

# 108 學年度 第 2 學期 進階光譜學 Advanced Spectroscopy 課程綱要

| 課程名稱：<br>( 中文 ) 進階光譜學<br>( 英文 ) Advanced Spectroscopy  |                        | 開課單位：  | 分子碩     |                              |    |    |
|--|------------------------|--|---------|------------------------------|----|----|
|  |                        | 永久課號：  | IMO5128 |                              |    |    |
| 授課教師：<br>遠藤泰樹  |                        |  |         |                              |    |    |
| 學分數：   | 3.00                   | 必 / 選修：  | 選修      | 開課年級：                        | *  |    |
| 先修科目或先備能力：<br>Basic knowledge of quantum mechanics or quantum chemistry  |                        |  |         |                              |    |    |
| 課程概述與目標：<br>Energy level structures of relatively simple molecules, for rotation, vibration and electronic motions, together with spectra involving these motions, are discussed. Spectroscopic methods for the investigations of these energy level structures are also given. A few advanced features are discussed. |                        |  |         |                              |    |    |
| 教科書 ( 請註明書名、作者、出版社、出版年等資訊 )：   |                        | (1) P. Atkins and J. de Pauls, "Physical Chemistry", Oxford Univ. Press.<br>(2) P. F. Bernath, "Spectra of Atoms and Molecules", Oxford Univ. Press. |         |                              |    |    |
| 課程大綱   |                        | 分配時數   |         |                              |    | 備註 |
| 單元主題   | 內容綱要                   | 講授   | 示範      | 習作                           | 其他 |    |
| 教學要點概述：  |                        |  |         |                              |    |    |
| 1. 學期作業、考試、評量<br>Reports for each chapter. 30%<br>Final exam. 70%  |                        |  |         |                              |    |    |
| 2. 教學方法及教學相關配合事項 ( 如助教、網站或圖書及資料庫等 )<br>Prepare printed materials   |                        |  |         |                              |    |    |
| 師生晤談   | 排定時間                   | 地點   |         | 聯絡方式                         |    |    |
|  | Wednesday, 16:00-17:00 | SBII, R125   |         | Tel : 31518 endo@nctu.edu.tw |    |    |
| 每週進度表  |                        |  |         |                              |    |    |
| 週  | 上課日期                   | 課程進度、內容、主題   |         |                              |    |    |

|    |           |  |
|----|-----------|--|
| 次  |           |  |
| 1  | 2020/2/19 | General introduction   |
| 2  | 2020/2/26 | Diatomic molecules; rotation and vibration                                 |
| 3  | 2020/3/4  | Selection rules and general treatments                                     |
| 4  | 2020/3/11 | Their spectra and experimental observations                                |
| 5  | 2020/3/18 | Polyatomic molecules; rotation and angular momenta                         |
| 6  | 2020/3/25 | Rotational energy levels   |
| 7  | 2020/4/1  | Rotational energy levels (cont.)   |
| 8  | 2019/4/8  | Nuclear spin statistics. Radio astronomy                                   |
| 9  | 2020/4/15 | Vibration of polyatomic molecules  |
| 10 | 2020/4/22 | Group theory   |
| 11 | 2020/4/29 | GF-matrix method, selection rules, and spectra                             |
| 12 | 2020/5/6  | Large amplitude motions, molecular complexes etc.                          |
| 13 | 2020/5/13 | Electronic spectra of diatomic molecules; electronic states                |
| 14 | 2020/5/20 | Selection rules, spectra and spontaneous emission                          |
| 15 | 2020/5/27 | Rotational energy levels of open-shell molecules                           |
| 16 | 2020/6/3  | Electronic spectra of polyatomic molecules; electronic states and symmetry |
| 17 | 2020/6/10 | Selection rules, spectra, and dynamics in the excited states               |
| 18 | 2020/6/17 | Final exam.  |

備註：

- 1.請遵守智慧財產權觀念及勿使用不法影印教科書。
- 2.其他欄包含參訪、專題演講等活動。

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