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②图玄東華大學

6 图 2 米 半 大 学								
教學計劃表 Syllabus								
課程名稱(中文) Course Name in Chinese	薄膜太陽能電池				學年/學期 Academic Year/Se	113/2		
課程名稱(英文) Course Name in English	Thin-film solar cells							
科目代碼 Course Code	EEM0210	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	/黄家華							
先修課程 Prerequisite								
課程描述 Course Description								
The fundamental concepts and operation principles of thin-film photovoltaics are introduced. The required properties of semiconductor materials for the thin-film photovoltaics are discussed. The technologies of various photovoltaic devices including amorphous Si solar cells, CdTe solar cells, CIGS-based solar cells, dye-sensitized solar cells, organic solar cells, and perovskite solar cells are presented.								
課程目標 Course Objectives								

The thin-film solar cells are classified. The semiconductor materials and their related properties for various types of solar cells are introduced. In addition, the device structures and the design concepts associated with the device performance are addressed. The deposition techniques of the semiconductors and fabrication processes of thin-film solar modules are highlighted.

	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。	•
В	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。	0
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	•
Е	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	0
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	•
Н	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。	0
圖示	説明Illustration :● 高度相關 Highly correlated ○中度相關 Moderately co	orrelated

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 内容 Subject/Topics 備註Remarks

1	Introduction of thin-film solar cells					
2	Classification of thin-film solar cells					
3	Substrates for thin-film solar cells, Cell configurations					
4	Module fabrication					
5	Materials for thin-film solar cells					
6	Operation principles of thin-film solar cells					
7	Dye-sensitized solar cells and organic solar cells					
8	期中考試 Midterm Exam					
9	amorphous Si solar cells					
10	amourphous Si solar cells					
11	CdTe solar cells					
12	CdTe solar cells					
13	CIGS-based solar cells					
14	CIGS-based solar cells					
15	Oral presentation					
16	期末考試 Final Exam					
17	Perovskite solar cells					
18	Perovskite/Si or CIGS tandem solar cells					
	教學策略 Teaching Strategies					
✓ 課堂講	授 Lecture	Field Trip				
其他Mi	scellaneous:					
	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	型智(SBL)				
翻轉教	室 Flipped Classroom					
社會責任(Social Responsibility)					
	踐Community Practice	on				
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 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	多元評量方式 Assessments							
Items	Percentage	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)									
期中考成績 Midterm Exam	35%								
期末考成績 Final Exam	35%								
作業成績 Homework and/or Assignments									
其他 Miscellaneous (專題口頭報告和書面報告)	30%								

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. "Handbook of Photovoltaic Science and Engineering," John Wiley & Sons.
- 2. "The Physics of Solar Cells," Jenny Nelson, Imperial College Press.
- 3. "Photovoltaic Materials," Richard H. Bube, Imperial College Press.

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.)

其他補充說明(Supplemental instructions)