

國立陽明交通大學遠距教學課程－教學計畫大綱
The Teaching Plan for Distance Learning Courses of National Yang Ming Chiao
Tung University

填表說明：

Description:

1. 開授遠距教學課程，應由開課單位擬具教學計畫，依課程規劃及研議程序辦理，經教務相關之校級會議通過後實施；本教學計畫大綱會上傳至教育部「大學校院課程網」。
The teaching plan for a distance learning course should be made by the course provider, based on the curriculum plan and study procedures, and then be submitted to a university-level meeting related to academic affairs for approval before the course can be conducted. It will be uploaded to the "University Curriculum Website" of the Ministry of Education.
2. 同一教師不得針對課程名稱或性質相近之課程再次申請授課時數加計。
Teachers are not allowed to apply for additional teaching hours again using their courses with similar titles or natures.

開課期間： 113 學年度 第 2 學期
Course Period: _____ Semester of Academic Year _____

- 首次開設之「遠距課程」：☐是(請續勾選下題一或題二) ☒否(以下免勾選)
Offering the "Distance course" for the first time:

☐Yes (please check the boxes in Table 1 or 2 below) ☐No (no need to check the following boxes)

- 請教師先確認本次申請加計 1.5 倍之課程 ☐是 ☐否 為「課程名稱」或「性質相近」之課程

(不申請加計 1.5 倍者免填)

Please confirm that the course for which you are applying for 1.5 times teaching hours this time is a course of the same "course name" or of "similar nature" (yes or no)

(if not applicable, there's no need to check the boxes below)

- 1、此為上或下學期首次開設遠距課程，是否要申請加計授課時數 1.5 倍：☐要申請 ☐不申請

This is the first time you're offering a distance course in the first or second semester. Do you need to apply for 1.5 times teaching hours: ☐Yes ☐No

- 2、此為暑期首次開設遠距課程，是否要申請加計授課時數 1.5 倍：(非暑期課程免填)

This is the first time you're offering a distance course in the summer term. Do you need to apply for 1.5 times teaching hours: (if not applicable, there's no need to check a box below)

☐要申請(不支領暑期授課鐘點費，改列計為次學年授課時數加計 1.5 倍)

☐Yes (I don't want to get paid for the summer course. Instead, I'd like to have it credited to the teaching hours in the following academic year.)

☐不申請

☐No

壹、課程基本資料 (有包含者請於□打✓)

1. Basic information (Check a box if applicable)

| | | |
|---|---|---|
| 1 | 課程名稱 Course name | 材料熱力學(二) |
| 2 | 課程英文名稱 Course name in English | Introduction to Thermodynamics of Materials |
| 3 | 永久課號 Permanent Course ID | ENMS10018 |
| 4 | 當期課號 Course Number | 516302 |
| 5 | 教學型態 Teaching style *本校遠距教學課程定義： *NYCU's definition of a distance learning course: (1) 係指本校修課學生皆以遠距線上方式進行學習之課程。 A courses that is delivered remotely, meaning that students receive instruction online. (2) 遠距(同步及非同步)授課時數超過總授課時數二分之一。 A course in which distance learning sessions (synchronous and asynchronous) account for more than half of its total teaching hours. | <input type="checkbox"/> 非同步遠距課程 Asynchronous distance course <input checked="" type="checkbox"/> 同步遠距課程 Synchronous distance course 請填列本校課程主播而外校收播之校名與系所：(無則免填) If the course is broadcast by NYCU while received by other university, please fill in its name and department: (if not applicable, leave it blank) 外校名稱：_____ 外校系所：_____ Name of the other university: _____ Name of the department: _____ *與國外學校有合作遠距課程，請填列(無則免填)： Please list the cooperative distance courses you're having with a foreign university (if not applicable, leave it blank): 國外合作學校與系所名稱：_____ Name of the foreign university and its department : _____ <input type="checkbox"/> 國內主播 Course offered and broadcast by NYCU <input type="checkbox"/> 境外專班 Overseas Master Degree Program offered by NYCU <input type="checkbox"/> 雙聯學制 Dual Degree Program <input type="checkbox"/> 其他 Others |
| 6 | 授課教師姓名及職稱 Name and position of the teacher | (1) 姓名 Name：曾院介 (2) 職稱 Position：教授 |
| 7 | 開課單位名稱(或所屬學院及科系所名稱) Name of the course provider (or the college and department) | 主開系所 Main department offering the course：材料系 輔開系所 Department(s) offering assistance: |
| 8 | 課程學制 Course structure | <input checked="" type="checkbox"/> 學士班 Bachelor's Degree Program <input type="checkbox"/> 碩士班 Master's Degree Program <input type="checkbox"/> 碩士在職專班 In-service Master's Program <input type="checkbox"/> 博士班 PhD Program <input type="checkbox"/> 學位學程 (□四年制 □碩士班 □博士班) Degree program (□ 4-year program □ Master's program □ PhD Program) <input type="checkbox"/> 學分學程 Credit program |

