

# 「電磁學」課程大綱

(11020 EE 336000, Electromagnetism)

## 一、課程說明(Course descriptions)

本課程為電機系核心課程之一。採「演繹式」架構，以向量分析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、天線、傳輸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)

課前預習問答、課堂講授、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)
2. Maxwell's equations in integral form (Ch 2)
3. Maxwell's equations in differential form (Sec. 3.1-3.3)
4. [First midterm exam \(tentatively scheduled on 4/6\)](#)
5. Uniform plane waves in free space (Sec. 3.4-3.7)
6. Radiation and antennas (Selected topics in Ch 10)
7. Fields and waves in material media (Ch 4)
8. [Second midterm exam \(tentatively scheduled on 5/18\)](#)
9. Electromagnetic potentials (Sec. 5.1-5.4)
10. Transmission lines (Selected topics in Ch 6-7)
11. [Team project \(tentatively scheduled on 6/17\)](#)

## 五、成績考核(Evaluation)

兩次期中考(各 35%)，團隊專題(10%)，作業及教師考核(20%)

## 六、可連結之網頁位址(Hyperlinks)

數位學習平台：<https://elearn.nthu.edu.tw/login/index.php>