國立台灣科技大學 114學年 第2學期　課程大綱

Spring 2026 NTUST Course Outline

授課教師：陳亮光

Instructor:Liang-Kuang Chen

課程名稱：車輛控制與駕駛輔助系統

Course Title：Vehicle Control and Driver Assist Systems

2026/11/3

課程代號：ME3621701 Course Code 學分數：3 Credits	必選修：選修/半學年 Required/Electve:Elective/Half Yr. 先修課程： Prerequisites

節次教室：T2(TR-212) T3(TR-212) T4(TR-212)
Time/Location

專業核心能力：
Core Professional Competencies

核心能力1：運用數學、科學及工程知識的能力
核心能力3：執行工程實務所需技術、技巧及使用現代化工具的能力
核心能力6：能發掘、分析、應用研究成果及因應複雜且整合性工程問題的能力
核心能力7：認識時事議題，瞭解工程技術對環境、社會及全球的影響，並培養持續學習的習慣與能力，並具備外文閱讀的能力

課程網址：
Course Website

課程宗旨：
Course Objectives

本課程針對智慧車輛的車輛控制與駕駛輔助系統進行介紹，從車輛運動控制所需的動力學理論基礎與模型出發，搭配各項安全系統功能所需的控制管道進行探討，並著重於SAE J3016所訂自駕等級LV2-3的輔助功能分析，並介紹駕駛人行為分析與控制模型建立，以及其衍生的智慧功能之設計議題。使學生了解不同層級智慧自駕功能相關的理論基礎與控制技術應用。
This course introduces the vehicle control and driver assist systems within the smart vehicles category. The contents start from the theoretical vehicle dynamics fundamentals and various models used for vehicle motion control. The available control channels used for different safety systems will be discussed, based on the SAE J3016 standard. Analyses and discussions of the assist functions nature of LV2-3 ADS are covered. The driver behavior analysis and control modelling are also introduced, in conjunction with the relevant design issues originated from the human driver issues. The objective is to train the students with the understanding of the theoretical fundamentals and control applications associated with different levels of the vehicle autonomous driving functions.

課程大綱：
Outline of Lectures

	1. 車輛控制系統介紹：人控系統與不同層級的控制介入 2. 駕駛輔助系統介紹：SAE J3016 3. 車輛動力學：含縱向、橫向、垂直向、輪胎，以及高自由度的複合模型 4. 車輛運動控制與安全系統功能分析 5. 駕駛輔助系統設計：自動緊急煞車(AEB)、適應性定速巡航(ACC)、車道維持輔助(LKA) 6. 駕駛人行為分析與建模：控制理論模型、訊號基礎模型 7. 駕駛在環之駕駛輔助系統分析探討 1. Introduction to vehicle control systems: manual control system and different control intervention levels 2. Introduction to driver assist systems levels: SAE J3016 3. Vehicle dynamics: including longitudinal, lateral, vertical, tires, and high-order complex models 4. Vehicle motion control and active safety systems function analysis 5. Driver assist system design examples: autonomous emergency braking (AEB), adaptive cruise control (ACC), lane keeping assist (LKA) 6. Driver behavior analysis and modeling: control theoretical model, signal/data based model 7. Discussion and analysis of human-in-the-loop real-time simulations of driver assist systems development
授課方式： Method of Instruction	講授 Lecture：70% 分組討論 Group discussion：0% 案例研討 Case study：10% 操做練習 Practical exercises：20% 講授 Lecture：%
教科書： Textbooks	none assigned, materials organized based on the references (listed below) will be provided.
參考書目： References	1. Fundamentals of Vehicle Dynamics: Revised Edition, by Thomas D. Gillespie, SAE International, 20212. 2. Vehicle Dynamics and Control, by Rajesh Rajamani, 2nd Ed., Springer, 2012. 3. Digital Human Modeling for Vehicle and Workplace Design, by Don B. Chaffin, SAE International, 2001.
修課須知： Notice	
評量方式： Grading	10% attendance, 30% case study report and quizzes, 30% midterm exam, 30% final exam.
備註說明： Notes	動力學、自動控制