet with one of the following members of the **CNSM Student Success Team** to release their hold:

Graduation Specialist, Tatiana Pedroza
(MH-488) 657-278-7217 tapedroza@fullerton.edu
- Junior/Senior Advising
- Probation and GE advising
- Focus on Graduation Candidates
- Appointments at http://nsmgradspecialist.youcanbook.me

Retention Specialist, Sam Barrozo
(MH-488) 657-278-7062 sbarrozo@fullerton.edu
- Freshman/Sophomore Advising
- Probation and GE advising
- Interventions for at-risk students

Assistant Dean, Colleen McDonough
(MH-488) 657-278-4158
cmcdonough@fullerton.edu
- Consults on Faculty/Student Issues
- Advocates for students with concerns
- Assists with University policies/procedures
- CSUF resources and referrals

THE BIOLOGY MAJOR

I. Biology courses (40 units), including:

A. Biology Core Courses

The Core provides a solid basis for understanding the principles that underlie the many distinct disciplines of biology, and focuses instructional attention on individuals working as part of small teams. These teams work together in the laboratory and field to discover information about the biological world. The Core is composed of six courses:

BIOL 151 Cellular and Molecular Biology
BIOL 152 Evolution and Organismal Biology
BIOL 251 Genetics and **BIOL 253L** Cell and Molecular Biology Skills Laboratory
BIOL 252 Principles of Ecology and **BIOL 254L** Research Skills for Ecology and Organismal Biology

B. Upper Division Biology Courses (see concentration worksheets)

Upon completion of the core biology courses, each student selects one of five concentrations. Biology majors will graduate with a Bachelor of Science degree in Biology with a Concentration in Cell and Developmental Biology, Ecology and Evolutionary Biology, Marine Biology, Molecular Biology and Biotechnology, or Plant Biology. Each concentration focuses on a specific field of study within biology. The major requires a minimum of 23 upper-division Biology units, including at least 5 upper-division units of laboratory or field-based activities, and at least 6 units of 400-level biology courses. Two 400-level elective courses (see those marked by †) may be taken to fulfill the University's upper-division writing requirement. A capstone course (2 units minimum) culminates each concentration.

II. Supporting Courses

Supporting courses in Mathematics, Chemistry, and Physics provide the broad-based knowledge that is essential to any scientist. The concepts introduced build the foundation necessary to advance to upper division coursework in Biology.

MATH: Calculus and/or statistics (8 units)
CHEM: General and organic chemistry with lab (18 units)
PHYS: Elementary physics with lab (8 units)

BIOLOGY CORE AND SUPPORTING COURSES WORKSHEET

(This version applies to freshmen entering Fall 2017 and later)

Required Biology Core Courses must be passed with a C or better:

Course	Title (units)	When passed	Grade
BIOL 151	Cellular and Molecular Biology (4)		
BIOL 152	Evolution and Organismal Biology (4)		
BIOL 251 and BIOL 253L	Genetics (3) and Cell/Molecular Skills Lab (1)		
BIOL 252 and BIOL 254L	Principles of Ecology (3) and Research Skills for Ecology/Organismal Biology (1)		

→After completion of the Biology Core Courses, Upper Division Biology electives in a concentration must be taken (at least 23 units, of which 5 units must be lab/field), to reach a total of 40 units of Biology courses.

Required Supporting Courses must be passed with a C or better (34 units):

Course	Title (units)	When passed	Grade
MATH 130 and MATH 338 **OR**	Calculus (4) and Statistics (4)		
MATH 150A and MATH 150B	Calculus (4) and Calculus (4)		
CHEM 120A	General Chemistry (5)		
CHEM 120B	General Chemistry (5)		
CHEM 301A	Organic Chemistry (3)		
CHEM 301B	Organic Chemistry (3)		
CHEM 302	Organic Chemistry Lab (2)		
PHYS 211	Elementary Physics (3)		
PHYS 211L	Elementary Physics Lab (1)		
PHYS 212	Elementary Physics (3)		
PHYS 212L	Elementary Physics Lab (1)		

Required University Upper-Division Writing (Must pass with a C or better)

ENGL 301* Advanced College Writing (3) **OR** ENGL 363* Scientific Writing (3) **OR** 6 units of BIOL courses that meet the writing requirement †		

Course	Prerequisites (co-requisites noted in parenthesis)
BIOL 151	must be eligible to take MATH 115 or higher and have passed/be eligible to take ENGL 101
BIOL 152	BIOL 151 or equivalent
BIOL 251	BIOL 151 or 172 and BIOL 152 or 171 and CHEM 120A or MATH 130 or MATH 150A
BIOL 253L	BIOL 251 (co-req)
BIOL 252	BIOL 151 or 172 and BIOL 152 or 171 and CHEM 120A or MATH 130 or MATH 150A
BIOL 254L	BIOL 252 (co-req)
BIOL 302	BIOL CORE and CHEM 120B
BIOL 303	BIOL CORE and CHEM 120B
BIOL 309	BIOL CORE and CHEM 120B
BIOL 314	BIOL CORE
BIOL 325	BIOL CORE
MATH 130/150A	passing score on MQE or exemption
MATH 150B	MATH 150A
MATH 338	MATH 130 or MATH 150B or consent of instructor
CHEM 120A	Passing score on CPE or CHEM 115
CHEM 120B	CHEM 120A
CHEM 301A	CHEM 120A and 120B
CHEM 301B	CHEM 120A, 120B, and 301A
CHEM 302	CHEM 301A; CHEM 301B (co-req)
PHYS 211	MATH 125 or MATH 130 or 150A; PHYS 211L (co-req)
PHYS 211L	PHYS 211 (co-req)
PHYS 212	PHYS 211; PHYS 212L (co-req)
PHYS 212L	PHYS 212 (co-req)

† BIOL courses that meet the writing requirement: BIOL 411, 414, 417, 422, 426, 427, 446, 449, 468, 470, 495, and 498 (& 465 and 466 effective F11)

* Students interested in health professions careers should take ENGL 301 or ENGL 363.

CELL AND DEVELOPMENTAL BIOLOGY CONCENTRATION (C&D) WORKSHEET

The study of the structural and functional dynamics of cells, including topics such as compartmentation and secretion, cell motility, and cell-cell interactions as they apply to the specialized fields of immunology, microbiology, neurobiology, physiology, and developmental biology.

Course categories	√	Courses*
Biology Core		All Biology Core courses must be completed prior to starting concentration
The concentration consists of 23 units of upper-division **biology** electives, of which at least 5 units must be laboratory- or field-based; at least 6 units must be 400-level, and at least 2 capstone units. The 23 units of upper-division biology electives must also meet the following requirements:		
Upper-Division Required courses (7 units)		Complete both of these before entering the other upper division electives: BIOL 302 General Microbiology (4/2) BIOL 303 Intermediate Cell Biology (3)
Upper-Division Biology electives 10 units minimum		Cell Biology Courses – students must take a minimum of 7 units of the following: BIOL 329 Essential Techniques in Cell Biology (3/2) BIOL 362 Mammalian Physiology (4/1) [Was 4/2 from F99 – F04] BIOL 405 Developmental Biology (3) BIOL 417 Advances in Cell Biology (3)† BIOL 418L Advances in Cell Biology Lab (2/2) BIOL 424 Immunology (4/2) BIOL 427 Stem Cell Biology (3) ‡ †(effective F 11) BIOL 428 Biology of Cancer (3) ‡ BIOL 429 Techniques in Stem Cell Biology (3/2) ‡ BIOL 465 Integrative Biology of Spider Silk (3) ‡ †(effective F 11) BIOL 470 Cellular Neurobiology (3)† ‡ Associated Courses – students may use the following courses to complete the 10-unit minimum: BIOL 309 Intermediate Molecular Biology (3) BIOL 402 Computer Lab in Molecular Systematics (3/1) BIOL 407 Genes & Genomes (3) BIOL 411 Medical Genetics and Systems Biology (3)† BIOL 412 Principles of Gene Manipulation (3) BIOL 413 Advances in Molecular Genetics (3) BIOL 414 Microbial Genetics (3)† BIOL 426 Molecular Virology (3)† ‡ BIOL 430 Advances in Microbiology (3) BIOL 445 Plant Cell Physiology (3) BIOL 448 Plant Molecular Biology (3) CHEM 421 Biological Chemistry (3)
Free upper-division electives		Additional upper-division biology electives to reach a total of at least 23 units. Although it is recommended that C&D concentration majors select these additional elective units from courses listed on this page, any upper-division biology major course may be used to fulfill these units.
Capstone Courses 2 units minimum		BIOL 400 Seminar in Biology Education (Issues in Teaching Cell Biology) (2) BIOL 426 Molecular Virology (3)† ‡ BIOL 427 Stem Cell Biology (3) ‡ †(effective F 11) BIOL 428 Biology of Cancer (3) ‡ BIOL 429 Techniques in Stem Cell Biology (3/2) ‡ BIOL 465 Integrative Biology of Spider Silk (3) ‡ †(effective F 11) BIOL 470 Cellular Neurobiology (3)† ‡ BIOL 482 Capstone Studies in Biology (2) BIOL 495 Biological Internship (3/2)† BIOL 498 Senior Thesis (1-2)† BIOL 499L Independent Laboratory Study (1-3)
Total upper-division units	**23**	

† Courses meet the upper-division writing requirements (6 units required)
* Courses shown as total units / lab-field units e.g. 4/2
‡ Courses count as electives or capstone, but not both

Other concentration requirements:	**Courses**	**units**
5 units of upper-division lab or field courses		
6 units of 400-level biology courses		
Upper-division writing requirement (ENGL 301 OR ENGL 363 OR 6 units of BIOL courses that meet the writing requirement †)		
No more than a combined total of 6 units of Biol 480 (3 max), 482 (2 max), 495 (3 max), 498 (3 max), and Biol 499L (6 max) shall be counted toward the 23 upper-division Biology units required for the major. No more than 3 units of Biol 499L shall be counted toward the 5 units of upper-division lab or field courses required for the major.		

ECOLOGY & EVOLUTIONARY BIOLOGY CONCENTRATION (EEB) WORKSHEET

The study of all biological organisms (ranging from the level of the individual to communities and ecosystems), their responses to the environment on evolutionary and ecological time scales, and their conservation.

