

 國立東華大學  
教學計劃表 Syllabus

|                                                                       |                                                                                                    |                                                                                |                             |    |                                    |  |                                                                                          |   |
|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------|----|------------------------------------|--|------------------------------------------------------------------------------------------|---|
| 課程名稱(中文)<br>Course Name in Chinese                                    |                                                                                                    | 光電數值分析與計算                                                                      |                             |    | 學年/學期<br>Academic Year/Semester    |  | 114/1                                                                                    |   |
| 課程名稱(英文)<br>Course Name in English                                    |                                                                                                    | Numerical analysis and calculation for Opto-electronics                        |                             |    |                                    |  |                                                                                          |   |
| 科目代碼<br>Course Code                                                   |                                                                                                    | OE_53130                                                                       | 系級<br>Department & Year     | 碩士 | 開課單位<br>Course-Offering Department |  | 光電工程學系                                                                                   |   |
| 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                                                    |                                                                                                    | /李政誼                                                                           |                             |    |                                    |  |                                                                                          |   |
| 先修課程<br>Prerequisite                                                  |                                                                                                    |                                                                                |                             |    |                                    |  |                                                                                          |   |
| 課程描述 Course Description                                               |                                                                                                    |                                                                                |                             |    |                                    |  |                                                                                          |   |
| 課程分為兩部分：上部分介紹matlab程式語言的撰寫方式與程式邏輯、資料處理與分析。下部分介紹常用的數值方法解決光電工程問題。       |                                                                                                    |                                                                                |                             |    |                                    |  |                                                                                          |   |
| 課程目標 Course Objectives                                                |                                                                                                    |                                                                                |                             |    |                                    |  |                                                                                          |   |
| 以程式語言及數值方法處理光電領域的計算問題                                                 |                                                                                                    |                                                                                |                             |    |                                    |  |                                                                                          |   |
| 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                                                                     |                                                                                                    | Environments of matlab, Script-M file, Basic operation, and matrix calculation |                             |    |                                    |  |                                                                                          |   |
| 2                                                                     |                                                                                                    | Basic operation                                                                |                             |    |                                    |  |                                                                                          |   |
| 3                                                                     |                                                                                                    | matrix calculation                                                             |                             |    |                                    |  |                                                                                          |   |
| 4                                                                     |                                                                                                    | 2D, and 3D graphics                                                            |                             |    |                                    |  |                                                                                          |   |

|    |                                                               |                     |
|----|---------------------------------------------------------------|---------------------|
| 5  |                                                               | 國慶日(放假)             |
| 6  | Structured programming M Function files and Data input/output |                     |
| 7  |                                                               | 臺灣光復暨金門古寧頭大捷紀念日(放假) |
| 8  | Symbol calculation and App Designer                           |                     |
| 9  | 期中考試週 Midterm Exam                                            |                     |
| 10 | Optoelectric application                                      |                     |
| 11 | Computing integrals and application                           |                     |
| 12 | Ordinary differential equations and application               |                     |
| 13 | Nonlinear algebra equations and Optimization                  |                     |
| 14 | Fast Fourier transform                                        |                     |
| 15 | Curve fitting: linear and nonlinear regression                |                     |
| 16 | Numerical calculation of partial differential equation        |                     |
| 17 | 期末考試週                                                         |                     |
| 18 | Finite-Difference Time-Domain method (時域有限差分)                 |                     |

#### 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:

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| 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(含出缺席)<br>General Performance<br>(Attendance Record)                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10%                |                    |          |          |          |          |          |          |    |
| 期中考成績 Midterm Exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 25%                |                    |          |          |          |          |          |          |    |
| 期末考成績 Final Exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 25%                |                    |          |          |          |          |          |          |    |
| 作業成績 Homework and/or<br>Assignments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20%                |                    |          |          |          |          |          |          |    |
| 其他 Miscellaneous<br>(小考6次)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20%                |                    |          |          |          |          |          |          |    |
| 評量方式補充說明<br>Grading & Assessments Supplemental instructions                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                    |          |          |          |          |          |          |    |
| 教科書與參考書目 (書名、作者、書局、代理商、說明)<br>Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                    |          |          |          |          |          |          |    |
| PPT Lectures<br>References:<br>1. matlab 設計入門,<br><a href="http://mirlab.org/jang/books/matlabprogramming4beginner/">http://mirlab.org/jang/books/matlabprogramming4beginner/</a><br>2. Programming for Computations - MATLAB/Octave, A Gentle Introduction to Numerical Simulations with MATLAB/Octave<br>Authors: Svein Linge and Hans Petter Langtangen<br>Free for download: <a href="https://link.springer.com/book/10.1007%2F978-3-319-32452-4">https://link.springer.com/book/10.1007%2F978-3-319-32452-4</a> |                    |                    |          |          |          |          |          |          |    |
| 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)<br>Teaching Aids & Teacher's Website(Including online teaching information.<br>Personal website can be listed here.)                                                                                                                                                                                                                                                                                                                                                               |                    |                    |          |          |          |          |          |          |    |
| 課程講義放置於東華e學苑 <a href="http://www.elearn.ndhu.edu.tw/moodle/">http://www.elearn.ndhu.edu.tw/moodle/</a><br>線上教學連線資訊, 也會一併公布在東華e學苑 <a href="http://www.elearn.ndhu.edu.tw/moodle/">http://www.elearn.ndhu.edu.tw/moodle/</a>                                                                                                                                                                                                                                                                                           |                    |                    |          |          |          |          |          |          |    |
| 其他補充說明 (Supplemental instructions)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                    |          |          |          |          |          |          |    |