



Online energy and environmental laboratory courses

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Abstract

Covid-19 has dramatically changed teaching and learning in CityU and other universities. While we have adapted swiftly to online teaching in most lecture-based courses, online teaching of laboratory courses remains a huge challenge. Many AUs including SEE are considering extending the semester to fulfill the learning objectives of laboratory courses as a temporary one-off emergency measure. Taking advantage of the rapid infrastructural development in CityU e-learning, it is a great opportunity to start developing online laboratory courses. Conventionally, laboratory courses involve a lot of hands-on activities. However, as technology in instrumentation has advanced rapidly, many lab modules use sophisticated computer-controlled instruments that the hands-on activities quickly become controlling the instruments by knobs, touchpad, or software, which are somewhat low-level routine skill sets. Some experiments are long because the process being evaluated takes long, e.g., slow chemical reactions. Students very often found these experiments not productive. It is timely to challenge the conventional operation of laboratory courses. In the proposed project, we aim to examine the feasibility of converting 4 experiments (2 in each of the laboratory course in BEng Energy Science and Engineering (ESE) and BEng Environmental Science and Engineering (EVE)) to online mode to enhance the critical analysis components of teaching and learning. Experience learned from this project will be potentially useful for other laboratory intensive courses in CityU and beyond. The long-term goal aims to shift the paradigm of teaching and learning in laboratory courses towards higher level learning experiences and less repetitious, laborious, mechanical maneuvers and passive observations.