Course categories	√	Courses*
Biology Core		All Biology Core courses must be completed prior to starting concentration
The concentration consists of 23 units of upper-division **biology** electives, of which at least 5 units must be laboratory- or field-based; at least 6 units must be 400-level, and at least 2 capstone units. The 23 units of upper-division biology electives must also meet the following requirements:		
Upper-Division Required courses (6 units)		BIOL 314 Population and Community Ecology (3) **AND** BIOL 325 Principles of Evolution (3)
Upper-Division electives in Organismal Biology and Physiology (6 units minimum)		**Organismal Biology courses - students must take at least one of the following: (3 units minimum)** Animal Biology: BIOL 467 Entomology (4/2) BIOL 474 Natural History of Vertebrates (4/2) BIOL 476 Herpetology (4/2) BIOL 478 Mammalogy (4/2) BIOL 479 Ornithology (4/2) Plant Biology: BIOL 340 Field Botany (3/2) BIOL 344 Survey of Land Plants (4/2) BIOL 345 Plant Biology (3/1) [was 4/1 in Sp14] BIOL 441 Plant Taxonomy (4/2) Microbiology: BIOL 302 General Microbiology (4/2) **Physiology Courses – students must take at least one of the following: (3 units minimum)** BIOL 362 Mammalian Physiology (4/1) [was 4/2 from F99 – F04] BIOL 444 Plant Physiological Ecology (4/2) BIOL 445 Plant Cell Physiology (3) BIOL 465 Integrative Biology of Spider Silk (3) ‡†(effective F11) BIOL 468 Comparative Animal Physiology (4/1)† [was 4/2 prior to F06]
Additional Upper-Division EEB electives (5 units minimum) [1]a maximum of 4 units of these marine biology classes may be applied toward the 5 units of upper-division EEB electives		**Any additional upper-division Biology courses(s) from the Organismal Biology or Capstone list (additional units from Organismal Biology or Capstone courses not used to fulfill those requirements count here) or courses from among the following: (5 units minimum)** BIOL 301 Problems in Environmental Biology (3/2) BIOL 317 Field Marine Biology (4/2)[1] BIOL 402 Computer Lab in Molecular Systematics (3/1) BIOL 404 Evolution (3) or BIOL 409 Teaching Evolution: Online Course for Teachers (3) BIOL 419 Marine Ecology (3)[1] BIOL 419L Marine Ecology Laboratory (1)[1] BIOL 422 Coastal Ecology (4/2)[1]† BIOL 436 Advanced Applied Statistics (4/1) BIOL 442 Pollination Biology (3/1) BIOL 443 Plant Ecology (4/2) BIOL 444 Plant Physiological Ecology (4/2) BIOL 446 Marine Phycology (4/2)[1]† BIOL 449 Desert Ecology (4/2)† BIOL 461 Marine Invertebrate Zoology (4/2)[1] BIOL 466 Behavioral Ecology (3) †(effective F11) BIOL 468 Comparative Animal Physiology (4/1)† [was 4/2 prior to F06] BIOL 475 Ichthyology (4/2)[1]
Free upper-division electives		Additional upper-division biology electives to reach at least 23 units. Although it is recommended that EEB concentration majors select these additional elective units from courses listed on this page, any upper-division biology major course may be used to fulfill these units.
Capstone Courses 2 units minimum		BIOL 400 Seminar in Biology Education (Issues in Teaching Evolution & Biodiversity OR Issues in Teaching Physiology & Ecology) (2) BIOL 401 Biogeography (3) BIOL 447 Ethnobotany (3/1) BIOL 450 Conservation Biology (3) BIOL 465 Integrative Biology of Spider Silk (3) ‡ †(effective F11) BIOL 481 Advances in Evolution and Ecology (3) BIOL 482 Capstone Studies in Biology (2) BIOL 495 Biological Internship (3/2)† BIOL 498 Senior Thesis (1-2)† BIOL 499L Independent Laboratory Study (1-3)
Total upper-division units	**23**	

† Courses meet the upper-division writing requirements (6 units required) * Courses shown as total units / lab-field units e.g. 4/2

‡ Course counts as elective or capstone, but not both

Other concentration requirements:	**Courses**	**units**
5 units of upper-division lab or field courses		
6 units of 400-level biology courses		
Upper-division writing requirement (ENGL 301 OR ENGL 363 OR 6 units of BIOL courses that meet the writing requirement †)		

No more than a combined total of 6 units of Biol 480 (3 max), 482 (2 max), 495 (3 max), 498 (3 max), and Biol 499L (6 max) shall be counted toward the 23 upper-division Biology units required for the major. No more than 3 units of Biol 499L shall be counted toward the 5 units of upper-division lab or field courses required for the major.

MARINE BIOLOGY CONCENTRATION (MB) WORKSHEET

The study of marine organisms and their coastal and oceanic habitats, including classification, structure/ function, ecology and physiology of these organisms, and conservation, environmental and evolutionary issues related to these organisms and their habitats.

Course categories	√	Courses *
Biology Core		All Biology Core courses must be completed prior to starting concentration
The concentration consists of 23 units of upper-division **biology** electives, of which at least 5 units must be laboratory- or field-based; at least 6 units must be 400-level, and at least 2 capstone units. The 23 units of upper-division biology electives must also meet the following requirements:		
Upper-Division Required Courses (3 units)		BIOL 314 Population and Community Ecology (3) **OR** BIOL 325 Principles of Evolution (3)
Upper-Division Biology electives 11 units minimum		Ecology Courses –take at least one of the following: (4 units minimum) BIOL 419 Marine Ecology (3) and BIOL 419L Marine Ecology Laboratory (1/1) OR BIOL 422 Coastal Ecology (4/2)† ‡ OSI (Catalina Semester) courses (4/2): 353, 420, 455, 458 Organismal/Systematics courses - take at least one of the following: (4 units minimum) BIOL 446 Marine Phycology (4/2)† BIOL 461 Marine Invertebrate Zoology (4/2) BIOL 475 Ichthyology (4/2) OSI (Catalina Semester) courses (4/2): 313, 417, 419, 420, 425 Other Marine Biology courses – take at least one of the following: (3 units minimum) BIOL 301 Problems in Environmental Biology (3/2) BIOL 302 Microbiology (4/2) BIOL 317 Field Marine Biology (4/2) BIOL 402 Computer Lab in Molecular Systematics (3/1) BIOL 404 Evolution (3) or BIOL 409 Evolution for Teachers (3) BIOL 405 Developmental Biology (3) BIOL 436 Advanced Applied Statistics (4/1) BIOL 468 Comparative Animal Physiology (4/1)† [was 4/2 prior to F06] OSI (Catalina Semester) courses (4/2): 345, 460 any Upper Division Required, Ecology, or Organismal/Systematics course listed above and not used to meet the above requirements
Free upper-division electives		Additional upper-division biology electives to reach a total of at least 23 units. Although it is recommended that MB concentration majors select these additional elective units from courses listed on this page, any upper-division biology major course may be used to fulfill these units.
Capstone Courses 2 units minimum		BIOL 400 Seminar in Biology Education (Issues in Teaching Evolution & Biodiversity OR Issues in Teaching Physiology & Ecology) (2) BIOL 401 Biogeography (3) BIOL 422 Coastal Ecology (4/2)† ‡ BIOL 450 Conservation Biology (3) BIOL 482 Capstone Studies in Biology (2) BIOL 495 Biological Internship (3/2)† BIOL 498 Senior Thesis (1-2)† BIOL 499L Independent Laboratory Study (1-3) OSI (Catalina Semester) course (3/3): 496
Total upper-division units	**23**	

† Courses meet the upper-division writing requirements (6 units required)
* Courses shown as total units / lab-field units e.g. 4/2
‡ Course counts as elective or capstone, but not both

Other concentration requirements:	Courses	units
5 units of upper-division lab or field courses		
6 units of 400-level biology courses		
Upper-division writing requirement (ENGL 301 OR ENGL 363 OR 6 units of BIOL courses that meet the writing requirement †)		
No more than a combined total of 6 units of Biol 480 (3 max), 482 (2 max), 495 (3 max), 498 (3 max), and Biol 499L (6 max) shall be counted toward the 23 upper-division Biology units required for the major. No more than 3 units of Biol 499L shall be counted toward the 5 units of upper-division lab or field courses required for the major.		

MOLECULAR BIOLOGY AND BIOTECHNOLOGY CONCENTRATION (MB&B) WORKSHEET

The study of genetics, molecular biology, and biotechnology and their applications to medicine, agriculture and the environment (e.g., cancer, infectious diseases, gene therapy, crop improvement, and bioremediation).

Course categories	√	Courses *
Biology Core		All Biology Core courses must be completed prior to starting concentration
The concentration consists of 23 units of upper-division **biology** electives, of which at least 5 units must be laboratory- or field-based; at least 6 units must be 400-level, and at least 2 capstone units. The 23 units of upper-division biology electives must also meet the following requirements:		
Upper-Division Required Courses (6-7 units)		Complete these before entering the other upper division electives: BIOL 309 Intermediate Molecular Biology (3) **and one or more of the following:** BIOL 302 General Microbiology (4/2) CHEM 421 Biological Chemistry (3) **or** CHEM 423A General Biochemistry (3)
Upper-Division Biology electives 10 units minimum		Molecular Biology Courses – students must take a minimum of 6 units of the following: BIOL 402 Computer Lab in Molecular Systematics (3/1) BIOL 405 Developmental Biology (3) BIOL 407 Genes & Genomes (3) BIOL 411 Medical Genetics and Systems Biology (3)† BIOL 412 Principles of Gene Manipulation (3) ‡ BIOL 413 Advances in Molecular Genetics (3) BIOL 414 Microbial Genetics (3)† BIOL 426 Molecular Virology (3)† ‡ BIOL 430 Advances in Microbiology (3) ‡ BIOL 445 Plant Cell Physiology (3) BIOL 448 Plant Molecular Biology (3) BIOL 472A Advances in Biotechnology Lab (3/2) ‡ BIOL 472B Advances in Biotechnology Lab (3/2) ‡ BIOL 473 Bioinformatics (3/1) CHEM 421 Biological Chemistry (3) **or** CHEM 423A General Biochemistry (3) Associated Courses – students may use the following courses to complete the 10-unit minimum: BIOL 329 Essential Techniques in Cell Biology (3/2) BIOL 362 Mammalian Physiology (4/1) [Was 4/2 from F99 – F04] BIOL 417 Advances in Cell Biology (3) BIOL 418L Advances in Cell Biology Lab (2/2) BIOL 424 Immunology (4/2) BIOL 427 Stem Cell Biology (3) †(effective F11) BIOL 428 Biology of Cancer (3) BIOL 429 Techniques in Stem Cell Biology (3/2) ‡ BIOL 444 Plant Physiological Ecology (4/2) BIOL 465 Integrative Biology of Spider Silk (3) †(effective F11) BIOL 470 Cellular Neurobiology (3)† BIOL 477 Advances in Biotechnology (3)
Free upper-Division electives		Additional upper-division biology electives to reach a total of at least 23 units. Although it is recommended that MB&B concentration majors select these additional elective units from courses listed on this page, any upper-division biology major course may be used to fulfill these units.
Capstone Courses 2 units minimum		BIOL 400 Seminar in Biology Education (Issues in Teaching Genetics and Molecular Biology) (2) BIOL 412 Principles in Gene Manipulation (3) ‡ BIOL 426 Molecular Virology (3)† ‡ BIOL 429 Techniques in Stem Cell Biology (3/2) ‡ BIOL 430 Advances in Microbiology (3) ‡ BIOL 472A Advances in Biotechnology Lab (3/2) ‡ BIOL 472B Advances in Biotechnology Lab (3/2) ‡ BIOL 482 Capstone Studies in Biology (2) BIOL 495 Biological Internship (must be in the concentration) (3/2)† BIOL 498 Senior Thesis (must be in the concentration) (1-2)† BIOL 499L Independent Laboratory Study (1-3)
Total upper-Division units	**23**	

† Courses meet the upper-division writing requirements (6 units required) ‡ Courses count as electives or capstone, but not both

* Courses shown as total units / lab-field units e.g. 4/2

Other concentration requirements:	Courses	units
5 units of upper-division lab or field courses		
6 units of 400-level biology courses		
Upper-division writing requirement (ENGL 301 OR ENGL 363 OR 6 units of BIOL courses that meet the writing requirement †)		
No more than a combined total of 6 units of Biol 480 (3 max), 482 (2 max), 495 (3 max), 498 (3 max), and Biol 499L (6 max) shall be counted toward the 23 upper-division Biology units required for the major. No more than 3 units of Biol 499L shall be counted toward the 5 units of upper-division lab or field courses required for the major.		

PLANT BIOLOGY CONCENTRATION (PB) WORKSHEET

The study of plant biology, including plant diversity, plant cell biology, developmental plant biology, plant ecology, plant evolution, plant genetics, molecular plant biology, organismal plant biology, phycology, plant physiology, plant-animal interactions, plant-microbe interactions, and plant pathology.