| | | |
|----|---|--|
| 9 | 科目類別 Subject Type | <input type="checkbox"/> 共同科目 Common Subject <input type="checkbox"/> 通識科目 General Education Subject <input type="checkbox"/> 校定科目 NYCU-determined Subject <input checked="" type="checkbox"/> 專業科目 Professional Subject <input type="checkbox"/> 教育科目 Educational Subject <input type="checkbox"/> 其他 Others |
| 10 | 選課別 Course Type | <input checked="" type="checkbox"/> 必修 Required <input type="checkbox"/> 選修 Elective <input type="checkbox"/> 其他 Others |
| 11 | 學分數 No. of Credits | 3 |
| 12 | 每週上課時數 No. of teaching hours per week | 3 *每週上課時數：同步遠距課程請填入每週「面授」及「同步」之合計上課時數。若無法界定每週時數，填入每週平均時數（即學期總「面授」+「同步」時數除以總課程週數）；非同步遠距教學，請填平均每週非同步授課時數。 *Teaching hours per week: For synchronous distance learning, please fill in the total hours of "face-to-face" and "synchronous" teaching sessions per week. If the teaching hours cannot be calculated, just fill in the average number of hours per week (total hours of "face-to-face" + "synchronous" sessions divided by the total number of the course weeks); for asynchronous distance learning, please fill in the hours of asynchronous teaching sessions per week. |
| 13 | 開課班級數 No. of classes | 1 |
| 14 | 預計總修課人數 Expected No. of students taking the course | 65 |
| 15 | 全英語教學 Course taught in English only | <input type="checkbox"/> 是 Yes <input checked="" type="checkbox"/> 否 No |
| 16 | 課程平臺網址（非同步教學必填） Course platform website (required for asynchronous teaching) | <input type="checkbox"/> E3 非同步遠距教學 E3 Asynchronous distance learning course <input checked="" type="checkbox"/> E3 同步遠距教學 E3 Synchronous distance learning course <input type="checkbox"/> E3&CS100 教室(同步) E3 & CS100 classroom (synchronous) <input type="checkbox"/> 其他 Others：_____ |

貳、課程教學計畫

2. The Teaching Plan

| | | |
|----|-----------------------------|--|
| 1. | 教學目標 Teaching objectives | 教導熱力學基本知識、自由能、相圖 |
| 2. | 適合修習對象 Target students | 理工科系皆適合 |
| 3. | 課程內容大綱 Course outline | （請填寫每週次的授課內容及授課方式；授課方式請填時數） (please fill in course contents and teaching method for each week; fill in number of teaching hours for the teaching methods) |

| 週次 Week | 授課內容 Contents of the course | 授課方式及時數 Teaching methods and hours (請填時數，無則免填) (fill in the number of hours, leave it blank if you don't have anything to include) | | |
|------------|--|---|---------------------------|---------------------|
| | | 面授 Face-to-face teaching | 遠距教學 Distance learning | |
| | | | 非同步 Asynchronous | 同步 Synchronous |
| 1 | 複習材料熱力學(一) 三大定律, Maxwell equations, four thermodynamics potentials, 並進入第七章相圖平衡 | | | 3 |
| 2 | 第七章相圖平衡概念介紹 | | | 3 |
| 3 | 第八章氣體分子行為簡介 P-V-T 之間的相互關係理想氣體-非理想氣體行為之修正 | | | 3 |
| 4 | 較複雜之雙元,三元相圖概念解說, 定溫, 定壓下相圖變化概念建立 | | | 3 |
| 5 | 凡得瓦爾氣體介紹非真實氣體之熱力學行為之量測 | | | 3 |
| 6 | Heat of mixing and entropy of mixing of ideal gases 基本理論計算介紹 | 2 (同一週內兩堂課進行實體期中考) | | 1 (同一週內一堂課繼續進行遠距教學) |
| 7 | 液體之行為簡介, Henry's La, Raoul's law 簡介 | | | 3 |
| 8 | Gibbs-Duham 概念介紹 | | | 3 |
| 9 | 理想溶液, 非理想溶液之觀念建立以及其生成熱之觀念建立 | | | 3 |
| 10 | Regular solution, 以及其在統計力學的觀點介紹 | | | 3 |
| 11 | Gibbs free energy 運用在材料相圖之觀念建立 | 2 (同一週內兩堂課進行實體期中考) | | 1 (同一週內一堂課繼續進行遠距教學) |
| 12 | 液態及固態材料標準態之觀念建立 相圖 Gibbs free energy 繪製之練習 | | | 3 |
| 13 | 卡諾循環(Carnot cycle)介紹 | | | 3 |
| 14 | 相圖對 P, V, T 之變化行為及對應之 Gibbs Free Energy 觀念介紹 第十二章 氣體行為之介紹 | | | 3 |
| 15 | pure condensed and gaseous phase 反應簡介 | | | 3 |
| 16 | 期末考 | 2 (同一週內兩 | | 1 |

