

Field Biologist Certificate of Achievement

Item 1. Program Goals and Objectives

The Field Biologist Certificate of Achievement is a program designed to provide students with education and training in various aspects of field biology in preparation for entry level employment in resource management and field based research. This program will train students for employment in environmental consulting, government agencies and field research, while providing for continuing education opportunities in the biological sciences. A certificated field biologist may work in the field doing plant and animal surveys, threatened and endangered species surveys, sensitive habitat delineation, biological construction monitoring or scientific data collection; all under the direction of qualified professional biologists. In preparing students with the aforementioned skill sets, the certificate of achievement will help provide local, state and federal agencies and private employers a qualified pool of applicants.

The student learning outcomes for the Field Biology Certificate of Achievement are as follows:

1. Apply field sampling techniques that qualitatively and quantitatively measure and explain ecological phenomena.
2. Identify major habitat types and describe the natural history of select plants, animals, and fungi of California.
3. Correctly use various plant and animal taxonomic keys.
4. Correctly enter data and other information in a field journal and field data forms.

These objectives provide students with the necessary field biology skills for entry level employment in various biological resource management, research and monitoring fields and continued education in the biological sciences.

Item 2. Catalog Description

The Field Biologist Certificate of Achievement is a program designed to provide students with education and training in various aspects of field biology in preparation for 1) entry level employment in the environmental consulting field or government agencies 2) entry level field research assistant and 3) continuing education in biology. A certificated field biologist may work in the field doing plant and animals surveys, threatened and endangered species surveys, sensitive habitat delineation, biological construction monitoring or scientific data collection, all under the direction of qualified professional biologists. Students planning for a career in biology in most cases will need to earn at least a Bachelor's Degree. Therefore biology students are strongly encouraged to meet with a counselor about transfer requirements (IGETC/CSU certification) early in their program. Biology students should also meet with biology faculty about course/program offerings as soon as possible in order to complete the program in a timely manner.

Item 3. Program Requirements

Certificate of Achievement: Field Biologist

Requirements	Dept. Name/#	Name	Units	Sequence
Required Core (15-20 units)	BIOL 11A or 11AH	Biology for Science Majors I	5	Yr 1/2, fall/spring
	BIOL 4 and	Principles of Zoology	5	Yr 1/2, fall/spring
	BIOL 6 Or	Principles of Botany	5	Yr 1/2, fall/spring

	BIOL 11B	Biology for Science Majors II	5	Yr 1/2, fall/spring
	BIOL 7	Field Biology	5	Yr 2, spring
Four Electives (2-7 units)	ANTHRO 16A	Field Archaeology I	2	Yr 1/2, fall/spring
	GEOG 1	Physical Geography	3	Yr 1/2, fall/spring
	GEOG 10	Introduction to GIS	3	Yr 1/2, fall/spring
	GEOL 1	Physical Geology	4	Yr 1/2, fall/spring
	or			
	GEOL 1H	Honors Physical Geology	4	Yr 1/2, fall/spring
	GEOL 3	Geology Field Studies	1-2	Yr 1/2, fall/spring
GEOL 4	Geology of California	3	Yr 1/2, fall/spring	

Required Core Total: 15-20 units
TOTAL UNITS: 22 units

Proposed Sequence:
Year 1, fall = 5 units
Year 1, spring = 5 units
Year 2, fall = 5 units
Year 2 spring = 5 units
TOTAL UNITS: 15-20 units

Suggested Sequence of Courses:
Recommended sequence BIOL 11A, BIOL 4, BIOL 6, BIOL 7. An alternative sequence would be BIOL 11A, BIOL 11B, BIOL 7. Elective courses may be taken in any sequence but GEOL 1 is highly recommended for field biology students.

Item 4. Master Planning

The Field Biologist Certificate of Achievement has been created to meet specific goals set by the State of California, State Center Community College District and Fresno City College. Keeping in mind the mission of community colleges, this program addresses an increased educational need at the community college level as well as an increase in job opportunities in the local and state economy.