Course categories	√	Courses *
Biology Core		All Biology Core courses must be completed prior to starting concentration
The concentration consists of 12 units of upper-division **biology** electives, of which at least 3 units must be laboratory- or field-based; at least 6 units must be 400-level, and at least 2 units must be capstone. The 12 units of upper-division biology electives must also meet the following requirements:		
Upper-Division Required Course 3 units		BIOL 345 Plant Biology (3/1)
Upper-Division Biology electives 7 units minimum		BIOL 340 Field Botany (3/2) BIOL 344 Survey of the Land Plants (4/2) BIOL 441 Plant Taxonomy (4/2) BIOL 442 Pollination Biology (3/1) BIOL 443 Plant Ecology (4/2) BIOL 444 Plant Physiological Ecology (4/2) BIOL 445 Plant Cell Physiology (3) BIOL 446 Marine Phycology (4/2) † BIOL 447 Ethnobotany (3/1) BIOL 448 Plant Molecular Biology (4/1) BIOL 449 Desert Ecology (4/2) † GEOG 325 Natural Vegetation (3)
Capstone Courses 2 units minimum		BIOL 450 Conservation Biology (3) BIOL 482 Capstone Studies in Biology (2) BIOL 498 Senior Thesis (1-2)† BIOL 499L Independent Laboratory Study (1-3)
Total upper-division units	**12**	**Important Notice**: This concentration has only 12 required units of courses (including 3 lab- or field-based units) within the concentration. The remaining 11 units to reach the **required 23 upper-division units (including 5 lab- or field-based units) for the biology major** are free upper-division units and can be fulfilled by taking any 300/400 level biology majors' courses, including the ones listed above.

† Courses meet the upper-division writing requirements (6 units required for the major, which do not have to be taken within the concentration)

* Courses shown as total units / lab-field units e.g. 4/2

‡ Course counts as elective or capstone, but not both

Other concentration requirements:	Courses	units
3 units of upper-division lab or field courses		
6 units of 400-level biology courses		
Upper-division writing requirement (ENGL 301 OR ENGL 363 OR 6 units of BIOL courses that meet the writing requirement †)		
No more than a combined total of 6 units of Biol 480 (3 max), 482 (2 max), 495 (3 max), 498 (3 max), and Biol 499L (6 max) shall be counted toward the 23 upper-division Biology units required for the major. No more than 3 units of Biol 499L shall be counted toward the 5 units of upper-division lab or field courses required for the major.		

ALL BIOLOGY ELECTIVES

The following is a list of all of the elective courses offered by the Department. Not every course is taught each semester.

FOR PREREQUISITES SEE COURSE CATALOG

300-Level BIOL Courses that **DO** count toward "Biology Electives" - units listed are shown as "total number of units for the course/lab units in the course":

301	Problems in Environmental Biology	3/2	SS
302	General Microbiology	4/2	F, S
303	Intermediate Cell Biology	3	F, S
304	Supervised Biology Lab Instruction	2	P
309	Intermediate Molecular Biology	3	F, S
314	Population and Community Ecology	3	F
317	Field Marine Biology	4/2	S / E
325	Principles of Evolution	3	F, S
329	Essential Techniques in Cell Biology	3/2	SS
340	Field Botany	3/2	S / E
344	Survey of Land Plants	4/2	P
345	Plant Biology (4/1 in Sp14 only)	3/1	F
361	Human Anatomy	4/2	F, S
362	Mammalian Physiology	4/1	F, S

400-Level BIOL Courses that **DO** count toward "Biology Electives" – units listed are shown as "total number of units for the course/lab units in the course":

400	Seminar in Biology Education (Issues in Teaching Evolution & Biodiversity OR Issues in Teaching Physiology & Ecology)	2	P
401	Biogeography	3	F / E
402	Computer Lab in Molecular Systematics	3/1	F / O
405	Developmental Biology	3	S
407	Genes & Genomes	3	F / E
409	Teaching Evolution: Online Course for Teachers (WEB)	3	P
411†	Medical Genetics	3	SS
412	Principles of Gene Manipulation	3	F
413	Advances in Molecular Genetics	3	S
414†	Microbial Genetics	3	I
417†	Advances in Cell Biology	3	F, S
418L	Advances in Cell Biology Laboratory	2/2	P
419	Marine Ecology	3	F / O
419L	Marine Ecology Lab	1/1	F / O
422†	Coastal Ecology	4/2	F / E
424	Immunology	4/2	S
426†	Molecular Virology (effective Sp15; was Virology prior to Sp15)	3	S
427†	Stem Cell Biology (effective F11)	3	F, S
428	Biology of Cancer	3	F
429	Techniques in Stem Cell Biology	3/2	F
430	Advances in Microbiology	3	F, S
436	Advanced Applied Statistics (MATH 436)	4/1	S #
441	Plant Taxonomy	4/2	P
442	Pollination Biology	3/1	P
443	Plant Ecology	4/2	S / O
444	Plant Physiological Ecology	4/2	F / O
445	Plant Cell Physiology	3	F / E
446†	Marine Phycology	4/2	F / O

(Continued next page) ⟶

KEY (when classes are normally offered):

F = Fall S = Spring SS = Summer I = Intersession E = Even years O = Odd years P = Periodic

† courses that meet the upper division writing requirement (6 units required to meet the writing requirement)

*A combined total of 6 units from all of these classes may be applied to the 23 upper division Biology units required for the major. See the bottom of the concentration sheets for more detail; ** Maximum of 3 units (total) may be applied to Biology major requirements; # See Mathematics, Anthropology, or Chemistry Schedules

447	Ethnobotany	3/1	P
448	Plant Molecular Biology (effective F15; was 3/0 prior to F15)	4/1	F / O
449†	Desert Ecology	4/2	S / E
450	Conservation Biology	3	S
451	Advanced Human Evolution (ANTH 451)	3	S #
456	Hormones and Behavior (ANTH 456)	3	F #
461	Invertebrate Zoology	4/2	F / E
462	General Parasitology	4/1	P
465†	Integrative Biology of Spider Silk († effective F11)	3	P
466†	Behavioral Ecology († effective F11)	3	F / E
467	Entomology	4/2	S / E
468†	Comparative Animal Physiology (4/2 prior to F06)	4/1	S / E
470†	Cellular Neurobiology	3	S
472A	Advances in Biotechnology Laboratory (CHEM 472A)	3/2	F
472B	Advances in Biotechnology Laboratory (CHEM 472B)	3/2	S #
473	Bioinformatics (CHEM 473)	3/1	S
474	Natural History of Vertebrates	4/2	P
475	Ichthyology	4/2	S / O
476	Herpetology	4/2	S / E
477	Advances in Biotechnology (CHEM 477)	3	P #
478	Mammalogy	4/2	F / O
479	Ornithology	4/2	S / O
* 480	Advanced Topics in Undergrad Biology	1-3	F, S
* 480C	CIRM/Stem Cell Biology Proseminar (for BSCR Scholars only)	2	F
* 480D	Colloquium: Diverse Topics in Biology	1	F, S
* 480M	MARC Proseminar (for MARC Scholars only)	1	F, S
481	Advances in Evolution & Ecology	3	F / O
* 482	Capstone Studies in Biology	2/2	P
* 495†	Biological Internship	3/2	F, S
* 498†	Senior Thesis	2	F, S
* 499L	Independent Laboratory Study	(1 to 3)	F, S
** CHEM 421	Biological Chemistry	3	F, S #
** CHEM 423A,B	General Biochemistry	3, 3	F, S #

300 or 400 level Courses that **DO NOT** count as "Biology Electives" for the Biology major
If you are a Biology Major do not take these courses:

300	Environmental Biology and Sustainability	3	F
305	Human Heredity and Development	3	F, S
306	Biology of Aging	3	F
310	Human Physiology	3	F, S
310L	Human Physiology Lab	1	F, S
311	Nutrition and Disease (CHEM 311)	3	F, S
318	Wildlife Conservation	3	S / O
319	Marine Biology	3	S
322	Human Behavioral Ecology (ANTH 322)	3	F, S
327	Stem Cells and Regenerative Medicine	3	S
330	Sustainability Ecology: American Indian Models	3	S / E
352	Plants and Life (accepted for majors prior to F05)	3	S / E
360	Biology of Human Sexuality	3	F, S
453	Life Science Concepts	3	F, S
496	Biology Tutorials	1 - 3	P

KEY (when classes are normally offered):
F = Fall S = Spring SS = Summer I = Intersession E = Even years O = Odd years P = Periodic
† courses that meet the upper division writing requirement (6 units required to meet the writing requirement)
*A combined total of 6 units from all of these classes may be applied to the 23 upper division Biology units required for the major. See the bottom of the concentration sheets for more detail; ** Maximum of 3 units (total) may be applied to Biology major requirements; # See Mathematics, Anthropology, or Chemistry Schedules

PLANNING YOUR COURSEWORK

Many CSUF students work and/or have family commitments, long drives to CSUF and back, as well as other important obligations that take up their time. To be successful as a biology major, we recommend the following based on a 60-hour work week (school + commitments) and the need to study 25 – 35 h per week. Keep in mind that lecture classes generally meet for 3 h per week and labs meet for 3-6 h per week (3 hours per unit of lab; Biology core class labs meet for 3 h per week, and some upper division Biology courses have labs that meet for 6 h per week). ***Every week, you should spend 3 h studying for every unit of lecture and 2 h studying for every unit of lab.***

Hours for Work/Family/Commuting per week	Maximum Number of Units Per Semester
0 – 9	14 - 16
10 – 19	13 – 14
20 – 29	9 – 12
30 – 39	6 – 9

PLANNING TIME TO GRADUATION

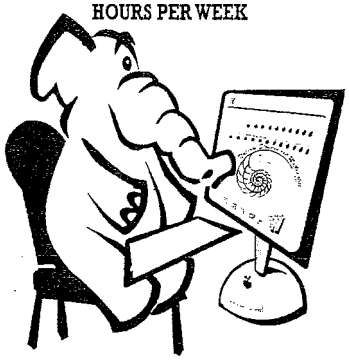
If You Complete:	**You Will Graduate In:**
30 units per year	4 years
24 units per year	5 years
20 units per year	6 years

To reach your goal for graduation, you'll need to balance your time, your course load, and make a plan indicating how you will fulfill all of your degree requirements. When making this plan, consider how much you need to work, how much time you need to be successful in your courses (for most this means getting A's and B's; not C's), and the consequences of how you arrange your schedule (i.e., it is generally not a good idea to take Calculus, Chemistry, Physics, Biology, and History in a single semester). Use one of the matrices on the following 2 pages to plan your college coursework.

TO BE A SUCCESSFUL TITAN

STUDY 25 - 35

HOURS PER WEEK



SAMPLE COURSE MATRIX FOR STUDENTS PLANNING TO GRADUATE IN 4 YEARS

THIS MATRIX ASSUMES STUDENTS START IN MATH 130 (CALCULUS) OR HIGHER AND THAT STUDENTS ARE COMMITTED TO COMPLETING 30 OR MORE UNITS PER YEAR; IF YOU START IN MATH 115 YOU WILL NEED TO ENROLL IN SUMMER OR INTERSESSION CLASSES TO GRADUATE IN 4 YEARS. This plan is a sample only. It should not replace early and frequent consultation with an advisor as requirements are subject to change and number of units each semester depends upon satisfactory performance and progress. Students interested in health professions are strongly encouraged to discuss their plans with the Health Professions Advisor to ensure prerequisites for entrance exams are completed in the correct sequence.

