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：梁書豪

Instructor:Shuhao Liang

課程名稱：5G網路基礎技術

Course Title：5G Network Foundation

2026/11/3

課程代號： SI5039701 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(工業4.0中心電腦教室) T7(工業4.0中心電腦教室) T8(工業4.0中心電腦教室)
專業核心能力： Core Professional Competencies	■ 專業知識及技能 ■ 解決工程與管理問題之能力 ■ 評估分析與獨立解決問題之能力
課程網址： Course Website	
課程宗旨： Course Objectives	5G Network Foundation is an introductory course for students interested in communications without an electronics or communication training background. The curriculum begins with 5G applications and network architecture, providing students with general knowledge. Then, it gradually enters technical sectors - the 5G RAN and Core. Software-Defined Networking (SDN), Network Function Virtualization (NFV), and slicing are the core of the 5G network professional sectors. Constructing network topology exercises with GNS3 can help students build confidence in 5G networks and related fields, even if they don't have relevant training. At the end of the course, students can design a 5G network and demonstrate its performance and efficiency using simulation results. Students who have completed professional training in 5 G networks may participate in 5G-related roles in emerging industries, including augmented reality, virtual reality, smart classrooms, intelligent manufacturing, intelligent health care, autonomous vehicles, and smart cities.
課程大綱： Outline of Lectures	

	The course content is based on the textbook and reference, Nokia 5G Network Foundation. The hands-on practices use the free5GC Tutorial to help students enhance their understanding of 5G CORE. The curriculum is as follows, Week 01: Course Introduction - Textbook and Hands-On Free5GC Intro. Week 02: Drivers and Motivation for 5G; Team up. Week 03: Free5GC Tutorial and LFS114 (3-4 hours) Course Week 04: Visit the 2026 Smart City Expo. Week 05: Wireless Spectrum for 5G; Free5GC Lab 1 Week 06: Radio Access Technology (1/2); Free5GC Lab 2 Week 07: Radio Access Technology (2/2); Free5GC Lab 3 Week 08: Mid-term exam Week 09: Proposal - 5G network application project Week 10: Free5GC Lab 4-8 Week 11: Next Generation Network Architecture; Free5GC Lab(project discussion) Week 12: Access Control and Mobility Management; Free5GC Lab(project discussion) Week 13: Sessions, User Plane, and QoS Management; Free5GC Lab(project discussion) Week 14: Security and Critical Machine-Type Communication; Free5GC Lab (project discussion) Week 15: Massive Machine-Type Communication and the Internet of Things; Free5GC Lab(project discussion). Week 16: Final presentation and demo
授課方式： Method of Instruction	講授 Lecture：50% 分組討論 Group discussion：10% 案例研討 Case study：10% 操做練習 Practical exercises：30% 講授 Lecture：Visit Smart City Expo on Mar 17, 2026: https://en.smartcity.org.tw/index.php/en-us/ (Visit report as homework)%
教科書： Textbooks	Textbook: Chandramouli, Devaki, editors (2019). 5G for the Connected World. John Wiley & Sons.; ISBN: 9781119247081
參考書目： References	1. Reference: Nokia Learning and Development Hub, online course: Bell Labs 5G foundation. 2. Free5GC: https://free5gc.org/; 3. Hands-on: Free 5GC Tutorial https://github.com/free5gc/free5GLabs 4. Free5gc tutorial video:https://www.youtube.com/@free5gc447 5. Introduction to free5GC (LFS114): https://trainingportal.linuxfoundation.org/courses/introduction-to-free5gc-lfs114
修課須知： Notice	The TA will assist students with examples in the hands-on exercises.
評量方式： Grading	General performance (attendance, in-class quizzes, exercises, homework): 40%. Mid-term exam and proposal, 30%. Final project (free5GC), 30%.
備註說明： Notes	1. The students taking this course should be familiar with some math, physics, and programming capability — an electronics or communication background is not required. 2. Computer requirement: CPU with AVX(opens in a new tab) support, 4GB or more of RAM is recommended, and a Linux kernel is required.