國立東華大學

教學計劃表　Syllabus

課程名稱(中文) Course Name in Chinese	超大型積體電路設計導論(一)			學年/學期 Academic Year/Semester	115/1
課程名稱(英文) Course Name in English	Introduction to VLSI Design (I)				
科目代碼 Course Code	EE__33710	系級 Department & Year	學三	開課單位 Course-Offering Department	電機工程學系
修別 Type	學程 Program	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/吳柏宏				
先修課程 Prerequisite	/#電子學(一)				

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

銜接數位邏輯設計的觀念，使學生了解CMOS製程、元件特性、實體結構與電路佈局，並完成數位邏輯電路分析與網路設計，建立VLSI系統設計之基礎。 (Integrating the principles of digital logic design, this course enables students to understand CMOS manufacturing processes, the characteristics of electronic devices, and explore physical structures and circuit layouts. It also guides them in performing digital logic circuit analysis and network design, thereby establishing a foundation for VLSI system design)

	系專業能力 Basic Learning Outcomes	課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.'s Education 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.	●
B	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.	●
C	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.	●
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.	●
E	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.	●
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	○
H	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	An Overview of VLSI	
2	Logic Design with MOSFETs (I)	
3	Logic Design with MOSFETs (II)	
4	國定假日(停課一次)	
5	Physical Structure of CMOS Integrated Circuits (I)	
6	Physical Structure of CMOS Integrated Circuits (II)	
7	Fabrication of CMOS Integrated Circuits	
8	國定假日(停課一次)	
9	期中考試 Midterm Exam	
10	Elements of Physical Design (I)	
11	Elements of Physical Design (II)	
12	Electrical Characteristics of MOSFETs(I)	
13	Electrical Characteristics of MOSFETs(II)	
14	Electronic Analysis of CMOS Logic Gates(I)	
15	Electronic Analysis of CMOS Logic Gates(II)	
16	Designing High-Speed CMOS Logic Networks	
17	期末考試週 Final Exam	

彈性教學規劃 Flexible Teaching Plan	請勾選(至少需勾選1 個項目)： Please tick the box(es). (At least one item is required.): ☐ 問題討論 Problem-based Discussion ☐ 翻轉教學 Flipped Classroom ☐ 展演實作 Performance / Practical Presentation ☐ 校外參訪Off-campus Visit ☐ 講座活動 Lecture / Seminar ☐ 線上作業 Online Assignments ☑ 自主學習 Self-directed Learning ☐ 課業輔導Academic Support ☐ 實驗操作 Experiment Operation ☐ 遠距教學(同步) Distance Learning (Synchronous) ☐ 遠距教學(非同步) Distance Learning (Asynchronous) ☐ 其他(請填寫) Others (Please specify.): 備註: 本校學期週數自115 學年度起調整為17 週，為符合1學分18 小時之原則，請教師規劃安排彈性教學。 Note: From the 115th academic year, the semester will be 17 weeks. Please include flexible teaching activities to meet the required 18 hours per credit.

教 學 策 略 Teaching Strategies

☑ 課堂講授 Lecture ☐ 分組討論Group Discussion ☐ 參觀實習 Field Trip

☑ 其他Miscellaneous: 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 ☐ 磨課師 Moocs

社會責任(Social Responsibility)

☐ 在地實踐Community Practice ☐ 產學合作 Industy-Academia Cooperation

跨域合作(Transdisciplinary Projects)

☐ 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 other:

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

其他補充說明 (Supplemental instructions)