The California State Community College mission goals states that (1) The California Community Colleges shall, as a primary mission, offer academic and vocational instruction at the lower division level for both younger and older students, including those persons returning to school. The Field Biology Certificate program meets this goal and can provide opportunities for employment and prepares students for continued education. According to the United States Department of Labor Jobs for Environmental science and protection technicians typically need an associate's degree or 2 years of postsecondary education and employment of environmental science and field technicians is projected to grow 19 percent from 2012 to 2022, faster than the average for all occupations. Environmental science and protection technicians should have good job prospects overall and in May of 2012 the median annual wage for environmental science and protection technicians was \$41,240. Heightened public interest in conservation and the hazards facing the environment, as well as the increasing demands placed on the environment by population growth, is expected to spur demand for jobs in this field. Job prospects for Environmental Scientists, Conservation Scientists, and Wildlife Biologists are all predicted to increase by 2022.

In addition to meeting this state goal, the program also meets specific goals set by SCCC. Specifically Goal 4, Economic and workforce Development, states that “SCCCD is committed to being a partner in developing the economic vitality of the region through collaboration with its community partners and by offering and assuring access to quality career technical programs.” The field Biologist Certificate program will create a relevant career technical program and curriculum in collaboration with external partners which includes opportunities for internships with the California Department of Fish and Wildlife as well as local non-profit organizations and private companies. The Fresno City College Educational Master Plan shows that jobs for Environmental Scientists and Specialist are to increase by 22% in Fresno County by 2016. A labor market analysis of job growth from 2012-2022 from the California Employment Development Department shows that biological technician positions will increase by 17.1% with an average of 520 annual job openings and a mean hourly wage of \$25.76. Data for life and social science technicians show an increase of 20%, with an annual average of 470 job openings and a mean hourly wage of \$24.92. Similar projections are shown for Forest Conservation and Environmental Technicians (appendix III). This program will also help to increase persistence and completion rates for students in career technical programs and increase the number of quality work experience, apprenticeship, job shadowing, service learning and internship experiences. All of which are goals set by the State Center Community College District.

The Field Biologist Certificate of Achievement program will be a signature program at Fresno City College. The Field Biology class has been taught continuously by the FCC Department of Biology since the 1970’s and has a significant historical place in the department. Since that time, the field biology class has helped prepared students for employment as biological field technicians, biological consultants and for further education in the natural sciences. This program will give the students the recognition and official certificate they deserve for completing this program. It will ensure the continuation of a long history of former field biology students becoming professionals in both government and private sectors. In addition, this program will help engage students in campus and community activities that enable them to enhance learning opportunities beyond the classroom and further engage in the betterment of the community.

The plan to create this program has been part of the last two departmental Program Reviews and this program will help to achieve the following specific goals outline in the Fresno City College strategic plan. These include:

Student Success

Goal 1: FCC will identify and implement collaborative and specific activities to facilitate successful completion of our students’ educational objectives.

All of the classes in the Field biologist Certificate program are degree applicable to the AS degree in Life Science and are UC and CSU transferable courses.

Access

Goal 2: FCC will identify access barriers and create strategies to mitigate them.

During the time when many other institutions (including CSU Fresno) significantly cut their field classes and followed the money to a more molecular based program, FCC will continue to provide students with knowledge and job skills that they will not receive from any other institution here locally.

Quality

Goal 3: FCC will provide the highest quality instructional programs utilizing current and emerging methodologies, pedagogies, and technologies as appropriate.

The Field biologist program gives students first-hand experiences with the flora, fauna and ecological processes that are at the core of any biology program. Students that take field biology gain foundational

knowledge, application, and first hand experiences using field methodologies and technology that they will use throughout their educational and professional career. In addition to those destined for field and agency work, the program will court future K-12 science educators, as the curriculum directly ties in to many of the K-12 science standards and provides a greater depth of natural history and ecology than what standard preparatory classes provide. Several of the current faculty are among some of the past students who have taken the field biology course and benefited greatly from the experience and knowledge that it offered.

Partnerships

Goal 4: FCC will strengthen existing and create new community partnerships with educational, business, and other entities to ensure our region is receiving quality services to meet its economic, cultural, and social needs.