| | | | 堂課進行實體 期中考) | | (同一週內一堂課 繼續進行遠距教 學) |
|----|---|--|----------------|--|---------------------------|
| 4. | 教學方式 Teaching methods | <p>(有包含者請打，可複選) (Check a box if applicable; select one or more answer choices) (Check a box if applicable; select one or more answer choices)</p> <p><input checked="" type="checkbox"/> (1) 提供線上課程主要及補充教材 Main and supplementary teaching materials are provided for online courses</p> <p><input checked="" type="checkbox"/> (2) 有線上教師或線上助教 Online teachers or teaching assistants are available.</p> <p><input type="checkbox"/> (3) 提供線上非同步教學，次數：____次，總時數：____小時 Online asynchronous teaching sessions are provided: _____ time(s), with a total of _____ hours</p> <p><input checked="" type="checkbox"/> (4) 提供面授教學，次數：__3__次，總時數：__6__小時 Face-to-face teaching is provided: _____ time(s), with a total of _____ hours</p> <p><input checked="" type="checkbox"/> (5) 提供線上同步教學，次數：__16__次，總時數：__42__小時 Online synchronous teaching sessions are provided: _____ time(s), with a total of _____ hours</p> <p><input type="checkbox"/> (6) 其它：(請說明) Other options (Details here):</p> | | | |
| 5. | 教科書及參考書資料 Textbooks and reference materials | <p>1. 教科書 Textbooks : Introduction to the Thermodynamics of Materials,D. Gaskell, 6th edition, CRC Press</p> <p>2. 講義 Handouts : 自製</p> <p>3. 參考資料 Reference materials:</p> <p>4. 相關網站 Related websites : https://www.facebook.com/groups/243740989419775</p> | | | |
| 6. | 於 E3 系統所提供的 學習活動 Learning activities offered by the E3 system | <p>請勾選以下會使用之 E3 功能 Please check the E3 features that you will use</p> <p><input checked="" type="checkbox"/> 最新消息發佈、瀏覽 Releasing and browsing the latest news</p> <p><input checked="" type="checkbox"/> 教材內容設計、觀看、下載 Designing, viewing or downloading the contents of teaching materials</p> <p><input checked="" type="checkbox"/> 成績系統管理及查詢 Managing and inquiring the system that keeps track of student grades</p> <p><input type="checkbox"/> 進行線上測驗、發佈 Conducting or releasing an online test</p> <p><input checked="" type="checkbox"/> 學習資訊 Gaining access to learning information</p> <p><input type="checkbox"/> 互動式學習設計(聊天室或討論區) Designing interactive learning (through a chat room or discussion forum)</p> <p><input type="checkbox"/> 各種教學活動之功能呈現 Presenting the benefits of all teaching activities</p> <p><input type="checkbox"/> 其他相關功能 (請說明) Other features (Details here)</p> | | | |
| 7. | 師生互動討論方式 How teacher-student discussion is conducted | <p><input checked="" type="checkbox"/> 線上討論 Online discussion :</p> <p><input checked="" type="checkbox"/> 面談 Face-to-face discussion :</p> <p><input type="checkbox"/> 其他 Others :</p> | | | |

| | | |
|-----|---|--|
| 8. | 作業繳交方式 How assignments are submitted | <p>(有包含者請打，可複選) (Check a box if applicable; select one or more answer choices)</p> <p><input checked="" type="checkbox"/> (1)提供線上說明作業內容 Offering online instructions on how assignments should be done</p> <p><input type="checkbox"/> (2)線上即時作業填答 Allowing students to complete online assignments in real time</p> <p><input checked="" type="checkbox"/> (3)作業檔案上傳及下載 Allowing students to upload and download assignments</p> <p><input type="checkbox"/> (4)線上測驗 Providing online tests</p> <p><input checked="" type="checkbox"/> (5)成績查詢 Allowing grade inquiry</p> <p><input type="checkbox"/> (6)其他做法 (請說明) Others (Details here) :</p> |
| 9. | 成績評量方式 How performance is evaluated | <p>(1) 考試方式 How tests are conducted : 筆試(實體)、實作</p> <p>(2) 考評項目其所佔總分比率 Evaluation items, with their percentage of the total score : 85%</p> |
| 10. | 上課注意事項 Other classroom rules | 非經授課教師同意不得錄影 |

請注意：教師授課使用之教材，不得非法重製，並應遵守著作財產權之相關規定，如有涉及犯罪或侵權行為應負相關法律責任。建議老師參考主管機關之教師授課著作權錦囊(連結經濟部智慧財產局)
<https://topic.tipo.gov.tw/copyright-tw/cp-415-855924-5dd9b-301.html>

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<https://topic.tipo.gov.tw/copyright-tw/cp-415-855924-5dd9b-301.html>

申請教師簽章： 曾院介
Signature of applicant:

開課單位主管簽章： 材料科學與工程學系 系主任 吳文偉
Signature of head of course provider: