

**SJSU Annual Program Assessment Form  
Academic Year 2015-2016**

Department: Meteorology and Climate Science
Program: BS in Meteorology concentration in Climate Science
College: Science
Program Website: <a href="http://www.sjsu.edu/meteorology">www.sjsu.edu/meteorology</a>
Link to Program Learning Outcomes (PLOs) on program website: <a href="#">PLO BS Climate</a>
Program Accreditation (if any):
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Date of Report: June 1, 2016

**Part A**

**1. List of Program Learning Outcomes (PLOs)**

The PLOs for the Meteorology and Climate Science program follow the standards accepted by the American Meteorological Society ([AMS: BS in Meteorology recommendations](#)). The roadmap for the BS in Climate Science, loosely following the guidelines from the AMS, includes courses in Mathematics, Physics, and Chemistry in addition to courses in the department that teach computer programming and statistics. The Climate Science emphasis differs from the Meteorology emphasis. Rather than taking atmospheric dynamics, physics, and synoptic meteorology, the students take Climatology, Climate Modeling, and Climate Solutions in this department. A Life Cycle Engineering course, Planet Earth in the Geology Department, Environmental Studies courses, dealing with issues, policy, and energy round out their curriculum.

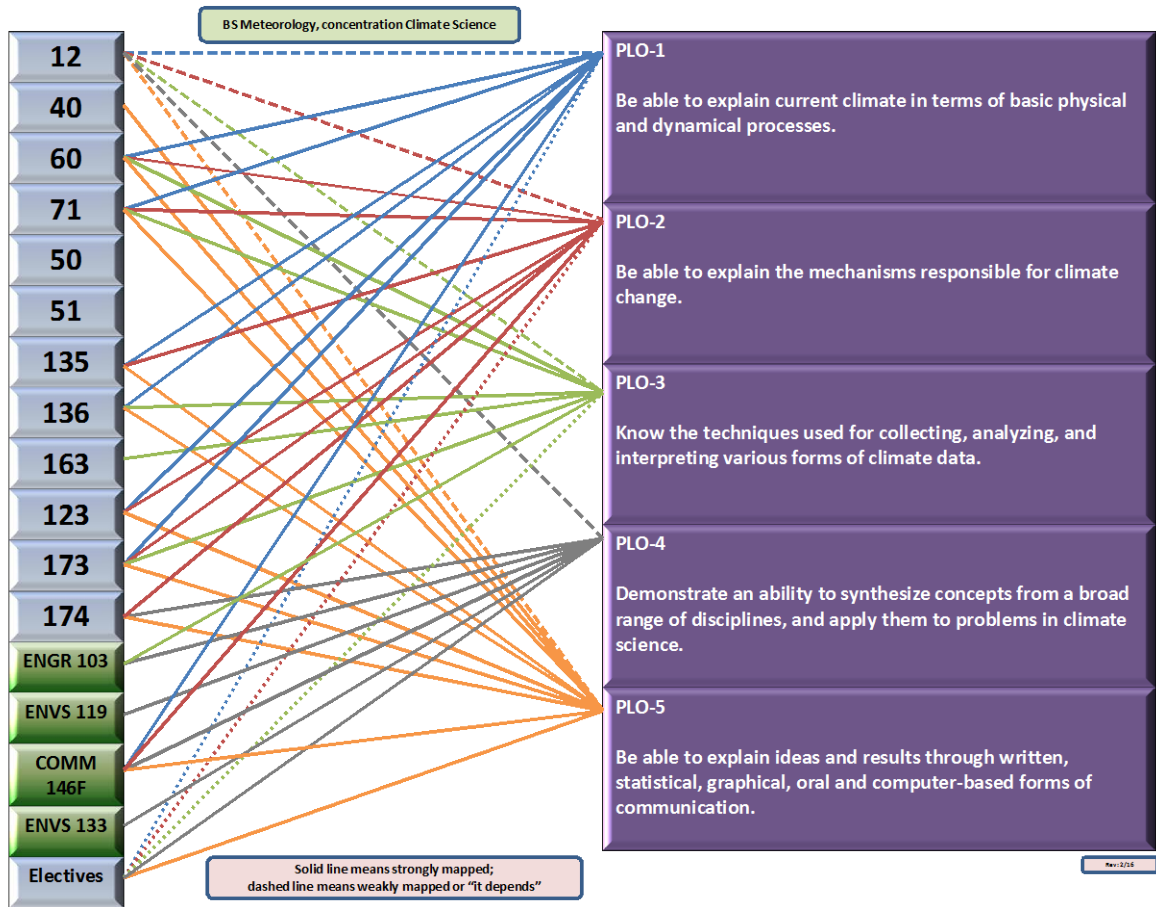
The PLOs for the BS Meteorology – Concentration in Climate Science are:

