國立東華大學

教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	光電電磁元件模擬			學年/學期 Academic Year/Semester	113/2
課程名稱(英文) Course Name in English	Simulation of opto-electromagnetic devices				
科目代碼 Course Code	OE__53200	系級 Department & Year	碩士	開課單位 Course-Offering Department	光電工程學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/李政誼				
先修課程 Prerequisite					

課程描述 Course Description

Provide a comprehensive introduction of modern Photonic Devices: its physics and modelling.

課程目標 Course Objectives

介紹如何使用電腦輔助工具來模擬光電電磁元件並分析其計算結果

	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	具有獨立研究能力Equipped with abilities of independent research.	●
B	具有光電工程的專業知識及應用能力。Professional knowledge and application ability of Opto-electronic engineering	●
C	具有設計與執行實驗、報告撰寫與數據解釋之能力。Abilities to design and execute experiment, write reports, and explain data	●
D	使用儀器進行物件的分析及測試。Analysis and test of devices by instruments	●
E	具備適當的英文能力，應用於學習與交流。English language ability to study and interact	○
F	具有良好的溝通與團隊合作的能力。Ability to communicate and teamwork	○
G	具有創新思維及終身學習的能力。Creative thinking and life-long learning ability	●

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	Modelling environment, material library, structural construction, and setting of wave equation and boundary conditions	
2		和平紀念日
3	Electromagnetic Plane wave and Model of refractive index	
4	Gaussian beam: theory and its modelling	

5	Waves of Reflection and Transmission, Brewster angle, and Goos-Hänchen effect	
6	Mie's scattering theory for 2D object [米式散射]: theoretical background and its simulation	
7		民族掃墓節
8	Mie's scattering theory for 2D object [米式散射]: theoretical background and its simulation, Transfer matrix [傳遞矩陣] and scattering matrix [散射矩陣]	
9	期中考試週 Midterm Exam	
10	1D photonic crystal [一維光子晶體]: Theory and Simulation	
11	Localized surface plasmon [區域性表面電漿共振]: theoretical background and its modelling	
12	Step-index fiber [步階光纖]: theoretical background and its modelling	
13	Yagi-Uda nano-Antena [八木奈米天線]: theoretical background and its modelling	
14	2D photonic crystal [二維光子晶體]: theoretical background	
15		補假
16	2D photonic crystal [二維光子晶體]: Simulation & Metasurfaces [超穎介面]: theory and its modelling	
17	Project report	
18	Project report	

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 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 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	10%								
期中考成績 Midterm Exam	30%								
期末考成績 Final Exam	30%								
作業成績 Homework and/or Assignments	30%								
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. Introduction to COMSOL Multiphysics
2. Photonic crystals:Physics and Practical Modeling, Igor A. Sukhoivanov
Igor V. Guryev
3. An Introduction to Metamaterials and Nanophotonics, CONSTANTIN SIMOVSKI and SERGEI TRETYAKOV
4.Wave Propagation From Electrons to Photonic Crystals and Left-Handed Materials, Peter Markos.

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)