

**SJSU Annual Program Assessment Form
Academic Year 2016-2017**

Department: Meteorology and Climate Science
Program: BS in Meteorology concentration in Climate Science
College: Science
Program Website: www.sjsu.edu/meteorology
Link to Program Learning Outcomes (PLOs) on program website: PLO BS Climate
Program Accreditation (if any):
Contact Person and Email: Alison Bridger email: alison.bridger@sjsu.edu
Date of Report: March 10, 2017

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.

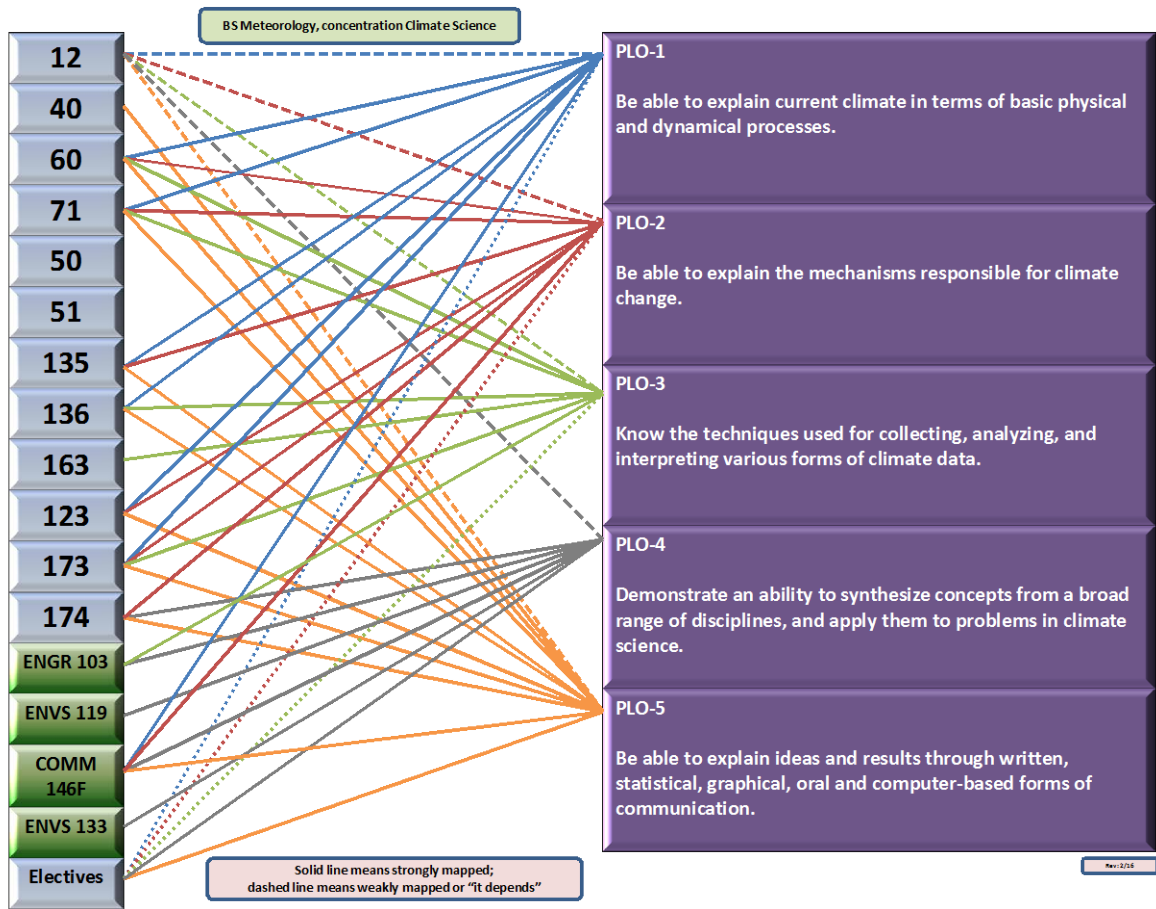
The PLOs for the BS Meteorology – Concentration in Climate Science are:

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 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

- All PLOs are posted online (currently 2 clicks away, but this will be upgraded to 1 click away).
- New this year:** PLO language has been added to the department landing page.
- Faculty have been encouraged by the chair to include language in our greensheets that: (a) mentions the existence of department PLOs; and (b) includes the URL.
- Almost all faculty use the CANVAS system, in which PLOs, rubrics etc. can be easily and readily shared with students.

