8. Computational Fluid Dynamics

Introduction

Uses of CFD solutions in the automotive industry are numerous. The capability of simulation and analysis using 3D modelling tools in the automotive sector have made the automobile industry look for better options in cost effective design and prototyping.

Purpose of the Event

The purpose of the event is to provide current challenges in automotive sector for the key research areas as well as innovation in design, material, shape, size etc in automotive products. Participants can design and develop 3D model and analyse any automotive components using CFD tool

The Concept: Using CFD Tool

- Build CFD analysis
- Analyse the model for thermal distribution
- CFD to demonstrate thermal conductivity of model

Alignment with curriculum:

- Thermodynamic
- Thermal engineering
- Heat and mass transfer
- Validating design procedure.

Expectations:

Tier-I	Tier-II	Tier-III
Discretize the model with appropriate CFD techniques using CFD Tool. Then perform static analysis.	Carry out basic Optimization process through different techniques as per model with solution	Modify the optimized model as per the thermal conductivity and then perform the static analysis to compare design performance

Competition Rules:

- Analysis can be done off line.
- 10 min presentation at the competition.
- Students can take any model for static analysis and optimization.

- Students have to use CFD tool to demonstrate.

Teams:

- Team Size: 2 or 3 Students per team
- Number of Teams for Tier-I: as many as possible
- Top 2 teams from each college will participate in Tier-II
- Top 3 teams from each division will participate in Tier-III

Judging Criteria:

Tier-I	**Tier-II**	**Tier-III**
Model selection Type of Meshing Mesh Quality Choice of loads and boundary condition Material & property selection Result interpretation	Model selection Type of Meshing Mesh Quality Choice of loads and boundary condition Material & property selection Result interpretation Type of Optimization discipline Selection of Objective for Optimization Weight reduction Selection of Optimization processes	Model selection Type of Meshing Mesh Quality Choice of loads and boundary condition Material & property selection Result interpretation Type of Optimization discipline Selection of Objective for Optimization Weight reduction Selection of Optimization processes Modifying the geometry as per manufacturability Result comparison Suggestions for improvement of design