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：黃志良

Instructor:Chih-Lyang Hwang

課程名稱：機器人學

Course Title：Robotics

2026/6/22

課程代號： EE5607701 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： Time/Location	T6(IB-602-2) T7(IB-602-2) T8(IB-602-2)
專業核心能力： Core Professional Competencies	
課程網址： Course Website	
課程宗旨： Course Objectives	To learn the important topics of robotics with machine learning. These topics include (i) LiDAR global localization for autonomous ground vehicles, (ii) Vision-based UAV self-positioning in low-altitude urban environments, (iii) Robust pedestrian tracking with severe occlusions in public spaces using 3D point clouds, (iv) Online skeleton-based action recognition, (v) Occluded, small-sized, and in the wild face recognition, (vi) Tightly-coupled UWB and IMU for real-time localization or navigation, and (vii) Tightly-coupled GPS and IMU or vision for real-time localization or navigation.
課程大綱： Outline of Lectures	Each of the following seven papers will be discussed every two weeks. [1] "BEVPlace++: Fast, robust, and lightweight LiDAR global localization for autonomous ground vehicles," IEEE Trans. Robotics, vol. 41, pp. 4479-4498, 2025. [2] "Vision-based UAV self-positioning in low-altitude urban environments," IEEE Trans. Image Process., vol. 33, pp. 493-508, Mar. 2024. [3] "Robust pedestrian tracking with severe occlusions in public spaces using 3D point clouds," IEEE Trans. Intell. Transport. Syst., vol. 26, no. 6, pp. 8411-8423, Jun. 2025. [4] "InfoGCN++: Learning representation by predicting the future for online skeleton-based action recognition," IEEE Trans. Pattern Anal. Mach. Intell., vol. 47, no. 1, pp. 514-528, Jan. 2025. [5] "Surveillance facial image quality assessment: A multi-dimensional dataset and lightweight model," IEEE Trans. Cir. Syst. Video Technol., earlier access, 2026. [6] "A tightly coupled UWB/PDR fusion positioning algorithm for indoor environments," IEEE Trans. Instrum. Meas., vol. 73, article no. 8507312, pp. 1-12, 2024. [7] "Factor graph optimization-based RTK/INS integration with raw observations for robust positioning in urban canyons," IEEE Trans. Instrum. Meas., vol. 74, article no. 9523511, pp. 1-11, 2025.
授課方式： Method of Instruction	講授 Lecture：100% 分組討論 Group discussion：0% 案例研討 Case study：0% 操做練習 Practical exercises：0% 講授 Lecture：English teaching class.%

教科書： Textbooks	The above 7 IEEE papers.
參考書目： References	The related papers for the above seven papers.
修課須知： Notice	
評量方式： Grading	(1) 15% for presence. (2) %85 for the planned exercises. Some notes are as follows: (i) At least three exercises from 5 planned exercises must be tackled. (ii) In addition, you should follow the planned schedule for the exercises. (iii) These exercises include the establishment of source codes to deal with the same or similar results of these 7 topics. (iv) Finish more satisfactory exercises, higher semester score.
備註說明： Notes	(1) You are interested in the above seven topics of robotics. (2) You want to learn similar topics with some source codes for machine learning.