A PROJECT REPORT ON

SIMULATION AND OPTIMIZATION MATERIAL OF WIND TURBINE BLADE PROFILES USING CATIA AND ANSYS

A project report submitted in partial full filament of the requirements for the award of the Degree of

BACHELOR OF TECHNOLOGY

IN

MECHANICAL ENGINEERING

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<u>CERTIFICATE</u>

This is to certify that the project work entitled —**SIMULATION AND OPTIMIZATION MATERIAL OF WIND TURBINE BLADE PROFILES USING CATIA AND ANSYS** Submitted by **GADI RATNA KAMAL (21815A0312), GEDDADA JYOTHI KRISHNA PRADEEP (21815A0315), CHENNUPATI DEEPTHANUSH (21815A0309), and ARIJLLI MAHESH (20811A0305)** to Avanthi Institute of Engineering and Technology, Makavarapalam, Anakapalli in partial fulfilment for the award of the degree of Bachelor of Technology in Mechanical Engineering, is a bonafide record work carried out by them, under guidance and supervision during 2020- 2024.
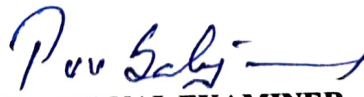
PROJECT GUIDE

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ABSTRACT

Wind energy is a fast-growing way to make power from wind, and it's good for the environment. Wind turbines have big blades that catch the wind to make electricity. This project is all about making those blades work better and cost less money.

First, we use special computer programs called CATIA and ANSYS to design and test the blades. CATIA helps us design the shape and size of the blades, while ANSYS helps us see how strong they are and how well they catch the wind.

We start by making different blade shapes in CATIA, changing things like length, width, and twist. Then we use ANSYS to test them. We look at things like how much stress they can handle, how much they bend, and how well they catch the wind.

After testing, we try to make the blades even better. We use special tools in ANSYS and CATIA to find the best combination of blade features. We want blades that are super-efficient at catching wind, strong enough to last a long time, and don't cost too much to make. By varying material to blade profile checking strength and mode shapes for Aluminium, Carbon fibre and E glass epoxy

KEYWORDS: Wind energy, Turbines, Wind blades, CATIA, ANSYS.