Year 1		Year 2		Year 3		Year 4	
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Biol 151 (4)	Biol 152 (4)	Biol 251 (3) and Biol 253L (1)	Biol 252 (3) and Biol 254L (1)	1 – 2 UDBEs (1 or 2 x 3-4)	1 – 2 UDBEs (1 or 2 x 3-4)	2 UDBEs (2 x 3-4)	2 -3 UDBEs (2 or 3 x (3-4)
Math 130 or 150A (4)	Chem 120A (5)	Chem 120B (5)	2nd Math 150B or 338 (4)	Chem 301A (3)	Chem 301B (3) Chem 302 (2)	Phys 211 + Phys 211L (3 + 1)	Phys 212 + Phys 212L (3 + 1)
GE A.2 Eng 101 (3)	GE A.1, oral comm. (3)	GE (3)	GE (3)	GE (3)	GE (3)	GE (3)	Free electives (to make 120 total units)
GE (3)	GE (3)	GE (3)	GE (3)	Engl 301 or 363 (3) if needed	GE (3)	GE (3)	
Total: 14 units	Total: 15 units	Total: 15 units	Total: 14 units	Total: 12-16 units	Total: 14 – 15 units	Total: 16-17** units	Total: 15-17** units

*UDBE = Upper division BIOL elective to meet concentration requirements

**Current University policy limits students to 16 units per semester, but students can petition to take > 16 units.

Blank Matrix for Planning Purposes

Year 1		Year 2		Year 3		Year 4	
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Intersession	Summer						
Total: 14 units	Total: 15 units	Total: 15 units	Total: 14 units	Total: 12 - 16 units	Total: 14 - 15 units	Total: 16- 17** units	Total: 15-17** units

SAMPLE COURSE MATRIX FOR STUDENTS PLANNING TO GRADUATE IN 5 YEARS

THIS MATRIX ASSUMES STUDENTS START IN MATH 130 (CALCULUS) OR HIGHER AND THAT STUDENTS ARE COMMITTED TO COMPLETING 24 OR MORE UNITS PER YEAR; IF YOU START IN MATH 115 YOU WILL NEED TO ENROLL IN SUMMER OR INTERSESSION CLASSES TO GRADUATE IN 5 YEARS. This plan is a sample only. It should not replace early and frequent consultation with an advisor as requirements are subject to change and number of units each semester depends upon satisfactory performance and progress. Students interested in health professions are strongly encouraged to discuss their plans with the Health Professions Advisor to ensure prerequisites for entrance exams are completed in the correct sequence.

Year 1		Year 2		Year 3		Year 4		Year 5	
Spring	Fall	Spring	Fall	Spring	Spring	Fall	Spring	Fall	Spring
Biol 151 (4)	Biol 152 (4)	Biol 251 (3) and Biol 253L (1)	Biol 252 (3) and Biol 254L (1)	1 UDBE* (3-4)	1 UDBE* (3-4)	1 UDBE* (3-4)	1 UDBE* (3-4)	1 UDBE* (3-4)	1 UDBE* (3-4)
Math 130 or 150A (4)	Chem 120A (5)	Chem 120B (5)	2nd Math 150B or 338 (4)	Chem 301A (3)	Chem 301B (3) Chem 302 (2)	Phys 211 + 211L (3 + 1)	Phys 212 + 212L (3 + 1)	1 UDBE* (3-4)	1 UDBE* (3-4)
GE A.2 Eng 101 (3)	GE A.1 oral comm. (3)	GE (3)	GE (3)	Engl 301 or 363 (3)	GE (3)	GE (3)	GE (3)	GE (3)	GE (3)
				GE (3)	Free elective (1)	Free elective (1-3)	GE (3)	GE (3)	GE (3)
Total: 11 units	Total: 12 units	Total: 12 units	Total: 11 units	Total: 12-13 units	Total: 12-13 units	Total: 12-15 units	Total: 13-14 units	Total: 12-14 units	Total: 12-14 units

* UDBE = Upper division BIOL elective to meet concentration requirements

Blank Matrix for Planning Purposes

Year 1		Year 2		Year 3		Year 4		Year 5	
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Intersession	Summer								
Total: 11 units	Total: 12 units	Total: 12 units	Total: 11 units	Total: 12-13 units	Total: 12-13 units	Total: 12-15 units	Total: 13-14 units	Total: 12-14 units	Total: 12-14 units

MINORS IN BIOLOGY

Biology Minor Requirements:

- All *students must complete Biology 151 and 152*
- *We have two minors – Cell & Molecular Biology and Environmental Biology*
- *Students will complete a third CORE Biology course aligned with their chosen minor (i.e. either Biol 251 or Biol 252)*
- *Students will complete three upper-division courses specific to their chosen minor (see below)*
- *Upper-division coursework should be chosen in consultation with the Biology Minor advisor and with careful consideration of prerequisites*

LOWER-DIVISION CORE Courses Required For All Students

- ☐ Biol 151 – Cellular and Molecular Biology (4 units)
- ☐ Biol 152 – Evolution and Organismal Biology (4 units)

Cell and Molecular Biology Minor

Total # of units required: 22 - 23 units

Lower-Division CORE Requirement (4 units)

- ☐ Biol 251 – Genetics &
- ☐ Biol 253L Cell & Molec. Biol Skills Lab

Upper-Division Required Course (3 units)

- ☐ Biol 303 – Intermediate Cell Biology (3 units)
  OR
  Biol 309 – Intermediate Molecular Biology (3 units)

Upper-Division Electives:

Students should choose two courses. At least one must have a laboratory.

Biol 302 – General Microbiology (4) L
Biol 362 – Mammalian Physiology (4) L
Biol 402 – Computer Lab in Molec. Systematics (3) L
Biol 411 – Medical Genetics and Systems Biology (3)
Biol 412 – Principles of Gene Manipulation (3)
Biol 413 – Advances in Molecular Genetics (3)
Biol 414 – Microbial Genetics (3)
Biol 417 – Advances in Cell Biology (3)
Biol 418L – Advances in Cell Biology Lab (2) L
Biol 424 – Immunology (4) L
Biol 426 – Molecular Virology (3)
Biol 428 – Biology of Cancer (3)
Biol 445 – Plant Cell Physiology (3)
Biol 448 – Plant Molecular Biology (4) L
Biol 470 – Cellular Neurobiology (3)
Chem 421 – Biological Chemistry (3) OR Chem 423A – General Biological Chemistry (3)

L – lab course

Environmental Biology Minor

Total # of units required: 21 - 22 units

Lower-Division CORE Requirement (4 units)

- ☐ Biol 252 – Ecology &
- ☐ Biol 254L Research Skills in Ecol. And Org. Biol.

Upper-Division Required Course (3 units)

- ☐ Biol 325 – Principles of Evolution (3 units)

Upper-Division Electives[1]

Students should choose two courses. At least one must have a laboratory.

Biol 317 – Field Marine Biology (4) L
Biol 345 – Plant Biology (3) L
Biol 340 – Field Botany (3) L
Biol 401 – Biogeography (3) L
Biol 419/Biol 419L – Marine Ecology (3) and Lab (1) L
Biol 422 – Coastal Ecology (4) L
Biol 441 – Plant Taxonomy (4)
Biol 443 – Plant Ecology (4) L
Biol 444 – Plant Physiological Ecology (4) L
Biol 446 – Marine Phycology (4) L
Biol 447 – Ethnobotany (3) L
Biol 449 – Desert Ecology (4) L
Biol 450 – Conservation Biology (3)
Biol 461 – Marine Invertebrate Biology (4) L
Biol 467 – Entomology (4) L
Biol 466 – Behavioral Ecology (3)
Biol 475 – Ichthyology (4) L
Biol 476 – Herpetology (4) L
Biol 478 – Mammology (4) L
Biol 479 – Ornithology (4) L

[1]*One Upper-Division Elective course can be chosen outside of Biology in consultation with the Biology Minor Advisor.*

Advisor Approval is REQUIRED to count one of the following courses for the Environmental Biology minor:

Chemistry Courses

Chem 436 – Atmospheric Chemistry (3)
Chem 437 – Environmental Water Chemistry (3)
Chem 438 – Environmental Biochemistry (3)
Chem 448 – Environmental Biochemistry (3)
Chem 313A *and* Chem 313B *and* Chem 313C – Environmental Pollution and Its Solutions (1 unit each)

Geography Courses

Geog 323 – Weather and Climate (3)
Geog 450 – Human Response to Environmental Hazards (3)
Geog 481 – Geographic Information Systems: Introduction (3)

Geology Courses

Geol 333 – General Oceanography (3)
Geol 335 – Hydrology and Surface Processes (3)
Geol 380 – Geologic Field Techniques (3)
Geol 201 – Earth History (3)

Other Outside Courses

Econ 362 – Environmental Economics (3)
Hesc 415 – Environmental Health
Phil 313 – Environmental Ethics (3)

MINORS ASSOCIATED WITH BIOLOGY

Minor in Business Administration

Biology majors that are also interested in business may sign up for a minor in Business Administration. A student who completes this minor and meets all other entrance requirements will be poised to apply to the Master of Business Administration (MBA) degree program and will then only need to take the second year (33 units) of coursework to complete the MBA. For more information, see https://business.fullerton.edu/programs/undergraduate/Minors. To sign up for the minor, see the Business Advising Center in SGMH-1201; phone (657) 278-2212.

Minor in Chemistry

The Chemistry minor is appropriate for students majoring in Biological Science, Geological Science, Physics, or Science Education. It is also appropriate for students who have interest in Art Restoration, Environmental Science, Forensic Science, Business Administration, Medical Technology, Patent or Environmental Law, or Science Writing. Students with interests in these or other areas should consult the Chemistry Department about courses appropriate for a minor.

A minor in Chemistry requires a minimum of 24 acceptable units of chemistry, including General Chemistry (CHEM 120A, B) plus 14 units of upper-division chemistry courses. These courses must be completed with a minimum grade of C.

Acceptable Upper Division Courses

Analytical	Biochemistry	Inorganic	Organic
315	421	325	301 A, B
316	422	425	302
411 A-G	423A,B		305
	445		306A,B
	472A,B		431
	477		

Physical	Environmental	Research
355	435	495
361A,B	436	
371A,B	437	
	438	

Any class not listed here may NOT be used to complete the Minor.

Interested in becoming a Health Inspector?
Minor in Health Science

The Health Science Minor-Environmental and Occupational Health track (22 units), designed to complement majors such as chemistry and biology, provides students with the necessary coursework to become eligible for the Registered Environmental Health Specialist (REHS) Exam offered by the California Department of Health Services. https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/EMB/REHS/REHS.aspx
CSUF is the only campus in Orange County to have an approved program. For more information go to: http://catalog.fullerton.edu or contact the Chair of HESC Department (657) 278-3316 or KHS-121.

RESEARCH AND OTHER OPPORTUNITIES FOR BIOLOGY MAJORS

Research Courses

Undergraduate Research with Faculty (BIOL 299L, 499L). The Department offers undergraduate research courses that provide opportunities to progress from closely directed research (BIOL 299L, usually performed at the freshman or sophomore level) to more independent work (BIOL 499L, usually performed at the junior or senior level). Student-faculty collaborations are created by mutual interest. The Faculty roster near the end of this handbook briefly summarizes faculty research interests but you can also learn about individual faculty research interests on the Biology web page and the abstracts posted outside of the Biology Department office (MH-282). Limited funding is available from the Department to support this student research.

