

## **ABSTRACT**

### **CERTAIN INVESTIGATIONS ON DEVELOPMENT OF NEW ALGORITHMS FOR SENSING, LATERAL CONTROL AND LONGITUDINAL CONTROL FOR INTELLIGENT TRANSPORTATION SYSTEM**

The course of the entire research work investigates the Advanced Vehicle Control System (AVCS) features of Intelligent Transportation System (ITS). The work in the thesis focuses on the design and development of auto-piloted vehicles and its control algorithms, which is an AVCS feature in ITS. The major features of AVCS include lane sensing, lateral control, longitudinal control, vehicle communication and vehicle platooning. Two types of prototype vehicles are designed for the real time implementation of the proposed algorithms. Two test bed tracks are used to test the performance of the proposed algorithms.

The combination of proposed sensor calibration algorithm, pre-processing algorithm, cascaded Kalman and PID steer control algorithm, adaptive speed and acceleration control algorithm, obstacle detection and collision avoidance algorithm together makes the test bed vehicle to complete the test bed track in a shortest time smoothly without much oscillations at desired speed. Test result shows that the proposed algorithm has better stability in real time environment in multiple prototype vehicles which justifies the proposed algorithms are vehicle independent.