1. Be able to explain current climate in terms of basic physical and dynamic processes.
2. Be able to explain the mechanisms responsible for climate change.
3. Know and be able to practice the techniques used for collecting, analyzing, and interpreting various forms of climate data.
4. Demonstrate an ability to synthesize concepts from a broad range of disciplines, and apply them to problems in climate science
5. Be able to explain ideas and results through written, statistical, graphical, oral and and computer-based forms of communication.

**2. Map of PLOs to [University Learning Goals \(ULGs\)](#)**

		BS CLIM SCI					
university	program	PLO-1	PLO-2	PLO-3	PLO-4	PLO-5	
		current climate	climate change	data techniques	concepts	communication	
ULG-1	1.1	X	X	X	X	X	
ULG-2	2.1			X	X	X	
	2.2	X	X	X	X		
	2.3	X	X		X		
ULG-3	3.1	X	X	X	X	X	
	3.2	X	X	X	X	X	
ULG-4	4.1	X	X	X	X		
	4.2	X	X	X	X	X	
	4.3	X	X	X	X	X	
ULG-5	5.1		X		X		
	5.2	GE only	GE only		X		
courses		112	112	136,173	174	100W,179,170,171	
		60,61,71,123	61,71,123				

### 3. Alignment – Matrix of PLOs to Courses



#### 4. Planning – [Assessment Schedule](#)

	AY 13-14	AY 14-15	AY 15-16	AY 15-16	AY 17-18
PLO 1					
PLO 2					
PLO 3					
PLO 4					
PLO 5					

#### 5. Student Experience

- Most classes in the program maintain a CANVAS Course Management System website where the syllabus is readily available and instructors use the tools to communicate with the students.
- The students do not have an opportunity to provided feedback regarding the PLOs or the Assessment activities.

#### Part B

#### 6. Assessment Data and Results

We assess PLO 3 in this assessment cycle: Know and be able to practice the techniques used for collecting, analyzing, and interpreting various forms of climate data. Meteorology 174, Climate Change

Solutions, is the capstone course for the students in the Climate Science program. The course was taught in Spring 2016 and is used to assess PLO 3.

## **Meteorology 174**

**Catalog Description METR 174 (Climate Change Solutions):** Senior level capstone course in which students will define and conduct a project which is both climate change related and of a practical nature.

This is a project-based course focused on developing real-world experience using climate model data to address a particular community need. Students will act as professional consultants and working with a client they will use the CMIP5 data archive to produce a report addressing the clients particular needs. The type of projects could include issues related to water availability, agriculture, energy systems, air pollution and species migration etc.

The students were required to access the CMIP3 data, a comprehensive climate modeling data set used by professional scientists around the world. Once they had the data, they were required to use a graphics package to make plots and calculate some statistics. Finally they were asked to interpret the results.

The four students in the class successfully imported the data from the repository at Lawrence Livermore National Laboratory and plotted the data. However, two of the students had some difficulty calculating the statistics, and one student struggled interpreting results.

All four students made presentations during the last week of the semester. The instructor (Dr. Walsh), along with another faculty member (Dr. Diao), were pleased with the quality of the presentations and the effort that the students had invested in their projects.

### **7. Analysis**

Writing programs in modern computer languages and using application programs has become a requirement for successful careers in climate science. However, a successful climate scientist must be able to interpret the results. All four students accomplished the programming activities, including acquiring data from a national database, a non-trivial process. Two students struggled with the statistics and one student missed some of the obvious conclusions that should have drawn. But with the overall success of the students in the course, we believe that the course is properly designed and properly integrates the material learned throughout the curriculum.

### **8. Proposed changes and goals (if any)**

Much of climate science incorporates statistics and other numerical methods of data analysis. This appears to be an area where students struggled somewhat. We will review how long it had been since the students took a statistics class, and how well they did in that class.

### **Part C**

<b>Proposed Changes and Goals</b>	<b>Status Update</b>
Review statistics courses taken by the students	