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：Saravanan

Instructor:Saravanan Adhim

課程名稱：半導體感測器與元件

Course Title：Semiconductor Sensors and Devices

2026/11/3

課程代號：EO5234701 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：W6(IB-509) W7(IB-509) W8(IB-509) Time/Location	
專業核心能力： Core Professional Competencies	1.應用進階電子領域知識之能力 2.研讀及撰寫專業論文之能力 3.評估分析與獨立解決問題之能力 4.設計規劃與執行專題及系統整合之能力 5.具國際觀及終身學習之能力
課程網址： Course Website	
課程宗旨： Course Objectives	The main purpose of this “SEMICONDUCTOR SENSORS DEVICES” course is to know the importance of SEMICONDUCTOR sensors and devices in various applications. To familiarize students with different types of sensors design, fabrications and their promising effects in real time applications.
課程大綱： Outline of Lectures	1.導論：半導體、奈米技術、感測器、啟用奈米技術的感測器、感應器特性和術語 2.感測器接口和模數轉換； 感測器的特性和物理效應。 3.半導體感應器的類型：電導率、電阻、氣體、濕度、溫度、電阻和電容FET、光學、光電及電化學等感測器。 4.智慧感測器、感測器人機介面和人工智慧感測器。 5.智能物联网传感器（IoT sensors） //1. Introduction: Semiconductors, Nanotechnology, Sensors, Nanotechnology Enabled Sensors, Sensor Characteristics and Terminology 2. Sensor interfacing and analog to digital conversion; Characteristics and Physical Effects of sensors. 3. Types of semiconductor Sensors: Resistive Sensors, Gas Sensors, Touch sensors, Pressure Sensors, Humidity sensors, temperature sensors, Resistive and Capacitive FET sensors, Optical sensors, CMOS sensors, Photosensors and electrochemical sensors. 4. Smart sensors, Sensor human-machine interfaces and artificial intelligence (AI) sensors. 5. Next generation Smart IoT sensors.
授課方式： Method of Instruction	講授 Lecture：70% 分組討論 Group discussion：10% 案例研討 Case study：0% 操做練習 Practical exercises：20% 講授 Lecture：%

教科書： Textbooks	Textbook: 1. Nanotechnology-Enabled Sensors, KouroshKalantar-zadeh, Springer publications (2007). 2. Semiconductor Gas Sensors, Raivo Jaaniso Ooi Kiang Tan (2013), Semiconductor pyhsics-Donald A.Neimen. 3. Nanotechnology and Nano Electronics – Materials, devices and measurement Techniques– Springer.
參考書目： References	1. Class handouts 2. Invited Talk from Semiconductor/Sensors Industry 3. Research articles 4. Real-time Sensor demo
修課須知： Notice	None
評量方式： Grading	*Attendance and participation: 10%. *Assignments: 10% *Mid-term Oral Presentation: 40%. *Final sensor report: 40%.
備註說明： Notes	None