Syllabus for AOS 90: Introduction to Undergraduate Research in the Atmospheric and Oceanic Sciences, Spring 2019

Class meetings: M/W 10 – 11:50 am in AOS computer lab (Math Sciences 7101)

Instructor
Jasper Kok
Email jfkok@ucla.edu
Office Location MS 7142
Office Hours T 2-3 pm, Th 1-2 pm; by appointment

Course Description and Goals
This course will provide students with a basic ability to understand, communicate, and conduct scientific research in the atmospheric and oceanic sciences. Instruction will cover the basics of the scientific process, scientific programming and statistical data analysis, finding and reading scientific literature, basic experimental techniques, analyzing Earth system data, and communicating scientific findings in oral and written form. These skills will be taught in the context of several projects drawn from the atmospheric and oceanic sciences.

Prerequisites
Physics 1A, 5A, or 6A; Chemistry and Biochemistry 14A or 20A; Math 3A and 3B or Math 31A and 31B; Earth, Planetary, and Space Sciences 71 (preferred) or Civil and Environmental Engineering M20 or Program in Computing 10A. Except for the programming requirement, one or more these courses could be taken concurrently with instructor permission.

Required materials
There is no required textbook for this class, and readings provided to students will be drawn from a number of different sources.

You do need an i>Clicker2 remote for in-class participation. The i>clicker2 is a response system that allows you to respond to questions I pose during class, allowing for interactive lectures. The i>clicker2 is the standard UCLA clicker that you might have already used in other classes, and will probably use in further (AOS) classes. Because I realize that purchasing an i>clicker2 can be a strain on possibly already tight finances, I have a pool of ~10 clickers that I loan out to students that do not already have a clicker. I will send out an email about this before the first class.

Preliminary grading scheme (SUBJECT TO CHANGE as course progresses)
Your grade will be based on points as outlined below:

• Quizzes on reading material – 10%
• In-class participation – 5%
• Midterm exam – 15%
• Assignments – 30%
• Two projects – 20%
• Presentation on final project – 20%

You are guaranteed an A if >93%, A- if >90%, B+ if >87%, B if >83%, etc.. My goal is for you all to learn enough to get A’s. I do not curve, because educational research shows this undermines student collaboration and impedes learning (see for instance here). If necessary, I will include additional extra credit options.
I almost never assign extra credit to individual students. The only exception would be an extenuating personal circumstance (which I will generally do my best to accommodate, so come see me if you have a personal situation).

Quizzes and assignments
- Assignments in this class will be diverse, ranging from reading scientific papers, performing data analysis, running a climate model and analyzing its output, and providing comments on the work of your peers.
- There will be approximately one assignment every week.
- You can once hand in an assignment late, up until the beginning of the class after which the assignment was due, without explanation required.
- You can drop one reading quiz from your final reading quiz grade.
- We will have a midterm exams to cover the formal class material, including statistical data analysis.

Projects
This class will teach the basics of understanding and conducting research in the context of several projects. This includes at least one individual project in which each student will pose and answer a research question of their own, and one group project. Each project will conclude with either a research papers or an oral presentation.

Exam dates
Midterm: TBD.
Final Exam: Thursday 6/13 from 8 – 11 am. The final “exam” will be oral presentations on the final project.

Registering your i>clicker2 remote
In order to receive participation credit, you need to register your i>clicker2 remote by the second day of class:
1. Log into class’ CCLE site at https://ccle.ucla.edu/
2. Locate the i>clicker block on the AOS 90 class site
3. Click on the “Remote Registration” link
4. Enter the i>clicker ID located on the back of the clicker.

i>clicker2 will be used every day in class, and you are responsible for bringing your remote daily.

If you lose or break your i>clicker2 remote, you will have to obtain another one. Please email me with your new Remote ID so that I can manually register your new remote.

