

# Software-Based Learning for Mechanical Engineering Laboratories using Mobile Applications

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## Abstract

The immense growth and enhancement of technology had expanded the development and implementation of numerous teaching methods. An interactive digital environment triggers the student's imagination and understanding of the course as well as provides traditional learning by enriching various classroom activities via touch of the finger. This final year project focuses on the development of virtual simulation based laboratory for mechanical engineering field accessed via mobile applications. The project utilizes the System Development Life Cycle (SDLC) as the core approach of development. The interface system outlined in the design phase is based on the objectives, scope and background research on prior phases as well as act on the model for the source coding and simulation of the system prototype. The virtual laboratory application consists of five types of simulation test which are Tensile Test, Hardness Test, Charpy Test, Plate Rolling Test and Basic Oxygen Steelmaking Test. The application requires the user to register themselves and upon a successful login, the user is taken to the menu that contain of all the tests. The user is able to obtain a basic idea of the experiment through the introduction and media section while the laboratory section leads to the step by step procedure of the experiment that leads to the simulation and result of the experiment. This particular software learning based virtual laboratory encourages learning experience for the student via virtual laboratory and simulation of the actual experiments. Alternately, the virtual laboratory helps students to obtain some idea on how the actual experiment is conducted and at the same time become familiar with the equipment used.

## Keywords:

VisualStudio, C#, XAML, SQL, IOT, Virtual Laboratory, Android, IOS, Mobile Applications