

## Capstone Design Project Proposal

**Title of Project:** \_Impact Test Setup to Measure Fracture Toughness of Materials\_

**Date:** \_04/04/2017\_

**Proposer:** Dr. Ibrahim Guven, MNE/VCU, [iguven@vcu.edu](mailto:iguven@vcu.edu)

**Project Title:** Impact Test Setup to Measure Fracture Toughness of Materials

**Unmet Need – Engineering Problem to be Addressed:** A laboratory setup that is able to impart impact energy on notched specimens with the purpose of measuring the fracture toughness. The fracture toughness of a material describes the conditions under which a material will break.

### **Proposed Deliverables:**

- Impact test structure.
- A sensor setup to measure the initial and final heights of the impactor head.
- A software component that interacts with the sensors.

### **Anticipated Resources Required:**

- Access to machine shop to machine the parts of the structure.
- Sensors (to be decided as part of the design project)
- Microcontroller kit (e.g. Arduino, Raspberry Pi, etc.)
- Hobby electronics setup (e.g. soldering gun, etc.)

### **Anticipated Skills required:**

- Coding in specialized languages (e.g., LabView, Matlab, Python, C++, etc.)
- Machining (e.g., milling, lathe, etc.)
- Report writing and documentation

**Other Information:** This design project will require building a testing system with a very specific, well-defined function. The constraints will be clearly described. Calibration and verification of the results will be an important part of the project; materials with known fracture toughness values will be tested to verify the fidelity of the test setup.