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# ②國玄東華大學

# 教學計劃表 Syllabus

| 課程名稱(中文)<br>Course Name in Chinese | 超大型積體電路                          | <b>\$設計導論(二)</b>              |  |                                       | 學年/學期<br>Academic Year/Semester |  |  |  |
|------------------------------------|----------------------------------|-------------------------------|--|---------------------------------------|---------------------------------|--|--|--|
| 課程名稱(英文)<br>Course Name in English | Introduction to VLSI Design (II) |                               |  |                                       |                                 |  |  |  |
| 科目代碼<br>Course Code                | EE33720                          | 系級<br>Department 學三<br>& Year |  | 開課單位<br>Course-Offering<br>Department | 電機工程學系                          |  |  |  |
| 修別<br>Type                         | 學程 Program                       | 學分數/時<br>Credit(s)/Hou        |  | 3                                     | 3.0/3.0                         |  |  |  |
| 授課教師<br>Instructor                 | /吳柏宏                             |                               |  |                                       |                                 |  |  |  |
| 先修課程<br>Prerequisite               |                                  |                               |  |                                       |                                 |  |  |  |
| 埋积性流 Course Description            |                                  |                               |  |                                       |                                 |  |  |  |

## 課程描述 Course Description

本課程主要以課堂講述方式讓學生能了解目前CMOS製程、元件電特性、實體結構與佈局,並進行邏輯閘分析與設計邏輯網路,建立VLSI系統設計之基礎。

#### 課程目標 Course Objectives

本課程主要以課堂講述方式使學生能了解VLSI系統元件、算術電路、記憶體與可程式邏輯之電路設計,並進一步了解系統階層的實體設計、VLSI時脈系統與電路的可靠度與測試流程,建立VLSI系統設計之基礎。

|   | 系專業能力<br>Basic Learning Outcomes  | 課程目標與系專業能<br>力相關性<br>Correlation between<br>Course Objectives<br>and Dept.'s<br>Education<br>Objectives |
|---|---|---|
| A | 培育具備工程、應用數學與物理科學等數理知識之基本能力。To cultivate the basic knowledge of engineering, applied mathematics and physics.  | 0   |
| В | 培育系統分析、模擬驗證、實作實現之能力。To cultivate the basic ability of analysis, verification and implementation of systems.   | •   |
| С | 訓練軟體工具使用與硬體實務驗證相互輔助之能力。To train the auxiliary ability between the utilization of software tool and the verification of the hardware practice.   | 0   |
| D | 訓練電機本知學能技術與工程實務相互結合運用之能力。To train the integrate ability between professional instinct in learning technique and engineering practice.   | •   |
| Е | 落實專題製作之群體合作與團隊競爭之能力。To fulfill the ability of group cooperation and teamwork competition.   |   |
| F | 落實發掘問題、邏輯分析、克服瓶頸與持續學習之能力To fulfill the ability of question finding, logical analyzing, bottleneck overcoming and continuous learning.   | 0   |
| G | 了解學術倫理與智慧財產觀念,掌握產業更迭需求與具備多元專長之能力。To obtain the ability of multi-specialization and to meet the industry demand as well as to have the ability of academic ethics and concept of intellectual property |   |
| Н | 了解國內外市場變化,具備基本科技英文閱讀溝通之能力。To understand the change of global market and the have the basic ability of reading and conversation in English.  |   |