Marine Biology Semester at Catalina. This semester-long program, offered through the California State University Ocean Studies Institute (OSI) and the Southern California Marine Institute (SCMI), provides an intensive undergraduate exposure to marine biology, and is designed for students with a serious commitment to environmental and marine science. The program is based at the University of Southern California (USC) Wrigley Institute for Environmental Studies, situated on Santa Catalina Island, 26 miles from Los Angeles, CA. http://www.scmi.net/csu-catalina-semester/

Research Programs

Big Data Discovery, and Diversity through Research Education Advancement and Partnerships (BD3-REAP) Program. The National Institutes of Health (NIH)-funded BD3-REAP Program is open to full-time students majoring in natural sciences and mathematics, and health science. The two-year program is designed to prepare students to pursue doctoral studies in biostatistics, bioinformatics, computational biology, and data science. Applications are available at the beginning of the fall semester. For more info, contact Dr. Math Cuajungco, Co-Program Director, phone (657) 278-8522 or mcuajungco@fullerton.edu

BSCR. The **CSUF Bridges to Stem Cell Research Program** (BSCR), funded by the California Institute for Regenerative Medicine (CIRM) provides an excellent opportunity for students aspiring to incorporate stem cell biology into their careers. Stem Cell Biology is one of the fastest growing areas in biomedicine and biotechnology. The BSCR program requires a full-time commitment for 19 months (from June through the following December), which includes 7 months of pre-internship training at CSUF during the summer and fall semester (required coursework and research experience), followed by a 12-month internship at a collaborating institution (Stanford University, UC Irvine, or USC). Financial benefits during the 12-month internship are as follows: a tuition waiver up to $3000 for the spring and fall semesters and stipend of $2500 per month. Applications are due in early April. Information is available from the director, Dr. Nilay Patel (657) 278 2483.
http://biology.fullerton.edu/stemcells/

LSAMP. The **CSU Louis Stokes Alliance for Minority Participation** program is supported by the National Science Foundation (NSF), the CSU Office of the Chancellor, and the 22 participating CSU campuses. The goal of this program is to increase the number graduates in sciences, technology, engineering, or math (STEM) from among students who have faced or face social, educational, or economic barriers to careers in STEM. CSU-LSAMP Research Scholars have a research commitment (minimum of 8-10 hours per week) during the academic year and can receive a research scholarship up to $4,000. http://lsamp.fullerton.edu/

MARC Scholars Program. **Maximizing Access to Research Careers** (MARC) applications are accepted each January, before the start of the spring semester. To qualify for the MARC Program, applicants should be from an underrepresented group and majoring in a STEM field (anthropology, biological science, biochemistry, chemistry, bioengineering, biophysics, mathematics, computer science, psychology). Students from any ethnicity who can provide proof of a disadvantaged status are also invited to apply. Applicants must have junior standing or be at least two years away from graduation with a minimum GPA of 3.2. As an honors undergraduate training program, this National Institutes of Health (NIH)-funded program develops fourteen exceptional Scholars per year and prepares them for success in Ph.D. or M.D./Ph.D. programs in biomedical or behavioral science. Scholars receive stipends, tuition, research materials, and travel support. They also participate in a MARC Proseminar where they study the

work of, and interact with, visiting scientists from across the U.S. and engage in an extramural research experience at a Ph.D. institution during their second summer in the MARC Program. Intramural research, which culminates with the defense of a MARC thesis, is conducted with a faculty member in the Department of Anthropology, Biological Science, Chemistry & Biochemistry, Computer Science, Engineering, Mathematics or Psychology. Fact sheets are available online (http://marc.fullerton.edu/), from the program director, Dr. Amybeth Cohen (657) 278-2178, and in the MARC Program Office (657) 278-4251 in MH-161B.

McNair Scholars Program. The Ronald McNair Scholars Program is a year-round program open to full-time students majoring in natural sciences, mathematics and engineering, and is designed to prepare students to pursue doctoral studies. Applicants must be members of a group underrepresented in graduate education and/or a first generation college student. Applicants must have completed at least 59 semester units and have a minimum GPA of 3.0. Applications are available at the beginning of the spring semester at McNair Scholars Office, UH-179 (657)278-7315. http://www.fullerton.edu/mcnair/

MHIRT Program. The **Minority Health & Health Disparities International Research Training program** is a National Institutes of Health (NIH) sponsored program that provides students belonging to underrepresented minorities or health disparities groups with the opportunity to carry out research during the summer (ten weeks) at laboratories in Thailand (Chiang Mai University), Argentina (Instituto Fundación Leloir, National Institute for Infectious Diseases, University of San Martín, Institute for Cell and Molecular Biology, School of Medicine-University of Buenos Aires), or England (King's College London, Cambridge University, Oxford University, York University) under the direction of world-renowned biochemists and molecular biologists. Fact sheets are available from the director, Dr. Marcelo Tolmasky (657) 278-5263. http://biology.fullerton.edu/people/faculty/marcelo-tolmasky/MHIRT%20website/index.html

RCP Program. The CSUF **Research Careers Preparatory Program** is a one-year program that provides freshman, sophomore/junior, and transfer students the opportunity to explore research as a career through a specially designed pro-seminar course, laboratory techniques class, and associated field or laboratory research activities. The main goals of the RCP program are to: 1) raise student awareness of research opportunities at CSUF and elsewhere, 2) provide students with the skill sets they need to be successful in their chosen careers, and 3) move more CSUF graduates into research-based graduate or professional programs in the U.S., or into the workforce within Orange County and throughout California. Participants in the program receive extensive academic and research mentoring through the three required courses, BIOL 280R, BIOL 280S, and BIOL 299L, CHEM 295/395, or PSYC 498. These courses will prepare and train students to be successful in their majors as future scientists (M.S., Ph.D.), future professionals (M.D., M.D.-Ph.D., D.O., O.D., D.D.S.-Ph.D.), and more broadly as responsible citizens. Participants will carry out undergraduate research with a faculty member in the Departments of Biological Science, Chemistry/Biochemistry, or Psychology. Upon successful completion of the one-year program, students often apply to MARC and other research scholar programs. For more information, please visit the RCP website at: http://biology.fullerton.edu/rcp

SCERP. The **Southern California Ecosystems Research Program** (SCERP) at CSUF, is a research training program for undergraduates focused on learning through discovery in environmental biology. This program strives to attract primarily underrepresented students to environmental biology early in their academic careers, typically at the end of the sophomore or junior year. Scholars participate in a summer field course followed by up to two years of independent research with a faculty mentor. Scholars receive stipends (approximately $2,000). Information is available from Dr. Bill Hoese, (657) 278-2476 or the Biology Dept. Office, MH-282, (657) 278-3614. http://biology.fullerton.edu/scerp/

Scholarships and Research Funding

STEER Scholarships. The **CSUF Scholarships to Enhance Excellence in the Chemical and Biological Research-Based Workforce** Program recruits and supports students to become highly qualified members of the Science, Technology, Engineering, and Mathematics (STEM) workforce. Students must have a minimum GPA of 2.75, have completed a FAFSA, and be eligible for financial aid. Students selected for the STEER program receive annual stipends of $6,500 and may receive additional support to take classes in summer and/or intersession, so they

may devote full time to learning science and preparing to enter the biotechnological industry. STEER scholars experience a support system that includes science faculty, peers, and CSUF Alumni.
http://www.fullerton.edu/biology/steer/

College of Natural Sciences and Mathematics and Cal State Fullerton Scholarships. A variety of scholarships – nearly $2 million annually at Cal State Fullerton – are awarded for outstanding achievement. In addition to scholastic achievement, financial need and other factors may be considered in the selection process. Many scholarships for NSM use the standard University Scholarship and Award Application, and are usually due in early February. Full details at http://www.fullerton.edu/financialaid/scholar/scholarships_default.htm

Intramural Research Funding. In addition to funding by the Department, there are other avenues for research support, including the ASI Research Grants, a student-operated committee that funds student research, and the Faculty Development Center Research and Creativity Awards that foster faculty-student collaborative research. Both require students to submit formal, competitive research proposals. For more information, students should ask their research mentors about these opportunities.

General education information

Please go to the Academic Advising Center home page (http://www.fullerton.edu/aac/) for additional information about GE requirements and a current list of GE courses. For questions about GEs, contact the CNSM Retention Specialist Sam Barrozo (sbarrozo@fullerton.edu), or the Academic Advising Center in UH-123A.

Area A: Core Competencies	**9 Units**
Oral Communication	**A.1**
Written Communication	**A.2**
Critical Thinking	**A.3**
Area B: Scientific Inquiry and Quantitative Reasoning	**12 Units**
Physical Science	**B.1**
Life Science	**B.2**
Laboratory Experience	**B.3**
Mathematics/Quantitative Reasoning	**B.4**
Implications & Explorations in Mathematics & Natural Sciences	**B.5**
Area C: Arts and Humanities	**12 Units**
Introduction to Arts	**C.1**
Introduction to the Humanities	**C.2**
Explorations in the Arts and Humanities	**C.3**
Origins of the World Civilizations	**C.4**
Area D: Social Sciences	**15 Units**
Introduction to the Social Sciences	**D.1**
World Civilizations and Cultures	**D.2**
American History, Institutions and Values	**D.3**
American Government	**D.4**
Explorations in Social Sciences	**D.5**
Area E: Lifelong Learning and Self Development	**3 Units**
Lifelong Learning and Self-Development	**E**
Area Z: Cultural (3 units required)	
Cultural Diversity	**Z***
Total	**51 Units**

What can I do with my Bachelors Degree in Biology?

Career info from CSUF Biology

- http://www.fullerton.edu/biology/careers/index.php
- student announcements and opportunities (including internship and job postings) http://biology.fullerton.edu/oppo.html

Careers in biology (general listings)

- American Institute of Biological Sciences (AIBS) http://www.aibs.org/careers/
- College Grad https://collegegrad.com/careers/life-physical-and-social-science

Careers in cell and molecular biology (if you are interested in the Cell and Development and Molecular Biology and Biotechnology concentrations):

- Nature http://www.nature.com/scitable/ebooks/guide-to-life-science-careers-14053951

Careers in organismal, ecology, or marine biology (if you are interested in the Ecology and Evolutionary Biology, Plant Biology, and Marine Biology concentrations):

- Ecological Society of America (ESA) http://www.esa.org/esa/careers-and-certification/explore-ecology-as-a-career/
- The Society for Integrative and Comparative Biology (SICB) http://www.sicb.org/careers/
- The Wildlife Society (TWS) http://wildlife.org/career-development

Careers in teaching

- See the 'Teach Science and Impact the Future' section of this handbook.

Careers in health care

- See the 'Health Professions as a Biology Major' section of this handbook.

Careers in scientific research

- See the 'Research and Other Opportunities for Biology Majors' section.

Interested in exploring other careers?

- Visit the CSUF Career Center http://www.fullerton.edu/career or contact the College of Natural Sciences and Math Career Specialist Michelle Levy (milevy@fullerton.edu)

HEALTH PROFESSIONS AS A BIOLOGY MAJOR

The basic requirements for most Health Professions Programs (e.g. Pharmacy, Medicine, Dentistry, Optometry, Veterinary Medicine, and Physicians Assistant programs) are a year of biology with lab, a year of general chemistry with lab, a year of organic chemistry with lab, a semester of statistics and a semester of calculus - all of which you will receive as a biology major at CSUF. There are few upper-division *required* courses but often specific courses are recommended, and these can vary depending on the field you'd like to go into and the schools to which you plan to apply. The best place for you to get this information is to go to the Health Professions Advising Office (see below) on campus and look at the information available for the schools you'd like to attend (see links below). **Every concentration in the Biology major can prepare you to go into a health profession**. You should choose your concentration based on what you are passionate about because that will help you to be motivated to achieve the high level of academic performance needed to obtain entrance into a professional program (see next page).

