



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 | 113/1 |
|---|--|-----------------------------|---------------------------------|------------------------------------|
| 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 |
| 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, photodiodes, 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。 | | | | |
| 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 | | | |

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| 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 General Performance | | | | | | | | | |
| 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)