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Department of Mechanical Eng. & Mechatronics

**The Effect of Exhaust Gas Temperature on the Emissions Removal Efficiency of a Catalytic Converter of the SI Engine**

**A project submitted to the college of engineering, department of mechanical engineering and mechatronics as a partial fulfilment**

**for the degree of**

**B.Sc**

**in mechanical engineering**

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## Dedication

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# Abbreviations



# Chapter One

# Introduction

## Introduction

The ever-increasing demand for internal combustion engines for the transportation sector and power generation increased the burdens on the assimilative capacity of the environment. New techniques were developed by the engine industry to mitigate the emissions to the standard levels specified by the environmental bodies. These solutions comprise new engine designs, sophisticated after treatment facilities, highly refined synthetic fuels and surrogates for the petroleum fuels, biofuels, and electrification. Most of these solutions need a great deal of changes in the infrastructure which are considered as expensive, and difficult to implement.

Scientists set the end of 2030 as the deadline to accomplish all the mandates taken by the government around the globe during COP 26 and the all the obligations suggested by UNCCC program.

Recently, a great deal of efforts and resources where utilized at the research centers around the globe to find new material for coating the monoliths which are characterized by high efficiency, fast response, working at low temperatures, long life, and inexpensive. In that context, understanding the behavior of catalytic converters is utterly important to pave the way for the development and improvements in the new generations of these catalytic converters.

## Aims and objectives.

This project aims to improve the operational conditions of the mandatory aftertreatment facilities installed on the exhaust system of the internal combustion engine. Engine-out temperature, the rate exhaust gas cooling, and the sequential position of the treatment elements play a key role on the efficiency and rate of the chemical reactions taking place in these facilities. In the course of this work, controlling the exhaust gas temperature is taken as one of the primary inputs along with other engine operational parameters to inspect the environmental performance of these aftertreatment facilities.