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## **ADVANCED DESIGN OF GAS ENGINES**

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**KEYWORDS** - Internal combustion engines, alternative fuels, advanced combustion techniques, mechanical hybrid systems, turbo compounding, reduction of fuel consumption, reduction of green house gas emission

**ABSTRACT** - Development of more energy-efficient and environmentally friendly transportation technologies based on gas engines is a key factor in reducing fuel consumption, CO<sub>2</sub> production and pollutants emissions within Australia therefore improving national energy security, environment, and economy. Advanced combustion systems are being considered to improve the efficiency of converting the fuel energy in mechanical energy while keeping pollutant formation within emission standards. These modes use low irreversibility combustion of mixtures from lean to extremely lean to produce higher fuel conversion efficiency within the cylinder throughout the range of engine speeds and loads. In addition to these advanced combustion systems, heat loss reducing systems are also being considered to further improve the fuel conversion efficiency recovering the exhaust energy through advanced turbo compounding.