Every spring, faculty in the department are contacted by various Federal, State, and local agencies and from the private sector who are looking for former field biology students to employ or participate in their programs. Further, many of the field biology students have gone on to serve our local community through volunteerism as docents environmental educators, and land stewards with organizations such as Sierra Foothill Conservancy and San Joaquin River Parkway and Conservation Trust. This contribution to the job market and local community is a continuation of a long history of former field biology students becoming professionals in both government and private sectors.

Item 5. Enrollment and Completer Projections

Enrollment Data

Use a table format (sample provided below*) to provide final (not census) enrollment data for all required existing courses for the last two years to validate the need for this program in the college service area. Include course department number, course title, annual sections, and annual enrollment total.

		<Year 1>		<Year 2>	
CB01: Course Department Number	CB02: Course Title	Annual # Sections	Annual Enrollment Total	Annual # Sections	Annual Enrollment Total
BIOL 11A	Biology for Science Majors I	6	199	8	245
BIOL 11AH	Honors Biology for Science Majors I	1	25	1	21
BIOL 4 (fall only)	Principles of Zoology	1	25	2	23
BIOL 6 (spring only)	Principles of Botany	2	41	0	0
BIOL 11B	Biology for Science Majors II	3	83	4	103
BIOL 7	Field Biology	1	15	1	14

Completer Projections

When the program is fully established, it is anticipated that there will be between 8 and 12 certificates awarded annually. These numbers are influenced by the number of students (15) that can be accommodated in Biology 7 (Field Biology) which is only offered in the spring semester. There is some discussion within the biology department to expand the number of courses and course offerings associated with this program if there is a demand.

Item 6. Place of Program in Curriculum/Similar Programs

At this time, no changes are needed to the college's existing course inventory and there are no existing programs that will be replaced through the approval of the proposed program. The Life Science program at Fresno City College is a related program that is broader in scope than the proposed program and primarily focuses on student transfer to four year institutions. The Field Biologist Certificate Program is intended to complement the Life Science AS degree and provide students with additional credentials upon transfer to four year institutions.

Item 7. Similar Programs at Other Colleges in Service Area

Reedley Community College (RCC) currently offers various certificates as part of their Natural Resources Program. Certificates that Reedley College offers include Backcountry Skills, Forest Surveying Technology, Forest Technology and Forestry Skills. Further, RCC offers an AS degree in Forestry and Natural Resources requiring a total of 48 semester units upon completion. Whereas the aforementioned RCC programs provide students with some of the skills and training offered in the Field Biologist Certificate of Achievement program at FCC, the FCC program is heavy in the biological sciences, with all required core courses being major's level courses for transfer into CSU or UC biology programs. Thus, transfer students may upon completion of their required transfer courses, apply for the Field Biologist Certificate of Completion. In obtaining this certificate, students can demonstrate to potential employers in resource management, biological consulting, and research fields that they have demonstrated proficiency in both knowledge and a skill set required for entry level employment in these endeavors. Further, the FCC program focuses on key biological principles and concepts offered in BIOL 11A, BIOL 11B, BIOL 4 and BIOL 6 with BIOL 7 being the course that focuses on the application of these principles. This is different from the RCC program in that most of the courses offered integrate both theory and application. Lastly, the FCC certificate primarily targets transfer students in the Biological Sciences, the RCC programs are predominately focused on career focused students in the field of Natural Sciences.

FORESTRY/NATURAL RESOURCES at RCC

(MAJOR #R.110C.AS)

ASSOCIATE IN SCIENCE DEGREE

The Associate in Science Degree in Forestry and Natural Resources is designed to provide students with the knowledge, training, and hands-on experience necessary to pursue a career in Natural Resources. Students are exposed to the guiding principles and philosophies of forestry and natural resource management in the context of ecosystem management. Following completion of this program, students will have the specialized training and technical skills for entry-level positions that can lead to accelerated advancement into supervisory and/or management positions. Opportunities exist within private, state and national park systems, and other resource agencies such as the California Department of Fish and Game, Cal Fire, U.S. Forest Service, and the U.S. Fish and Wildlife Service. Careers abound in the areas of fire suppression and management, outdoor recreation, interpretation, wildlife management, forest surveying, and watershed management.

