

REMOTE LABORATORIES FOR UNDERGRADUATE FOUNDATION PHYSICS

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Remote laboratories are a necessity of online learning and COVID-19 has only increased the need for online teaching options. In this presentation, a review will be given of the three forms of remote laboratories utilised for the Curtin University course 'Foundations of Physics': at home experimentation, remote access experiments and simulated experiments. This course runs concurrently in both internal and fully online modes so that each remote laboratory is mapped to a corresponding face-to-face experimental activity to provide equitable learning experiences. In each case, the experimental activity must be paired with the appropriate remote lab solution and care taken to provide supplementary resources, i.e. instructional videos, worked solutions and guidance manuals. Budget and logistical concerns limit the mapping of learning objectives, so the process is driven primarily by skill-based objectives, and secondarily by content restrictions where each activity is paired with a content module.

Remote laboratories are practically implemented for a large cohort in the undergraduate unit 'Foundations of Physics'. Side-by-side comparison of the internal and online modes provides a useful mechanism for continued improvements to online experimental programs.

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