|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **Course Information** |  |  |  | | --- | --- | | Course title | Digital Signal Processing in Vlsi Design | | Semester | 109-2 | | Designated for | COLLEGE OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE GRADUATE INSTITUTE OF ELECTRONICS ENGINEERING | | Instructor | [CHIA-HSIANG YANG](https://nol2.aca.ntu.edu.tw/nol/coursesearch/teacher.php?op=s2&td=901126) | | Curriculum Number | EE5141 | | Curriculum Identity Number | 921 U9330 | | Credits | 3.0 | | **Course Syllabus** | | | **Please respect the intellectual property rights of others and do not copy any of the course information without permission** | | | Course Description | 1. Basics of VLSI signal processing 2. Architectural transformation 3. Iterative and bit-level arithmetic 4. Digital filters  5. FFT 6. Time and frequency analysis  7. Wordlength optimization 8. Basics of digital circuits 9. Power reduction 10. Circuit optimization 11. Low energy implementation 12. Ultra low power design 13. Design examples | | Course Objective | 1. 介紹數位訊號處理架構設計的基本技巧與常用模組 2. 本課程的重點是積體電路之硬體架構設計與低功耗電路設計 | | Course Requirement | Homework: 30% Midterm: 30% Final project: 40% | | References | - D. Markovic and R. W. Brodersen: DSP Architecture Design Essentials, Springer, 2012 - K. K. Parhi, VLSI Digital Signal Processing Systems: Design and Implementation, Wiley, 1999 - J. Rabaey, A. Chandrakasan, B. Nikolić, Digital Integrated Circuits: A Design Perspective, 2nd Edition, Prentice Hall 2003 |  |  | | --- | | **Progress** |  |  |  |  | | --- | --- | --- | | Week | Date | Topic | | 第1週 |  | Introduction | | 第2週 |  | Basics of VLSI Signal Processing | | 第3週 |  | Digital Filters | | 第4週 |  | Iterative and Bit-Level Arithmetics | | 第5週 |  | Fast Fourier Transform (FFT) Module | | 第6週 |  | Time-Frequency Analysis | | 第7週 |  | National Holiday | | 第8週 |  | Basics of Digital Circuits, Power Reduction | | 第9週 |  | Circuit Optimization | | 第10週 |  | Low-Energy Implementations | | 第11週 |  | Midterm | | 第12週 |  | Ultra-Low Power/Voltage Design, Wordlength Optimization | | 第13週 |  | Multi-Antenna Decoders | | 第14週 |  | Bioinformatics/Biosignal Processors | | 第15週 |  | ML for VLSI/AI Processors | | 第16週 |  | Final Project Preview | | 第17週 |  | AI Processors | | 第18週 |  | Final Project Presentation | |

|  |
| --- |
|  |