「電磁學」課程大綱

(11120 EE 214001, Electromagnetism)

一、課程說明(Course descriptions)

本課程為電機系核心課程之一。以積分方程、微分方程的數學語言建構馬克士威方程組(Maxwell's equations)，據以解釋實驗觀察到之靜電、穩態電流、靜磁、電磁感應及與材料之交互作用等物理現象。課程也將透過平面波、傳輸線、天線等工程實例示範反射、穿透、色散等波動通性。本課程所需要的先備知識為：微積分(一二)、向量分析、普通物理(一二)、電路學、傅立葉轉換。對選修電磁波、光電工程、光電子學、微波工程、高頻電路設計、固態電子元件等進階課程至關重要。

二、教材(Teaching materials)

N. N. Rao, *Elements of Engineering Electromagnetics*, 6th edition, Pearson, 2004.

David K. Cheng, *Field and Wave Electromagnetics*, 2nd edition, Addison Wesley, 1989.

自編補充講義(Supplementary slides in pdf files)

三、教學方式(Teaching methods)

課堂講授、影片觀摩、隨堂討論及問答、團隊專題

四、教學進度(Syllabus)

1. Vectors and fields (Ch 1 of Rao's textbook, Weeks 1-2)
2. Maxwell's equations in integral form (Ch 2, Weeks 3-5)
3. Maxwell's equations in differential form (Sec. 3.1-3.3, Weeks 5-7)
4. First midterm exam (tentatively scheduled on 4/5, Week 8)
5. Uniform plane waves in free space (Sec. 3.4-3.7, Weeks 7-10)
6. Group project 1 (tentatively scheduled on 4/26)
7. Fields and waves in electric materials (Ch 4, Weeks 10-12)
8. Transmission lines (Selected topics in Ch 6-7, Weeks 12-13)
9. Electromagnetic potentials (Sec. 5.1-5.4, Weeks 14-15)
10. Final exam (tentatively scheduled on 5/29, Week 16)
11. Fields and waves in magnetic materials (Sec. 4.3, Weeks 15-16)
12. Radiation and antennas (Selected topics in Ch 10, Week 17)
13. Group project 2 (tentatively scheduled on 6/16, Week 18)

五、成績考核(Evaluation)

期中考(30%)，期末考(35%)，團隊專題(20%)，小考(15%)

六、可連結之網頁位址(Hyperlinks)

數位學習平台：https://eeclass.nthu.edu.tw/