圖示說明Illustration :● 高度相關 Highly correlated ○中度相關 Moderately correlated

## 授課進度表 Teaching Schedule & Content

| 週次Week | 內容 Subject/Topics                             | 備註Remarks |
|--------|---|-----------|
| 1      | Designing High-Speed CMOS Logic Networks (I)  |           |
| 2      | Designing High-Speed CMOS Logic Networks (II) |           |

| 3            | Advanced Techniques in CMOS Logic Circuits (I)                |
|--------------|---|
| 4            | Advanced Techniques in CMOS Logic Circuits (II)               |
| 5            | System Specifications Using Verilog HDL                       |
| 6            | General VLSI System Components (I)                            |
| 7            | General VLSI System Components (II)                           |
| 8            | Arithmetic Circuits in CMOS VLSI (I)                          |
| 9            | 期中考試 Midterm Exam   |
| 10           | Arithmetic Circuits in CMOS VLSI (II)                         |
| 11           | Memories and Programmable Logic (I)                           |
| 12           | Memories and Programmable Logic (II)                          |
| 13           | System Level Physical Design                                  |
| 14           | VLSI Clocking and System Design (I)                           |
| 15           | VLSI Clocking and System Design (II)                          |
| 16           | Reliability and Testing of VLSI Circuits                      |
| 17           | 期末考試週 Final Exam  |
| 18           | 補充教學週   |
|              | 教學策略 Teaching Strategies                                      |
| ✓ 課堂講        | 授 Lecture   |
| ✓ 其他Mis      | scellaneous: 補充案例說明、自主學習(含專題演講聆聽)                             |
|              | 教學創新自評Teaching Self-Evaluation                                |
| 創新教學(        | Innovative Teaching)  |
| 問題導          | 向學習(PBL) 團體合作學習(TBL) 解決導向學習(SBL)                              |
| 翻轉教          | 室 Flipped Classroom   |
| 社會責任(        | Social Responsibility)  |
| 在地實          | 踐Community Practice   |
| 跨域合作(        | Transdisciplinary Projects)                                   |
| <b>一</b> 跨界教 | 學Transdisciplinary Teaching    跨院系教學Inter-collegiate Teaching |
| 業師合:         | 授 Courses Co-taught with Industry Practitioners               |
|              |   |
| 其它 othe      | r:  |
|              |   |

| 學期成績計算及多元評量方式 Grading & Assessments                      |                    |                    |          |          |          |          |          |          |         |
|--|--------------------|--------------------|----------|----------|----------|----------|----------|----------|---------|
| 配分項目   | 配分比例<br>Percentage | 多元評量方式 Assessments |          |          |          |          |          |          |         |
| Items  |                    | 測驗<br>會考           | 實作<br>觀察 | 口頭<br>發表 | 專題<br>研究 | 創作<br>展演 | 卷宗<br>評量 | 證照<br>檢定 | 其他      |
| 平時成績(含出缺席)<br>General Performance<br>(Attendance Record) | 15%                | <b>~</b>           |          |          |          |          |          |          | 出席      |
| 期中考成績 Midterm Exam                                       | 30%                | <b>~</b>           |          |          |          |          |          |          |         |
| 期末考成績 Final Exam   | 30%                | ~                  |          |          |          |          |          |          |         |
| 作業成績 Homework and/or<br>Assignments                      | 25%                |                    |          |          |          |          | >        |          | 習題、心得報告 |
| 其他 Miscellaneous   |                    |                    |          |          |          |          |          |          |         |

評量方式補充說明

Grading & Assessments Supplemental instructions

#### 教科書與參考書目(書名、作者、書局、代理商、說明)

Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

Textbook: John P. Uyemura, Introduction to VLSI Circuits and Systems, 1st ed., John Wiley & Sons, 2002 Reference:

- 1. John P. Uyemur 原著,李世鴻編譯, VLSI電路與系統,2006年,初版三刷,全華圖書 (ISBN-13:978-9572142103)
- 2. Neil H. E. Weste & David Harris 原著,周世傑編譯,CMOS VLSI 設計原理(基礎篇),初版一刷,偉明圖書(ISBN-13:978-986-154-827-2)

#### 課程教材網址(含線上教學資訊,教師個人網址請列位於本校內之網址)

Teaching Aids & Teacher's Website(Including online teaching information.

Personal website can be listed here.)

課程簡報請至東華e學苑下載:

https://elearn4.ndhu.edu.tw/moodle/course/view.php?id=10819

其他補充說明(Supplemental instructions)