- e. It has not ever occurred to us to seek feedback from students on PLOs! We wrote them to be clear, and we assume they are clear! Likewise, it has never occurred to us to ask for student feedback on the whole assessment experience! Our students seem happy 😊. **New this year:** We are developing a mini-survey on this, results of which will be discussed next year.

Part B

6. Assessment Data and Results

In the 15-16 cycle, we assessed PLO 3: *Know the design and use of meteorological instruments, and techniques for collecting and interpreting the data*. Since the assessment cycle was mysteriously moved up by 3 months, we will report here on your feedback on our report on this from last year.

In the present 16-17 cycle, we plan to assess PLO 4: *Be able to explain current climate in terms of basic physical and dynamical processes, and explain the mechanisms responsible for climate change*. This is going to be tricky, since we're not teaching any courses with the word "climate" in the title this Spring! That's life in small programs for you!!

At the time this report was due (3/1/17), we had not yet collected any data for this years exercise, leaving nothing to discuss.

Going back to PLO 3 from last year, we chose to assess this PLO via the capstone course for this concentration, namely METR 174. In this class, each student chooses a topic, and works with an external entity to determine impacts of climate change. For example, a student might work with a local coffee company, and drill into climate data to understand/project how climate change could alter coffee growing conditions and thus coffee bean availability. Students were required to access the CMIP3 data, a huge, rich, and comprehensive climate modeling data set used by professional scientists around the world (and possibly now being deleted by the Trump administration). Once they had the data, students were required to use a graphics package to make plots and calculate some statistics. Finally they were asked to interpret and present the results.

Our analysis was reported last year. Feedback on our report pointed to the lack of a rubric used to test proficiency. Of all the faculty in our program, Prof. Walsh (instructor) is the most likely to use a rubric, so this criticism is irritating since nowhere on this form are/were we asked to supply a rubric used.

In terms of "closing the loop" on PLO 3, *Know the design and use of meteorological instruments, and techniques for collecting and interpreting the data*, this was only the 2nd time we've offered the class since this is a newish concentration. Thus this was the 1st time we've looked closely at this outcome via this course. We need to look more closely at issues students have with statistical analysis of data – we can do that next time either our Stats course is offered (Fall 17) or next time this course (MET 174) is offered (Spring 18 @ earliest), and this will allow us to "close the loop".

7. Analysis

This was covered directly above.

8. Proposed changes and goals (if any)

This exercise revealed that some of our students are weak in statistical analysis of data. That class (MET 136) will next be offered in Fall 17 and with a new instructor. We will identify what curriculum students in the Climate Science concentration need to have proficiency in, and ensure it gets covered in depth (lectures, labs and assigned work). The next time we hope to offer MET 174 might be Spring 18, which would allow us to see how the changes in 136 would impact student performance in 174.

A note about life in a small department. The assessment exercise seems clearly to be developed for large programs who offer every class every semester, possibly with multiple sections. In our program, we offer one section per year of the core classes. Hence the cycle of gathering data, analyzing data, discussing data, implementing changes, and re-measuring effectiveness (i.e., closing the loop) can easily take over a year. Some classes are offered even less frequently depending on student numbers, faculty flux etc. It proves to be challenging to close the loop over these large time spans. For example, the class mentioned in this report (MET 174) has been taught only twice ever, at a 2-year interval, and by different instructors. It may not be taught again for 2 more years. There are other classes in which this PLO could be measured, but the curriculum might be so different as to make it irrelevant to try to close a loop, at least in the short term. We strive to have our students graduate with as much knowledge and as many skills as are required in the modern workforce. Since these requirements evolve quite rapidly, we are constantly discussing our curriculum and making adjustments. What is less clear to us is how to explain our actions in terms of the campus assessment framework.

Part C

Proposed Changes and Goals	Status Update
Review statistics courses taken by the students (i.e., curriculum)	Ongoing
Identify specific statistics skills students must have (e.g., time series analysis, trend analysis, significance analysis)	Ongoing
Ensure skills identified are covered fully in MET 136	Fall 17