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國立東華大學

# 教學計劃表 Syllabus

| | | | | | |
|---|---|---|---|---|---|
| 課程名稱(中文)<br>Course Name in Chinese | 半導體元件 | | | 學年/學期<br>Academic Year/Semester | 112/2 |
| 課程名稱(英文)<br>Course Name in English | Semiconductor Devices | | | | |
| 科目代碼<br>Course Code | MS__51900 | 系級<br>Department & Year | 碩士 | 開課單位<br>Course-Offering Department | 材料科學與工程學系 |
| 修別<br>Type | 選修 Elective | 學分數/時間<br>Credit(s)/Hour(s) | 3.0/3.0 | | |
| 授課教師<br>Instructor | /林育賢 | | | | |
| 先修課程<br>Prerequisite | | | | | |

## 課程描述 Course Description

Modern Semiconductor Devices for Integrated Circuits, First Edition introduces students to the world of modern semiconductor devices with an emphasis on integrated circuit applications. This course is appropriate for both undergraduate and graduate students.

## 課程目標 Course Objectives

讓學生在修習此一課程後，能對固態電子元件有深入的了解，以利研究工作的進行。

| | 系專業能力<br>Basic Learning Outcomes | 課程目標與系專業能力相關性<br>Correlation between Course Objectives and Dept.'s Education Objectives |
|---|---|---|
| A | 具備材料科學所需的進階物理、化學及數學的知識。Acquire required advanced physical, chemical, and mathematic knowledge for materials science and engineering. | ○ |
| B | 具備材料科學的進階專業知識，並能應用於解決工程上之問題。Acquire required advanced professional knowledge for materials science and engineering, applicable in solving engineering problems. | ● |
| C | 具備獨立研究之能力。Equipped with capabilities of independent research. | ○ |
| D | 具備專業道德及責任感，與良好的溝通及團隊合作的能力。Acquire professional morality and responsibility, and capability of quality communication and team cooperation. | |
| E | 具備適當的英文能力，應用於學習與交流。Acquire English capability used for learning and interaction. | ○ |

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 | Introduction | |
| 2 | Semiconductor Materials, Review | |
| 3 | Semiconductor Materials, PN Junction, Review | |
| 4 | Metal-Semiconductor Junction | |
| 5 | Metal-Semiconductor Junction | |

| | | |
|---|---|---|
| 6 | Metal-Semiconductor Junction | |
| 7 | 清明節(放假) | |
| 8 | MOS Capacitor | |
| 9 | 期中考試週 Midterm Exam | |
| 10 | MOS Capacitor | |
| 11 | MOS Capacitor | |
| 12 | MOS Capacitor | |
| 13 | Introduction to FETs | |
| 14 | High-Mobility FETs | |
| 15 | MOSFETs | |
| 16 | MOSFETs | |
| 17 | 期末考試週 Final Exam | |
| 18 | 彈性補充教學時間 | |

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: 實務

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<br>Items | 配分比例<br>Percentage | 多元評量方式 Assessments | | | | | | | |
| | | 測驗<br>會考 | 實作<br>觀察 | 口頭<br>發表 | 專題<br>研究 | 創作<br>展演 | 卷宗<br>評量 | 證照<br>檢定 | 其他 |
| 平時成績 General Performance | 30% | | | | | | | | |
| 期中考成績 Midterm Exam | 25% | | | | | | | | |
| 期末考成績 Final Exam | 35% | | | | | | | | |
| 作業成績 Homework and/or Assignments | 5% | | | | | | | | |
| 其他 Miscellaneous (Classroom Attendance ) | 5% | | | | | | | | |

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
Title: Modern Semiconductor Devices for Integrated Circuits
Author: Chenming Calvin Hu

References:
1. Solid State Electronic Devices
Author: Ben G. Streetman and S. K. Banerjee
2. Semiconductor Physics And Devices
Autjor: Donald Neamen
3. Semiconductor Devices: Physics and Technology
Author: Simon M. Sze, Ming-Kwei Lee
4. Physics of Semiconductor Devices
Author: Simon M. Sze, Kwok K. Ng

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)