Appendix I. Advisory Committee Members and Affiliations

Rodney Olsen- Instructor of Biology, Fresno City College

Hawking Dowis- Instructor of Biology, Fresno City College

Krista Tomlison- Senior Environmental Scientist, California Department of Fish and Wildlife

Kat Calderala- Owner, Live Wire Environmental Consulting

Rosanna Ruiz- Education and Outreach Director, Sierra Foothill Conservancy

Patrick Kelly- Professor of Biology, CSU Stanislaus; Director, Endangered Species Recovery Program

Joanna Clines- Botanist, US Forest Service

Appendix II. Advisory Committee Meeting Minutes

Meeting Minutes

Field Biology Advisory Committee

20 May 2016

Sequoia Brewing Company

Fresno, CA

Present:

Rodney Olsen (FCC), Hawking Dowis (FCC), Krista Tomlison (CDFW), Kat Calderala (Live Wire Environmental Consulting), Rosanna Ruiz (Sierra Foothill Conservancy)

Not Present:

Patrick Kelly (CSU Stanislaus, Director Endangered Species Recovery Program), Joanna Clines (US Forest Service)

Call to Order - 12:05

Introductions

Overview and Scope of Program/Committee

Rodney and Hawkins gave an overview of the proposed Field Biology Certificate Program outlining the program goals and objectives, course requirements, industry needs, and status of the proposal with the State. The proposed certificate of achievement application was provided to all committee members prior to the meeting and was referred to during the overview. It was acknowledged that this program is in its infancy and has the potential to grow significantly as the need for qualified entry level applicants continues to increase.

Discussion/Questions/Comments

Student skill set upon completion- Discussed student skills needed in entry level resource jobs: threatened and endangered species identification, sampling methodology, nesting bird survey skills, habitat identification, general field techniques, CEQA and NEPA awareness, georeferencing, field safety and awareness. Krista shared some information on Reedley CC and their program offering environmental review on FESA, CESA, MBTA, HCP, NEPA, CEQA. Perhaps these are topics that can be covered by a single course once the program gets going.

Job market- Discussed job opportunities including internships, seasonal and entry level scientific aid positions with environmental consulting firms, federal, state and local agencies and local non-profits.

Rosanna discussed the need for interpreters and docents for all age demographics in the non-profit and educational fields. This program can help meet those needs.

Professionalism- discussion was had regarding the need for professional etiquette awareness of entry level applicants. The program can work to incorporate interview skills, environmental ethics, and appropriate use of social media as it pertains to work related information

Demographics- Discussion was had surrounding who this program will serve and how we can work to provide for opportunities for groups that are underrepresented in field based resource management, education, and conservation markets. Rosanna mentioned the SJV Leap program and other STEM related opportunities that aim to serve underserved demographics in environmental careers.

Outreach- Discussion was had concerning outreach and marketing of the program. The idea of having a lecture series where outside groups and the general public are invited was discussed. Further, field biology students can perform service projects as part of the program which may include docent and nature interpretation activities and working as volunteers for local agencies and non-profit organizations.

Next Steps

Rodney and Hawkins discussed where the program stands in terms of the application with the State and how we will be moving forward with the application following this meeting. Our next meeting will be in the spring of 2017.

Adjourn- 13:15

Addendum

Input from Patrick Kelly via email: I read through your *Field Biologist Certificate of Achievement* program description this morning and overall, it looks good to me. I did scan it when you first sent it, but I went through it more carefully this time and compared the course offerings with ours (CSU Stan.) for transfer students, and overall there is a pretty good fit (but see below). I presume you need to get this document approved up through the ranks at FCC and SCCC. I think there are a few typos here and there, and maybe some word-smithing would tighten it up for that level of review, but as far as I can tell you are covering all the bases. Firstly, there are people working for consulting firms with very little formal training in biology. Everybody working in ecological consulting with any modicum of responsibility needs to have basic coursework in biology, and ideally some of the other courses in your curriculum. Secondly, you recommend that students go on to a 4-year degree and I concur, but having a certificate like this under their belt would give them an advantage enrolling at a UC or CSU. For example, transferring to CSU Stan, an FCC student with the certificate would likely have most of the pre-reqs for a Biology major (maybe except Physics—1 yr) as well as (hopefully) GE classes (Geog/Geol) and then take our Ecology concentration (<https://www.csustan.edu/biology/concentrations/ecology>) once they have Intro. Genetics and Cell/Mol. Biology taken care of. I would think graduating with that ecology concentration and the FCC certificate, would look pretty good on a resume to CDFW, etc.

