UNC CHARLOTTE
The WILLIAM STATES LEE COLLEGE *of* ENGINEERING

UNC Charlotte – Lee College of Engineering Senior Design Program

Senior Design Project Description

Company Name	*Carrier/UTC*	**Date Submitted**	*04/15/2019*
Project Title	*ANSYS Result Report Automation* **CARR_ANSYS**	**Planned Starting Semester**	Fall 2019

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:

Discipline	Number	Discipline	Number
Mechanical	2	Electrical	1
Computer	2	Systems	
Other ( )			

Company and Project Overview:

Carrier is a world leader in high-technology heating, air-conditioning and refrigeration solutions. Carrier is a part of UTC Climate, Controls & Security, a unit of United Technologies Corp., a leading provider to the aerospace and building systems industries worldwide.

Built on Willis Carrier's invention of modern air conditioning in 1902, Carrier is a global leader in heating, air-conditioning and refrigeration solutions. In addition to the familiar residential products, Carrier has a vast array of heavy capacity commercial products for buildings and hi-rises of all types. These sophisticated units contain a wide variety of technologies including air handlers, air/water chillers, sensors and building automation controls.

The 9701 Old Statesville Rd Charlotte NC Carrier facility contains design engineering, test engineering and manufacturing operations. Some product examples are shown below:

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Carrier has recently undertaken an automation initiative in order to reduce engineering and design lead time. As such, Carrier is looking to automate several tasks with the FEA workflow. Carrier uses ANSYS products for FEA/CFD. Engineering wants to automate the process and reduce the lead-time for reporting. In this project, UNC-Charlotte Students will be provided HVAC pressure vessel component models to perform FEA on with the ultimate goal being to automate the report from analysis results.

Project Requirements:

Students will gain operational fluency in ANSYS (software provided by Carrier/ANSYS) and competency in ACT in order to automate an FEA report.

See the following reference information for ANSYS ACT:
https://www.ansys.com/products/structures/ansys-act

The students will be given a completed ANSYS simulation and a completed results report. The students will use these files as a template for their resulting automation tool. The resulting automation tool must be capable of being used in a generic capacity covering a variety of different simulations. The students must demonstrate this robustness by running a simulation on supplied geometries and using their automation tool to generate an acceptable report. Carrier would also like an analysis of the time savings due to the automation tool.

Expected Deliverables/Results:

- Operational fluency in ANSYS
- Competency in ACT
- Software and training provided by ANSYS
- An automated FEA reporting tool
- Demonstration of tool's robustness and capability of being utilized on a variety of simulations
- Analysis of time savings due to automation

Disposition of Deliverables at the End of the Project:

Deliver results to Supporters at the end of the Expo.

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

- Python
- Computational Methods
- Familiarity with ANSYS Workbench and FEA
- Completion of or Fall enrollment of MEGR 3225 (Introduction to Finite Element Analysis)
- Carrier has arranged additional training from Ansys for the student team. All team members are required to participate in this training and be professionally accountable for learning the material taught.