You can find more information about requirements, exams, etc. for various health professions at the:

CSUF Health Professions Advising Office: http://www.fullerton.edu/healthprofessions/
Association of American Medical Colleges: http://www.aamc.org
American Association of Colleges of Osteopathic Medicine: http://www.aacom.org
American Association of Colleges of Pharmacy: http://www.aacp.org
Association of Schools and Colleges of Optometry: http://www.opted.org
American Dental Education Association: http://www.adea.org
Physician Assistant Education Association: http://www.paeaonline.org/
Association of American Veterinary Medical Colleges: http://www.aavmc.org/

Professional schools have specific course requirements and activities that students should be aware of. For instance, basic science research, clinical work, and extra-curricular and community service are very important in building a strong application. A health professions advisor will be able to point out appropriate courses and activities and, in many cases, recommend specific programs that students should participate in.

Students may use the facilities of the Health Professions Advising Office as needed. Starting in their sophomore year students should seek advising at least once a semester prior to registration. Meeting with a health professions advisor does not take the place of mandatory advising through the Biological Science Department.

Other services that the Health Professions Advising Office provides include helping students select appropriate clinical career paths and the professional schools appropriate for their needs. An advisor will make suggestions on how students might improve their applications and personal statements and provide advice related to letters of recommendation and the interview process. When requested, mock interviews can be arranged through the Career Development Center. The Health Professions Advising Office also supervises on-campus clubs, such as the Student Health Professions Association. A complete listing of Student Organizations affiliated with the Health Professions Office can be found on their website (below). In addition, the Health Professions Advising Office evaluates files prepared by students who submit applications and, where appropriate, will prepare committee letters of support for qualified students. **The Health Professions Advising Office is in UH-223 (657-278-3980). Their website is: http://www.fullerton.edu/healthprofessions/**





CONSIDERING HEALTH PROFESSIONAL SCHOOL BUT INTERESTED IN ECOLOGY, ORGANISMAL, OR MARINE BIOLOGY?

Odds are you will perform best in courses that you enjoy and are interested in. You can take a Concentration in Ecology and Evolutionary Biology (EEB) or Marine Biology (MB) and still take the courses you will need to do well on entrance exams (e.g. MCAT, DAT, GRE) and apply to health professional schools. Both Concentrations are flexible and allow you to take BIOL302 (Microbiology) and BIOL362 (Mammalian Physiology), and either BIOL361 (Human Anatomy) or CHEM421 (Biochemistry); these are the upper-division courses that you may need to be prepared to apply to professional programs (whether you need BIOL361 or CHEM421 will depend upon the type of programs you are interested in; consult the Health Professions Office). Either Concentration will also give you the kind of broad training in biology that will help you should you decide to change your career path to teaching or some other general biology field. Here's how to fulfill the requirements, with only 7 courses required for each Concentration:

	Ecology & Evolutionary Biology (EEB)			**Marine Biology (MB)**	
	course	units		course	units
Upper-division required	BIOL314 BIOL325	3 3		BIOL314 or 325	3
Upper-division electives	BIOL302 BIOL362 BIOL361 or CHEM421 *Organismal/Ecology course**	4 (2) 4 (1) 4 (2) or 3 4		BIOL302 BIOL362 BIOL361 or CHEM421 *Ecology course* *Organismal/Systematics course*	4 (2) 4 (1) 4 (2) or 3 4 4
Capstone	*Capstone course*, including BIOL499L*	2		*Capstone course, including BIOL499L*	2

**if take CHEM421, need 2 units of lab from O/E or Capstone*

**if take BIOL361, O/E course must be 400-level*

Teach Science and Impact the Future!

What Public School Teaching Looks Like

Science teachers usually teach at the middle or high school levels.

- Middle school science teachers usually teach 5-6 periods of science each day. Each period is about 45 minutes in length. Teachers also have a planning period of about 45 minutes per day.
- High School science teachers usually teach 5 periods of science each day, and each period is about 55 minutes in length. Teachers also have a planning period of about 55 minutes.
- Teachers are usually required to be on site about 30 minutes before and after the school day.
- Teachers are also expected to attend department and school meetings, participate in professional development activities, hold parent and student conferences as needed, and make curriculum decisions regarding textbooks, laboratory activities, assignments, and assessments. Science teachers also select laboratory equipment.

What science is taught depends on the grade level. California has identified content standards for each grade level as follows:

- 6th Grade Focus on Earth Science; 7th Grade Focus on Life Science; 8th Grade Focus on Physical Science; Grades 9-12 include Natural/General Science and also Physics, Chemistry, Biology/Life Sciences, and Earth Sciences

Why Teaching is a Great Career Choice

Intrinsic Reasons for Teaching

- Joy of seeing students learn; potential to affect the lives of others
- Performing a significant social service
- Fellow teachers/colleagues relationships
- Work you love to do; gives sense you are respected and appreciated
- Love of subject taught; lifelong learning opportunities

Intrinsic Reasons for Teaching Science

- Science teachers shape students' lives and impact society
- Science teachers are part of the scientific community
- Science teachers influence the future

Extrinsic Reasons for Teaching

- **Salaries –** Beginning salaries for teachers in Southern California start around $45,000; veteran teachers may earn as much as $95,000. Teachers are paid additional stipends for coaching, serving in leadership roles, and for summer school teaching. Teachers move up the pay scale each year and jump extra steps for completing additional education. Moreover, teachers may be compensated at the hourly rate (ranging from $25-30) for some activities completed outside the school day.
- **Work Schedule –** Teachers typically work two semesters of 18 weeks plus 10 teacher work days. This means that teachers work about 185 days per year, compared to 260 week days of a standard year. Contracts also specify the number of compensated sick days (usually 10). Substitute coverage is provided for teachers to attend professional development activities. Many teachers use the summer for rejuvenation, education or travel, or part-time employment.
- **Benefits –** Teaching offers great retirement plans and health/dental/vision benefits. Membership in teacher credit unions that offer low interest loans.
- **Job Security –** Most teachers are tenured (have certain protections against job loss) after two years.
- **Opportunities for Advancement –** Teachers may become curriculum specialists, department chairs, counselors, and school and district administrators.

For more information, please contact Dr. Megan Tommerup, Teaching Credential Adviser (mtommerup@fullerton.edu).

Steps to Earning a Teaching Credential in Science

To earn a secondary science teaching credential, candidates must (1) demonstrate subject matter competency and (2) complete a program of professional preparation.

STEP 1: Demonstrating Subject Matter Competency

- The California Commission on Teacher Credentialing authorizes eight different science credentials for teaching in grades 7-12.
  - Each credential requires demonstration of subject matter competence through completion of specific undergraduate or graduate degrees OR successful passage of subtests of the California Science Examination for Teachers (CSET) in Science.
  - Candidates with a regular credential in a science area are authorized to teach in their specific discipline as well as general, integrated, and middle school science.
- The most common route to subject matter competency is a major in a specific discipline and passage of the appropriate CSETs. These are listed at http://ed.fullerton.edu/SecEd/Credential_Prog/Science.htm

STEP 2: Completing a Credential Program

- The California State University Fullerton Single Subject Credential Program requires 12 units of prerequisite coursework and two semesters of credential program coursework and fieldwork. A list of coursework is found at http://ed.fullerton.edu/SecEd/Credential_Prog/Program_Course_Sequence.htm
  - If you want to complete your credential while employed as a teacher (Intern Program), two additional courses are required in advance (EDSC 400 & EDSC 410).
  - All prerequisite and pre-service courses are offered summer, fall, intersession, and spring; WEB sections of all courses are available.

Financial Support While Earning Your Credential

There are two major financial opportunities to support students while they are earning their credential:

- Got loans? If you need some, get some! The **Assumption Program of Loans for Education (APLE)** assumes up to $19,000 in outstanding educational loan balances in return for four consecutive years of teaching science.
  - http://aple.csusuccess.org/scholarship
- The **Internship Program** allows science teachers to earn their credential while employed.
  - http://ed.fullerton.edu/current-students/internships/

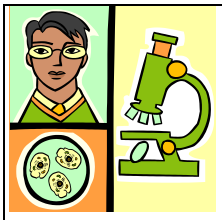
Next Steps if you are Interested in this Career Option

- **Visit the Center for Careers in Teaching** - http://www.fullerton.edu/cct
- **Complete required prerequisite coursework**.
  - Coursework may be completed during your undergraduate education.
  - Some courses may count as GE or electives.
- **Attend a Single Subject Credential Program overview**
  - http://ed.fullerton.edu/future-students/credential-programs/
- **Apply to the Single Subject Credential Program**
  - http://ed.fullerton.edu/future-students/credential-programs/
  - Deadlines: February 28 for Fall semester and September 30 for Spring semester
- **Demonstrate basic skills by passing the CBEST –** http://www.ctcexams.nesinc.com
- **Demonstrate subject matter competency by passing the appropriate California Subject Examination (CSET) subtests -** http://www.ctcexams.nesinc.com
-

Additional Resources for Future Science Teachers

- **National Association of Biology Teachers -** http://www.nabt.org/
- **National Science Teachers Association Career Center -** http://careers.nsta.org/
- **American Institute of Biological Sciences Resources for Teaching and Learning -** http://www.aibs.org/education/teaching_resources.html
- **Occupational Outlook Handbook – Information on Teaching** - http://www.bls.gov/ooh/about/teachers-guide.htm - the site offers extensive information on the nature of teaching, the employment picture, working conditions, and the job outlook

For more information, please contact Dr. Megan Tommerup, Teaching Credential Adviser (mtommerup@fullerton.edu).



SCIENCE TEACHING ACADEMIC PLAN: BIOLOGY

THIS IS A SAMPLE ACADEMIC PLAN

Candidates completing this pathway will earn a Bachelor of Science in Biology, prepare for the Biology CSET subtests, and complete the Single Subject Credential Program in Science. This plan is intended to be a sample only. The number of units taken each semester will depend upon the student's satisfactory performance and progress. This plan should not replace consultation with an advisor as requirements are subject to change.

	Semester 1		Semester 2	
FRESHMAN	G.E. Written Communication (G.E. A.A2)	3	BIOL 152 (Major)	4
	MATH 130 or 150A (Major & G.E. B.B4)	4	G.E. Intro to the Humanities (G.E. C.C2)	3
	BIOL 151 (Major & G.E. B.B2 & B. B3)	4	CHEM 120A (Major & G.E. B.B3)	5
	G.E. Intro to the Arts (G.E. C.C1)	3	G.E. Oral Communication (G.E. A.A1)	3
	Total Units:	14	Total Units:	15

To finish in 4 years, students may be required to take courses during the Summer Sessions OR Intersession.
Recommended: GE World Civilization and Cultures (G.E. D. D2) and GE American History, Institutions and Values (G.E. D. D3)

	Semester 3		Semester 4	
			******Attend Credential Program Overview******	
SOPHMORE	BIOL 251 and 253L (Major)	4	BIOL 252 and 254L (Major)	4
	Critical Thinking (G.E. A.A3)	3	CHEM 301A (Major)	3
	CHEM 120B (Major)	5	G.E. Origins of the World Civilizations (G.E. C.C4)	3
	G.E. American Government (G.E. D.D4)	3	G.E. Intro to Social Science (G.E. D. D1)	3
	Total Units:	15	Total Units:	13

To finish in 4 years, students may be required to take courses during the Summer Sessions OR Intersession.
Recommended: GE World Civilization and Cultures (G.E. D. D2) and GE American History, Institutions and Values (G.E. D. D3)

	Semester 5		Semester 6	
	******Take CBEST******		******File Grad Check******	
JUNIOR	CHEM 301B and 302 (Major)	5	BIOL Concentration Courses	6
	BIOL Concentration Course	3	MATH 337, MATH 338 or MATH 150B (Major)	4
	EDSC 304 (Cred. Prog. Prereq) (1) (2)	3	G.E. 300-Level Course (G.E. C.C3)	3
	G.E. Explorations in Social Sciences (G.E. D. D5)	3	EDSC 310 (Cred Prog Prereq) (1)	3
	Total Units:	14	Total Units:	16

To finish in 4 years, students may be required to take courses during the Summer Sessions OR Intersession.
Recommended: Credential Program Prerequisites - EDSC 320 (G.E. E.) and/or EDSC 330 and/or EDSC 340
OR Courses that will satisfy degree requirements for Biology Major.

