

國立東華大學
教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	光電半導體元件AA			學年/學期 Academic Year/Semester	114/1
課程名稱(英文) Course Name in English	Optoelectronic Semiconductor Devices				
科目代碼 Course Code	EE__3365AA	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	/黃家華				
先修課程 Prerequisite					
課程描述 Course Description					
The semiconductor physics emphasizing the interaction between light and semiconductors is introduced. Regarding this subject, the absorption of photons in the semiconductors is addressed. Furthermore, the operation principles, device structures, and fabrication technologies of optoelectronic semiconductor devices including light emitting diodes, laser diodes, photodioeds, and photovoltaics devices are discussed.					
課程目標 Course Objectives					
介紹光電半導體元件原理，包括發光二極體、雷射二極體、光檢測器、光伏元件等光電半導體元件。					
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	1. Intrinsic and extrinsic semiconductors. 2. Nondegenerate and degenerate semiconductors. 3. Formation of pn junctions.	
2	1. band diagrams of pn junctions. 2. Forward bias and Shockley equation.	
3	Moon Festival	
4	National Day	
5	1. Excess Minority Carrier recombination lifetimes 2. Heterojunction	
6	1. Homostructure LED 2. Heterostructure LED	
7	Exam 1	
8	1. LED materials 2. LED efficiency and luminous flux	
9	1. Optical absorption coefficients 2. Introduction of photodetectors	
10	1. Operation principle of photodetectors 2. photovoltaic mode of operation 3. photodiode mode of operation	
11	1. Spectral responsivity 2. Quantum efficiency	
12	Exam 2	
13	1. Solar spectrum 2. Operation principles of photovoltaic devices	
14	1. IV characteristics of pn junction photovoltaic devices 2. Equivalent circuit of photovoltaic devices 3. Series resistance and parallel resistance	
15	1. Materials for photovoltaic devices 2. Si and III-V Crystalline photovoltaic devices	
16	New Year's Day	
17	Thin-film photovoltaic devices	
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)									
期中考成績 Midterm Exam	66%								
期末考成績 Final Exam	34%								
作業成績 Homework and/or Assignments									
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.)									
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)									