

國立東華大學
教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	類比積體電路設計			學年/學期 Academic Year/Semester	113/2
課程名稱(英文) Course Name in English	Analog Integrated Circuit Design				
科目代碼 Course Code	EE_M0190	系級 Department & Year	碩士	開課單位 Course-Offering Department	電機工程學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)		3.0/3.0	
授課教師 Instructor	/翁若敏				
先修課程 Prerequisite					
課程描述 Course Description					
CMOS技術主要應用於數位電路，由於製程的日新月異，現今也用於設計高性能類比電路。本課程為大學部電子學進階之類比電子電路介紹與分析。結合相關課程，學習電路設計、模擬與驗證的技巧。 本課程介紹類比積體電路的基本原理與電路設計等內容，重點是以CMOS電晶體電為主，建立類比積體電路設計基礎。主要的課程內容包括有：類比訊號重要性、主被動元件介紹、單級放大器、運算放大器、回授放大器、電流鏡、頻率響應、壓控振盪器、鎖相迴路等，可培養類比積體電路設計與分析的基本能力					
課程目標 Course Objectives					
學習CMOS類比積體電路設計的基本理論與頻率響應分析，熟悉積體電路的設計與製程，並經由電路模擬軟體驗證類比電路之特性。 To learn the basic theories of CMOS analog integrated circuit design and the analysis of frequency response. To become familiar with integrated circuit design and manufacturing processes, as well as verify the characteristics of analog circuits through circuit simulation software.					
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	培育具備電機電子資訊工程等專業技術研發之能力。To cultivate the research and developing ability of electrical, electronics and information engineering。				●
B	培育系統分析、模擬驗證、實作實現之能力。To cultivate the advanced 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	訓練電機電子資訊專業知識與工程實務相互結合運用之能力。To train the integrate ability between professional EECS knowledge and engineering practice				●
E	落實論文研究之群體討論與團隊合作之互助能力。To fulfill the research ability in thesis by group discussion and teamwork cooperation				○
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，掌握國內外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，具備科技英文閱讀溝通與科技論文寫作之能力。To understand the change of global market and to have the ability of reading, conversation and technical writing 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	1. Introduction to Analog Design	
2	2. Basic MOS Device Physics	
3	3. Single-Stage Amplifier	
4	3. Single-Stage Amplifiers	
5	4. Differential Amplifiers	
6	4. Differential Amplifiers	
7	5. Passive and Active Current Mirrors	
8	6. Frequency Response of Amplifiers	
9	期中考試週 Midterm Exam	
10	7. Noise	
11	8. Feedback	
12	8. Feedback	
13	9. Operational Amplifiers	
14	9. Operational Amplifiers	
15	10. Stability and Frequency Compensation	
16	17. CMOS processing Technology	
17	18. Layout and Packaging	
18	期末考試週 Final Exam	

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:		

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 Industry-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)	20%								
期中考成績 Midterm Exam	0%								
期末考成績 Final Exam	60%								
作業成績 Homework and/or Assignments	20%								
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.) (1)Behzad Razavi, “Design of Analog CMOS Integrated Circuits”, McGraw-Hill, Inc., 2002. (滄海) (2)類比CMOS積體電路設計 劉深淵教授 審閱 / 李峻實 譯(滄海).									
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.) http://www.elearn.ndhu.edu.tw/moodle/course/view.php?id=46288									
其他補充說明 (Supplemental instructions)									