

The project aims at producing 6 interactive videos for pre-lab preparation and in-lab demonstration for the Electronic Circuit Design Laboratory. An interactive webpage is also developed to tie the lab activities with the underlying engineering concepts. With the prevalence of smartphones, the webpage is designed with access using smartphone in mind. As a result, if during the lab students encounter problems in using the equipment or understanding the instructions, they can visit the interactive website and watch the videos again.

The micro-modules cover the following topics: (1) Basic Electric Circuit Measurements — helping the students to understand the concept of floating equipment or grounded equipment, to learn the measurement method using digital multimeter and oscilloscope, and to verify the Ohm's Law, Kirchhoff's circuit laws and Thevenin equivalent circuits; (2) AC Circuit Analysis — introducing the characteristics of some components in alternating current (AC) circuits, the resonance behavior of RLC circuits, measurement techniques for inductance and capacitance, and to bridge them with the theoretic explanation; (3) Operational Amplifier — allowing students to understand the differences of open-loop and closed-loop amplifiers, the construction of high-pass and low-pass filter using amplifiers, and the application of operational amplifier in voltage regulators; (4) Digital Combinational Logic — aiding the students in using discrete logic chips, controlling 7-segment displays, and to verify De Morgan theorems; (5) Flip-flops and Finite-State Machine — helping the students to learn different types of flip-flops, and to use the flip-flops to develop a finite-state machine; (6) Finite-State Machine with VHDL — enabling the students to learn the hardware description language called VHDL, and to use it to develop an electronic rock-paper-scissors game.

The micro-modules will be available to the students in IERG1810 Electronic Circuit Design Laboratory. They will be required to complete pre-lab reading through the micro-modules. A formal evaluation, such as student surveys, will be conducted and benchmarking against conventional teaching will be documented for further improvement in the future.