	Semester 7		Semester 8	
	******Take CSET Subtests (5) ******		******Apply to Credential Program******	
SENIOR	BIOL Concentration Courses Upper-Division (3) (4)	6	BIOL Concentration Courses Upper-Division (3) (4)	8+
	PHYS 211 + 211 Lab (Major & G.E. B. B1)	4	PHYS 212 + 212 Lab (Major & G.E. B. B5)	4
	G.E. 300-Level Course (G.E. Z)	3		
	Cred Prog Prereq (EDSC 320 or 330 or 340) (1)	3	Total Units:	12+
	Total Units:	16	******Graduate with BS Biology******	

A GRADE OF "C" (2.0) OR BETTER IS REQUIRED FOR MAJOR CLASSES, INCLUDING SUPPORTING COURSES.

Special Notes:

- Class with footnote (1): Courses may be completed earlier in academic program. EDSC 304, 310, 320, 330, 340, and 410 are available fall, spring, summer, and intersession in Web and traditional formats.
- Class with footnote (2): Successful passage of CSET Subtests I (133) & II (134) can be substituted for EDSC 304.
- Class with footnote (3): Courses should include 6.0 units of approved Biology 400-level classes to meet Upper-Division Writing Requirements or successful passage of ENGL 301. Note: Students also need to take EWP test.
- Class with footnote (4): Students must take and pass (with a C or better [2.0]) a minimum of 23 units of Upper-Division Biology Electives in their chosen concentration to successfully complete requirements for a BS in Biology.
- Footnote (5): CSET Science Subtests: General Science I (118) & II (119) plus Concentration Area Subtest III (120-123) [http://www.ctcexams.nesinc.com].

Professional Track Intern candidates earn their credential while employed full-time in the public schools as science teachers. Students that opt for the *Professional Track* (Internship program) may be required to take additional prerequisite courses. Please see Credential Program advisor if you are a Professional Track candidate.

DEPARTMENT OF BIOLOGICAL SCIENCE FACULTY ROSTER

** Year joined faculty at CSUF*

ABRAHAM, Joel K. *(2011) Associate Professor; Ph.D., UC Berkeley

Teaches: Evolution and Organismal Biology, Seminar in Biology Education, Plant Ecology, Professional Aspects of Biology: Teaching Effectiveness

Research Interests: Biology education; student learning; educational technology; plant ecology

Office: MH 217C Phone: (657) 278-3138 jkabraham@fullerton.edu

BRENNAN, Catherine *(2013) Assistant Professor; Ph.D., University of Southern California

Teaches: Immunology, Intermediate Cell Biology, Cellular and Molecular Biology

Research Interests: Mechanisms of innate immune detection and signaling; phagosome biology; cell biology and genetics

Office: DBH 112A Phone: (657) 278-3637 cbrennan@fullerton.edu

BURNAFORD, Jennifer *(2009) Associate Professor; Ph.D., Oregon State University

Teaches: Evolution and Organismal Biology, Coastal Ecology, Marine Ecology, Marine Ecology Lab, Marine Phycology

Research Interests: Marine intertidal community ecology; marine algae and herbivory; habitat modification; interactions between invasive and native species

Office: MH 286A Phone: (657) 278-2382 jburnaford@fullerton.edu

CASEM, Merri Lynn *(2000) Professor; Ph.D., UC Riverside

DEPARTMENT CO-VICE-CHAIR

Teaches: Elements of Biology, Cellular and Molecular Biology, Advances in Cell Biology, Advances in Cell Biology Laboratory, Cellular Neurobiology, Integrative Biology of Spider Silk

Research Interests: Biology education; spider silk

Office: MH 387A Phone: (657) 278-2491 mcasem@fullerton.edu

CHEN, Esther J. *(2006) Associate Professor; Ph.D., Massachusetts Institute of Technology

Teaches: Genetics, General Microbiology, Advances in Molecular Genetics

Research Interests: Molecular biology of microbe-host interactions; genes and signals in a nitrogen-fixing symbiosis between bacteria and plants

Office: MH 207C Phone: (657) 278-2543 echen@fullerton.edu

COHEN, Amybeth *(1997) Professor; Ph.D., UC Riverside

DEPARTMENT CO-VICE-CHAIR
Director, MARC Scholars Program

Teaches: Genetics, Principles of Gene Manipulation, Plant Cell Physiology; MARC Proseminar

Research Interests: Regulation of photosynthetic gene expression in plant cells, nuclear-chloroplast interactions, expression of foreign therapeutic proteins in the unicellular green alga, *Chlamydomonas reinhardtii*

Office: MH 301A Phone: (657) 278-2178 acohen@fullerton.edu

DEPARTMENT OF BIOLOGICAL SCIENCE FACULTY ROSTER

CUAJUNGCO, Math P. *(2007) Professor; Ph.D., University of Auckland, New Zealand
Coordinator, MARC Scholars Program

Teaches: Cellular and Molecular Biology; Cellular Neurobiology; MARC Proseminar
Research Interests: Molecular, structural, and cellular biology of transient receptor potential (TRP) ion channels; zinc neurobiology; metallobiology of Alzheimer's disease; stem cell biology
Office: MH 207D Phone: (657) 278-8522 mcuajungco@fullerton.edu

DER, Joshua *(2015) Assistant Professor; Ph.D., Utah State University
Teaches: Principles of Evolution, Population Genetics, Plant Biology
Research Interests: Plant evolutionary genomics, plant systematics, bioinformatics, and molecular evolution; evolution of life history transitions in parasitic plants (esp. mistletoes) and land plants (esp. ferns)
Office: MH 640A Phone: (657) 278-4115 jder@fullerton.edu

DICKSON, Kathryn A. *(1988) Professor; Ph.D., Scripps Institution of Oceanography, UC San Diego
Teaches: Principles of Ecology, Human Physiology, Mammalian Physiology, Comparative Animal Physiology, Marine Biology
Research Interests: Locomotion and endothermy in fishes; comparative physiology and biochemistry; functional morphology of larval fishes
Office: DBH 116N Phone: (657) 278-5266 kdickson@fullerton.edu

EERNISSE, Douglas J. *(1994) Professor; Ph.D., UC Santa Cruz
Teaches: Evolution, Field Marine Biology, Molecular Systematics, Invertebrate Zoology
Research Interests: Animal phylogeny; evolution of Mollusca; marine zoology; systematics; population genetics; bioinformatics
Office: MH 636A Phone: (657) 278-3749 deernisse@fullerton.edu

FORSGREN, Kristy *(2012) Assistant Professor; Ph.D. University of Washington
Teaches: Mammalian Physiology, Human Physiology, Marine Biology
Research Interests: Gonadal development and reproductive dysfunction due to exposure to endocrine disrupting compounds in fishes; comparative reproductive physiology
Office: MH 319A Phone: (657) 278-4573 kforsgren@fullerton.edu

HOESE, William J. *(2000) Professor; Ph.D., Duke University
Co-director, SCERP Program

Teaches: Elements of Biology, Evolution and Organismal Biology, Professional Aspects of Biology: Teaching, Problems in Environmental Biology, Ornithology
Research Interests: Biology education; student learning; animal communication; functional morphology
Office: MH 301B Phone: (657) 278-2476 bhoese@fullerton.edu

JIMENEZ ORTIZ, Veronica *(2013) Assistant Professor; Ph.D., University of Chile
Teaches: Advances in Cell Biology, Intermediate Cell Biology, Medical Microbiology, and other courses in cell and microbiology
Research Interests: Mechanisms of stress adaptation in protozoans, ion channels, cellular physiology
Office: MH 307 Phone: (657) 278-2477 vjimenezortiz @fullerton.edu

DEPARTMENT OF BIOLOGICAL SCIENCE FACULTY ROSTER

JOHNSON, Hope A. *(2008) Associate Professor; Ph.D., Stanford University

Teaches: Genetics, General Microbiology, Advances in Microbiology

Research Interests: Microbial metal oxidation and reduction - the formation and dissolution of rocks; identifying the function of bacterial proteins with no known function; water quality and bioremediation

Office: MH 207F Phone: (657) 278-4529 hajohnson@fullerton.edu

MIYAMOTO, Alison *(2008) Associate Professor; Ph.D., Stanford University

Teaches: Cellular and Molecular Biology, Intermediate Cell Biology, Developmental Biology, Stem Cell Biology

Research Interests: Molecular mechanisms of Notch receptor signaling by typical and atypical ligands; developmental and cell biology of elastic fiber proteins; cell-matrix interactions in ovarian follicular angiogenesis

Office: DBH 114A Phone: (657) 278-2540 almiyamoto@fullerton.edu

NIKOLAIDIS, Nikolas *(2008) Associate Professor; Ph.D., Aristotle University of Thessaloniki (Greece)

Teaches: Genetics, Bioinformatics, Medical Genetics

Research Interests: Comparative genomics; bioinformatics; phylogenetics; molecular evolution and biochemistry of proteins involved in the innate and adaptive immune systems and stress responses

Office: MH 317A Phone: (657) 278-4526 nnikolaidis@fullerton.edu

PAIG-TRAN, Erin (Misty) *(2014) Assistant Professor; Ph.D., University of Washington

Teaches: Ichthyology, Human Anatomy, Human Anatomy and Physiology, Field Marine Biology

Research Interests: Comparative biomechanics, functional morphology, biomaterials, and biomimetics; emphasis on marine systems

Office: MH 236B Phone: (657) 278-5921 empaig-tran@fullerton.edu

PATEL, Nilay V. *(2006) Associate Professor; Ph.D., State University of New York at Stony Brook

Director, CIRM Bridges to Stem Cell Research Program

Teaches: Cellular and Molecular Biology, Intermediate Cell Biology, Techniques in Stem Cell Biology

Research Interests: Role of apolipoprotein-E in Alzheimer Disease; apolipoprotein-E gene regulation

Office: DBH 111A Phone: (657) 278-2483 npatel@fullerton.edu

RAMIREZ, Maria Soledad *(2014) Assistant Professor; Ph.D., University of Buenos Aires

Teaches: Advances in Microbiology, General Microbiology, Microbial Genetics, Public Health Microbiology

Research Interests: Antibiotic resistance, mechanisms of antibiotic resistance, mobile elements, infectious diseases, mechanisms of horizontal gene transfer, whole genome comparison of bacterial genomes, molecular techniques for species identification, emerging pathogens

Office: DBH 117A Phone: (657) 278-4562 msramirez@fullerton.edu

SACCO, Melanie *(2008) Associate Professor; Ph.D., University of London

Teaches: Genetics, Intermediate Molecular Biology, Molecular Virology, Principles of Gene Manipulation, Plant Molecular Biology

Research Interests: Molecular biology of plant-pathogen interactions, protein-protein interactions and signaling in disease resistance

Office: MH 685A Phone: (657) 278-2539 msacco@fullerton.edu

DEPARTMENT OF BIOLOGICAL SCIENCE FACULTY ROSTER

SANDQUIST, Darren R. *(1999) Professor; Ph.D., University of Utah

Director, California Desert Studies Consortium

Co-director, SCERP Program

Teaches: Principles of Ecology, Plant Biology, Plant Physiological Ecology, Field Botany, Plant Ecology, Desert Ecology

Research Interests: Desert plant ecology; evolution and ecology of plant physiology; biogeochemistry; applications of stable isotopes in ecological research; invasive species

Office: MH 313 Phone: (657) 278-2606 dsandquist@fullerton.edu

SCHENK, H. Jochen *(2002) Professor; Ph.D., UC Santa Barbara

Teaches: Principles of Ecology, Plant Biology, Field Botany, Plant Physiological Ecology, Evolutionary Ecology, Ecosystem Ecology, Professional Aspects of Biology

Research Interests: Plant ecology, especially ecology of plant roots; spatial ecology of plant populations, communities, and ecosystems; desert ecology; plant taxonomy.