Intended student learning outcomes
(1) Develop technical skills (programming, data analysis, experimental techniques, statistical analysis) needed for scientific inquiry and useful in the job market
(2) Develop problem-solving skills necessary for scientific inquiry and useful in the job market
(3) Demonstrate ability to read scientific literature
(4) Understand process of scientific research and relevance to society
(5) Demonstrate knowledge of research projects representing core areas of the atmospheric and oceanic sciences
(6) Develop scientific writing abilities
(7) Develop ability to pose relevant scientific questions
(8) Demonstrate ability to find scientific literature relevant to a scientific question
(9) Develop ability to answer scientific questions using quantitative, computational, and/or experimental skills
(10) Develop scientific presentation skills (oral communication needed for seminar & poster presentations)

Class organization and other miscellaneous notes
- I will have clicker questions and exercises (ungraded) during each lecture to facilitate interactions and active engagement with the material. The clickers will also be used to make the in-class quizzes quick and efficient. I will lend a clicker to all students who do not have one.
- Please turn your cellphones off or to silent mode during class. Please refrain from texting and other non-class related phone activity during class.
- If you are present in class and engage in a constructive manner, including assisting their neighbor when needed and refraining from texting, will receive full credit for participation.
- Handing in work late is penalized by 1%/hour, up to 10% per week day and up to 5% per weekend day. If you have a legitimate reason to hand work in late then I strive to be as accommodating as possible, so let me know.
- If you have a personal problem that regularly prevents you from coming to class, please come see me.
- I would like to meet each of you individually for a few minutes in the second week of class, so that I can get to know you a little and can better understand what you’re hoping to get out of the course. Details to follow.
- Presentations on the final projects will be done in finals week at the standard scheduled exam time.
- If you’re feeling overwhelmed or are having personal or professional issues, the Counseling and Psychological Services are here to help: (310) 825-0768 or www.caps.ucla.edu

Instances of academic dishonesty
Instances of cheating will be taken seriously. The penalty for serious cheating can be severe and could result in suspension or dismissal from UCLA. This is especially true for students in the ROTC or on particular fellowships.

I encourage you to work together on all assignments. Just make sure that your work is your own.

A detailed description of forms of academic dishonesty is provided in the UCLA Student Conduct Code at http://www.deanofstudents.ucla.edu/Portals/16/Documents/UCLACodeOfConduct__Rev030416.pdf.

Your Input is Important to me
I encourage your feedback at any time throughout the quarter about things that are helping you learn, things that aren’t helping, or things that I can improve. You will also have the opportunity to fill out evaluations midway into the class, in addition to the customary evaluation at the end.

Course Topics and Readings (TENTATIVE)
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic(s)</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Matlab; univariate statistics and data analysis, part 1</td>
<td>Matlab tutorial</td>
</tr>
<tr>
<td>2</td>
<td>The nature and process of science; basic measurements</td>
<td>Hw set #1; notebook exercise</td>
</tr>
<tr>
<td>3</td>
<td>Univariate statistics and data analysis, part 2</td>
<td>Hw set #2</td>
</tr>
<tr>
<td>4</td>
<td>Bivariate statistics and data analysis; project #1</td>
<td>Hw set #3</td>
</tr>
<tr>
<td>5</td>
<td>Bivariate statistics and data analysis; scientific writing</td>
<td>Midterm exam</td>
</tr>
<tr>
<td>6</td>
<td>Analyzing Earth system data; project #2</td>
<td>Hw set #4; project #1</td>
</tr>
<tr>
<td>7</td>
<td>Analyzing Earth system data; reading and finding scientific literature</td>
<td>Hw set #5</td>
</tr>
<tr>
<td>8</td>
<td>Final project; spare lecture</td>
<td>Reading article worksheet; project #2</td>
</tr>
<tr>
<td>9</td>
<td>Memorial Day; careers and research</td>
<td>work on final project</td>
</tr>
<tr>
<td>10</td>
<td>Oral presentation skills</td>
<td>work on final project</td>
</tr>
<tr>
<td>Final’s week</td>
<td>N/A</td>
<td>Presentations on final project</td>
</tr>
</tbody>
</table>