



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

### **Senior Design Project Description**

<b>Company Name</b>	<i>ABB</i>	<b>Date Submitted</b>	<i>11/6/2018</i>
<b>Project Title</b>	<i>New Insulation Material Design (ABB_INSUL)</i>	<b>Planned Starting Semester</b>	<i>Spring 2019</i>

#### **Personnel**

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	4	Electrical	
Computer		Systems	1
Other ( )			

#### **Company and Project Overview:**

ABB is a pioneering technology leader that works closely with utility, industry, transport and infrastructure customers in roughly 100 countries. With more than four decades at the forefront of digital technologies, we are a leader in digitally connected and enabled industrial equipment and systems with an installed base of more than 70,000 control systems connecting 70 million devices.

ABB designs and manufactures a large variety of mechanical components including motors, drives and bearings. This project will be working to research and develop new insulation solutions for products designed at the Kings Mountain, NC facility.

ABB product examples this project will involve:

- Large AC Motors
  - Weather Protected Enclosures
  - Totally Enclosed Fan Cooled Enclosures



### **Project Requirements:**

Insulation is an important part integrated system solutions that ABB offers. Insulation performance specification requirements can include items such as:

- Heat transfer
- Structural support
- Sound propagation
- Air flow
- Durability
- Toxicity
- Aesthetics
- Size
- Weight
- Combustibility
- Cost

The scope for this project will be to understand the requirements that ABB has for insulation in their products and research the options for insulation materials that best satisfy the performance requirements. Current insulation choices will be baselined regarding performance against specification and then new insulation material alternatives will be researched. Research should be comprehensive and ensure all possible insulation material solutions have been found. Based on what is found in the research, the most promising materials will be selected for physical evaluation. Experiments will be designed and carried out to test the materials in a way that represents the product's configuration and usage. Based on the testing and verification done, recommendations will be made for insulation specifications and materials for the ABB products under consideration.



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**Expected Deliverables/Results:**

- Documentation of current insulation used in products included in the study, documentation of current performance against desired specification and identification of gaps in performance against what would be considered optimal.
- Comprehensive research which documents all practical insulation products and methods which could be used on the products that are part of the project.
- Analysis which justifies a selection of specific materials for physical evaluation.
- Design and documentation of Experiments to test the selected material against the desired performance specifications.
- Recommendation for insulation design in products under question based on the testing.

**Disposition of Deliverables at the End of the Project:**

Students to deliver report and test materials to ABB Baldor's Kings Mountain location after Expo

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- Systems engineering student must have passed the SEGR 4141 Engineering Experimental Design course with a grade of B or better.
- Interest in research for material science applications.
- Ability to travel to Kings Mountain NC for data gathering and possibly design reviews (based on team/mentor/supporter discussions and agreement).