Office: MH 229A Phone: (657) 278-3678 jschenk@fullerton.edu

SHAHRESTANI, Parvin *(2015) Assistant Professor; Ph.D., UC Irvine

Teaches: Genetics, Principles of Evolution, Biology of Aging, Elements of Biology

Research Interests: Evolutionary genomics, experimental evolution, population genetics, aging and immunity in *Drosophila*.

Office: MH 207G Phone: (657) 278-4233 pshahrestani@fullerton.edu

STAPP, Paul *(2002) Professor; Ph.D., Colorado State University

Teaches: Principles of Ecology, Population and Community Ecology, Mammalogy, Professional Aspects of Biology

Research Interests: Vertebrate population and community ecology; food webs; wildlife-habitat relationships; invasive species; ecology of insular, desert and grassland ecosystems; conservation biology

Office: MH 207E Phone: (657) 278-2849 pstapp@fullerton.edu

TOLMASKY, Marcelo E. *(1995) Professor; Ph.D., University of Buenos Aires

Director, Center for Applied Biotechnology Studies (CABS)

Director, Minority Health & Health Disparities International Research Training Program (MHIRT)

Teaches: Advances in Microbiology, Microbial Genetics, Advances in Biotechnology Laboratory

Research Interests: Molecular genetics of mechanisms that contribute to the virulence of pathogenic bacteria

Office: MH 382 Phone: (657) 278-5263 mtolmasky@fullerton.edu

TRACY, Christopher *(2013) Assistant Professor; Ph.D., University of Wisconsin, Madison

(not accepting new graduate students)

Teaches: Principles of Ecology, Mammalian Physiology, Herpetology

Research Interests: Physiological Ecology of Reptiles and Amphibians, Physiology of Terrestrial Vertebrates, Ecology of Desert Vertebrates

Office: MH 389 Phone: (657) 278-5608 ctracy@fullerton.edu

DEPARTMENT OF BIOLOGICAL SCIENCE FACULTY ROSTER

WALKER, Sean E. *(2003) Professor; Ph.D., Miami University
DEPARTMENT CHAIR
Teaches: Evolution and Organismal Biology, Principles of Ecology, Entomology
Research Interests: Evolutionary and behavioral ecology; Evolution of sexual dimorphism; Life history evolution; Sexual selection
Office: MH 282 Phone: (657) 278-3614 swalker@fullerton.edu

WALTER, Ryan *(2015) Assistant Professor; Ph.D., University of Windsor
Teaches: Genetics, Evolutionary Genetics
Research Interests: Molecular ecology, hybridization and speciation, phylogeography, organismal dispersal and population connectivity, population genetics, evolution of fishes
Office: MH 689A Phone: (657) 278-4812 rwalter@fullerton.edu

ZACHERL, Danielle C. *(2003) Professor; Ph.D., UC Santa Barbara
Teaches: Marine Biology, Invertebrate Zoology, Marine Ecology, Evolution and Organismal Biology, Principles of Ecology
Research Interests: Effects of larval dispersal and recruitment on the population ecology and biogeography of marine invertebrates
Office: MH 278A Phone: (657) 278-7510 dzacherl@fullerton.edu

FULL-TIME LECTURERS

CHAFFEE, Carol *(2015) Full-time Lecturer; Ph.D., University of Florida
Biol 101 Coordinator
Teaches: Elements of Biology
Office: MH 207H Phone: (657) 278-7098 cchaffee@fullerton.edu

SMITH, Darryl *(2016) Full-time Lecturer; M.S., California State University Fullerton
Teaches: Human Anatomy, Human Anatomy and Physiology, Integrated Anatomy and Physiology, Mammalian Physiology
Office: MH 045 Phone: (657) 278-5051 darrylsmith@fullerton.edu

TOMMERUP, Megan *(2007) Full-time Lecturer; Ph.D., Claremont Graduate University
Teaching Credential Adviser
Teaches: Biology for Future Teachers, Life Science Concepts, Environmental Biology, Elements of Biology
Office: MH 236A Phone: (657) 278-5283 mtommerup@fullerton.edu

ADMINISTRATIVE OFFICES

Area Code 657

	Phone #	Room #
California State University, Fullerton, General Information	**278-2011**	
Biological Science Department Office	**278-3614**	**MH 282**
o Chair – Dr. Sean Walker	**278-3614**	**MH 282 B**
o Administrative Support Coordinator – Karen Lau	**278-2461**	**MH 282 C**
o Administrative Support Assistant II – Ernestine Hood	**278-4234**	**MH 282**
o Administrative Support Assistant II – Doreen Camacho	**278-4227**	**MH 282**
o Teaching Credential Advisor – Dr. Megan Tommerup Advises Biology majors seeking admission to the Single-Subject Credential Program.	**278-5283**	**MH 236 A**
o Biology Minor Advisor – Dr. Megan Tommerup (mtommerup@fullerton.edu)		
College of Natural Sciences and Mathematics, Dean's Office	**278-2638**	**MH 166**
o Assistant Dean – Dr. Colleen McDonough	**278-4158**	**MH 488B**
o Graduation Specialist – Tatiana Pedroza	**278-7217**	**MH 488C**
o Retention Specialist – Sam Barrozo	**278-7062**	**MH 488A**
o Career Specialist – Michelle Ajemian Levy	**278-3766**	**LH 208**
Academic Advisement Center Provides guidance in the selection of elective and general education courses, advises, and is the center for undeclared majors. No appointment is necessary.	**278-3606**	**UH 123**
Academic Appeals Students are encouraged to resolve grade disputes informally through the instructor, Department Chair, and Dean of the College. If informal resolution is not possible, the Coordinator of Academic Appeals will provide information and clarification about University policies and will work to resolve the dispute.	**278-3836**	**LH 805**
Admission and Records Maintains students' matriculation and grade records and processes graduation checks to verify degree completion. Students are required to submit official transcripts of all work to this office. "Change of Academic Objective" forms for changing major and "Withdrawal" forms are available here.	**278-2300**	**LH 114**
Career Planning and Placement Center Offers personal and career counseling. Offers a career resources library, part-time job listings, career bank, and programs on a variety of career-oriented subjects. The Science, Engineering, and Technology career specialist is Michelle Ajemian Levy, milevy@fullerton.edu.	**278-3121**	**LH 208**
Center for Careers in Teaching Resource center for those interested in teaching in middle or high school.	**278-7130**	**FTS 710**
Counseling and Psychological Services (CAPS) Student Health and Counseling Center East, across from Ruby Gerontology. For Biology majors, our counselor contact is Christina Carroll-Pavia, Ph.D.	**278-3040**	**SHCC**
Disability Support Services Provides assistance and services to students with physical and learning disabilities.	**278-3117**	**UH 101**
Financial Aid	**278-3125**	**UH 146**
Health Professions Advising Office NOTE: Advisement through the Health Professions Office does not replace mandatory advisement through the Department.	**278-3980**	**UH 223**
Library Houses over 1.2 million books and periodicals and one and a half million other resource items. May access collections of the 19 CSU libraries, UCI, UCR, & Fullerton College. Tours are available.	**278-2714**	**Pollak Library**
Student Health Center Provides medical care for illness and injury, family planning, health education, and immunization programs.	**278-2800**	**SHCC**
Testing Center University testing services, including EWP, ELM, GRE, EPT, TOEFL, & CBEST.	**278-2738**	**UH 229**
Transfer Resource Center Peer mentors and study area for recent Transfer students.	**278-8398**	**MH 525**
Tutoring Opportunity Center (OCSAMS) provides tutoring, computers, and photocopy machine.	**278-3836**	**MH 488**
University Learning Center Offers academic support and tools to assist students in mastering test taking and exam preparation skills. Lab and strategies classes are available.	**278-7082**	**PLN 200**

On-campus resources for Biology Majors

College of Natural Sciences and Mathematics (CNSM) Student Success Team

Graduation Specialist, Tatiana Pedroza
(MH-488) 657-278-7217 tapedroza@fullerton.edu
- Junior/Senior Advising
- Probation and GE advising
- Focus on Graduation Candidates
- Appointments at
http://nsmgradspecialist.youcanbook.me

Retention Specialist, Sam Barrozo
(MH-488) 657-278-7062 sbarrozo@fullerton.edu
- Freshman/Sophomore Advising
- Probation and GE advising
- Interventions for at-risk students

Career Specialist, Michelle Ajemian Levy
(LH-208) 657-278-3766,milevy@fullerton.edu
- Career/Major Exploration
- Graduate/Professional School Advising
- NSM Career Workshops and Programs
- Internship/Job Search

Assistant Dean, Colleen McDonough
(MH-488) 657-278-4158 cmcdonough@fullerton.edu
- Consults on Faculty/Student Issues
- Advocates for students with concerns
- Assists with University policies/procedures
- CSUF resources and referrals

Tutoring

- **Opportunity Center** for Biology, Chemistry and Biochemistry, and Physics (MH-488) 657-278-7082 http://www.fullerton.edu/nsm/student_success/ocsams/ocsams.php
- **Math Tutoring Center** (MH-553) 657-278-3631
- **Supplemental Instruction** http://www.fullerton.edu/si/
- **University Learning Center** (PLN 200) 657-278-2738 http://www.fullerton.edu/ulc/
- **Writing Center (**PLN 100) 657-278-3650 http://english.fullerton.edu/writing_center/

Career Resources (see also NSM Career Specialist info above)

- **Career Center** (LH-208) 657-278-3121 http://www.fullerton.edu/career
- **Center for Internships and Community Engagement** (LH-206) 657-278-3746 http://www.fullerton.edu/cice/
- **Center for Careers in Teaching** (EC 379) 657-278-7130 http://ed.fullerton.edu/cct/
- **Health Professions Advising Office** (UH 223) 657-278-3980 http://www.fullerton.edu/healthprofessions

Other Resources (for complete listing see the Student Affairs website http://www.fullerton.edu/sa/)

- **Scholarships** http://www.fullerton.edu/financialaid/award/scholarships.php
- **Directory of CSUF student clubs** https://fullerton.collegiatelink.net
- **Student Health Center** (SHCC West) 657-278-2800. Provides medical care for illness and injury, family planning, health education, and immunizations.
- **Counseling and Psychological Services (CAPS)** (SHCC East) 657-278-3040. For Biology students, our counselor contact is Christina Carroll-Pavia, Ph.D.
- **Disability Support Services** (UH 101) 657-278-3112 http://www.fullerton.edu/dss/
- **African American Resource Center** (H 222) 657-278-3230 aarc@fullerton.edu
- **Asian Pacific American Resource Center** (UH 211B) 657-278-3742 aparc@fullerton.edu
- **Chicano/a Resource Center** (Titan Shops CRC-109) 657-278-2537 crc@fullerton.edu
- **LGBT Queer Resource Center** (TSU 254) 657-278-4218 lgbtq@fullerton.edu
- **Titan Dreamers Resource Center** (PLN 203) 657-278-3234 tdrc@fullerton.edu
- **WoMen's Center** (UH 205) 657-278-3928 womenscenter@fullerton.edu
- **Adult Re-Entry and Parenting Student Programs** (UH 205) 657-278-3928
- **Veterans Student Services** (UH-230) 657-278-8660 vss@fullerton.edu