TEACHING ASTRONOMY WITH ASTROLAB AT PUCP

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We present our experiences teaching an introductory-level astronomy course at the Pontifical Catholic University of Peru (PUCP). Students attended theory sessions alongside practical experiences observing remotely using the Las Cumbres Observatory 40 cm telescopes `https://lco.global/`. This was done using the ASTROLAB (Starlight in the university lab) tutorial, a project of the Office of Astronomy for Development (OAD) of the IAU `https://www.astro4dev.org/astrolab-starlight-in-the-university-lab/`. With this effort, we try to make up for the few opportunities that undergraduate Peruvian students have to do observational astronomy, due to the limited number of astronomical facilities that exist in the country.

Students taking the course are introduced to methods of scientific research as they go through the same steps astronomers do when preparing and performing an observing program. They learn how to plan observations, submit proposals, process their data and analyze their results using astronomy software and Virtual Observatory (VO) tools on images obtained from the remote telescopes at Las Cumbres Observatory. This experience teaches students to develop teamwork abilities, understand the complexity and ambiguity of empirical work, develop practical skills, learn to perform error analysis, defend their results both in written and oral form, and most importantly: develop critical thinking.

This course was taught in three separate semesters between 2021 and 2023. Individual and group-based observation and analysis projects focused on a series of different observable astronomical objects and phenomena. Observations took the form of photometric (B, V, rp) images, due to the instruments we had access to from the Las Cumbres Observatory network. The analysis performed was primarily aperture photometry, although the mechanism to perform the analysis changed between semesters as the course developed, from pre-written Python algorithms the students had to manipulate to use of the IRIS software. Projects ranged from creating lightcurves of eclipsing binary stars, making color-magnitude diagrams of open clusters, identifying asteroids, and even obtaining a lightcurve of the recent supernova in M101, SN2023ixf; in each case students had to not only understand the nature of the scientific analysis to be performed, but also understand observational constraints and perform target selection.

By being exposed to a variety of kinds of objects, which behave very differently from an observational standpoint and thus require different modes of analysis, the students were able to be exposed to a wide panorama of the kinds of research done in astronomy, even while restricted purely to optical photometry. Individual and group reports of each project were submitted to the instructor for grading and feedback purposes.

This work makes use of observations from the Las Cumbres Observatory global telescope network (program LCOEPO2018A-001).

REFERENCES

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