Appendix III. Job Market Analysis

Biological Technicians in California (SOC Code : 19-4021)

Projections of Employment

In California, the number of Biological Technicians is expected to grow faster than average growth rate for all occupations. Jobs for Biological Technicians are expected to increase by 18.8 percent, or 2,400 jobs between 2014 and 2024.

Estimated Employment and Projected Growth Biological Technicians					
Geographic Area (Estimated Year- Projected Year)	Estimated Employment	Projected Employment	Numeric Change	Percent Change	Additional Openings Due to Net Replacements
California (2014-2024)	12,800	15,200	2,400	18.8	3,600

Source: EDD/LMID Projections of Employment by Occupation at www.labormarketinfo.edd.ca.gov/data/employment-projections.html

Annual Job Openings

In California, an average of 240 new job openings per year is expected for Biological Technicians, plus an additional 360 job openings due to net replacement needs, resulting in a total of 590 job openings.

Estimated Average Annual Job Openings Biological Technicians			
Geographic Area (Estimated Year- Projected Year)	Jobs From Growth	Jobs Due to Net Replacements	Total Annual Job Openings
California (2014-2024)	240	360	590

Source: EDD/LMID Projections of Employment by Occupation at www.labormarketinfo.edd.ca.gov/data/employment-projections.html

Life and Social Science Technicians in California (SOC Code : 19-4099)

All life, physical, and social science technicians not listed separately.

Employers are usually looking for candidates with an Associate degree.

Occupational Wages

[\[Top\]](#)

Area	Year	Period	Hourly Mean	Hourly by Percentile		
				25th	Median	75th
California	2016	1st Qtr	\$25.21	\$17.51	\$23.12	\$31.14

Occupational Projections of Employment (also called "Outlook" or "Demand")

[\[Top\]](#)

Area	Estimated Year-Projected Year	Employment		Employment Change		Annual Avg Openings
		Estimated	Projected	Number	Percent	
California	2014 - 2024	10,100	11,800	1,700	16.8	590

Forest and Conservation Technicians in California (SOC Code : 19-4093)

Compile data pertaining to size, content, condition, and other characteristics of forest tracts, under direction of foresters; train and lead forest workers in forest propagation, fire prevention and suppression. May assist conservation scientists in managing, improving, and protecting rangelands and wildlife habitats, and help provide technical assistance regarding the conservation of soil, water, and related natural resources.

Employers are usually looking for candidates with an Associate degree.

Occupational Wages

[\[Top\]](#)

Area	Year	Period	Hourly Mean	Hourly by Percentile		
				25th	Median	75th
California	2016	1st Qtr	\$18.67	\$13.93	\$16.68	\$22.57

Occupational Projections of Employment (also called "Outlook" or "Demand")[\[Top\]](#)

Area	Estimated Year-Projected Year	Employment		Employment Change		Annual Avg Openings
		Estimated	Projected	Number	Percent	
California	2014 - 2024	7,400	7,600	200	2.7	330

**Environmental Technicians, Including Health in California
(SOC Code : 19-4091)**

Performs laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health. Under direction of an environmental scientist or specialist, may collect samples of gases, soil, water, and other materials for testing and take corrective actions as assigned.

Employers are usually looking for candidates with an Associate degree.

Occupational Wages[\[Top\]](#)

Area	Year	Period	Hourly Mean	Hourly by Percentile		
				25th	Median	75th
California	2016	1st Qtr	\$23.86	\$16.98	\$22.21	\$29.25

Occupational Projections of Employment (also called "Outlook" or "Demand")[\[Top\]](#)

Area	Estimated Year-Projected Year	Employment		Employment Change		Annual Avg Openings
		Estimated	Projected	Number	Percent	
California	2014 - 2024	4,400	5,500	1,100	25.0	290