

國立清華大學課程大綱-研究所

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| 科號 | IEEM5191 | 組別 | | 學分 | 3 | 人數限制 | 50 |
| 上課時間 | M7M8M9 | | | 教室 | 901 | | |
| 科目中文名稱 | 非線性規劃 | | | | | | |
| 科目英文名稱 | Nonlinear Programming | | | | | | |
| 任課教師 | 李雨青 | | | | | | |
| 檔修科目 | | 建議先修 | ORI, Linear Programming, Computer Language | | | | |

※下列各欄由任課教師提供※

依IEET與評鑑精神,本系擬定之核心能力如下,教師請勾選本課程所欲培養之核心能力,並根據此建立核心能力達成指標,以課程評分量表(Rubrics)作為評估方法,並依據此評分量表確認及評估教學成效,是否作後續教學改進之用。(課程對應之核心能力並非要求”全選”,無對應到的核心能力”可以不選”)

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| 此科目對應之系所課程規畫所欲培養之核心能力 Core capability to be cultivated by this course | <ul style="list-style-type: none"> □ 工工專業與系統分析能力 IE profession and systems analysis skills 80% □ 獨立研究及解決問題的實作能力 Capability of independent research and problem solving 5% □ 領導、溝通與團隊合作能力 Leadership and coordination abilities 5% □ 自我充實能力 Capability of self-development and enrichment 5% □ 國際觀視野、國際化互動與表達能力 Global interaction and communication skills 5% |
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| <p>一、課程說明</p> | <p>This course aims to equip students with the toolbox of nonlinear programming. Students are expected to learn the basic properties, algorithms, and the common issues arising from a nonlinear programming problem.</p> <p>We will study the formulations of the unconstrained and constrained nonlinear programming and the solution techniques including gradient method, conjugate-gradient method, quasi-newton method, Lagrange multiplier methods, sequential quadratic programming methods, and interior-point methods; Convexity, duality, constraint qualification, and optimality condition of a nonlinear programming model will be introduced; Related classes of problems such as convex programming, global optimization, variational inequalities, etc., will be mentioned. In the semester, students will be assigned a few homework exercises, an in-class midterm exam, and a final project with report and presentation.</p> |
| <p>二、指定用書</p> | <p><i>Nonlinear Programming</i>, Dimitri P. Bertsekas, Athena Scientific, 2nd Edition, 2003 Required!</p> |
| <p>三、參考書籍</p> | <ul style="list-style-type: none"> ● <i>Numerical Optimization</i>, Jorge Nocedal and Stephen J. Wright, Springer, 2nd Edition, 2000 ● <i>Convex Analysis and Optimization</i>, Dimitri P. Bertsekas, Angelia Nedic, and Asuman E. Ozdaglar, Athena Scientific, 2003. ● <i>Introduction to Global Optimization</i>, Reiner. Horst, Panos M. Pardalos, and Nguyen Van Thoai, Kluwer Academic Publishers, 2nd Edition, 2000 ● <i>Finite-Dimensional Variational Inequalities and Complementarity Problems</i>, Francisco Facchinei and Jong-Shi Pang, Springer, 2003 ● 線性錐優化(簡體中文), 方述誠與邢文訓, 科學出版社, 2013 ● Selected journal papers |
| <p>四、教學軟體</p> | <p>(1) AMPL: with the solvers on NEOS A demo will be given in Lecture 3.</p> <p>(2) Matlab or other computer languages This is for implementing algorithms as a homework exercise or your final project.</p> |
| <p>五、教學方式</p> | <p>Students will usually be asked to preview the range-specified texts (which are announced every week) before the lectures. The lectures are expected to be a combination of handouts delivering, blackboard writing, and slides displaying. Taking (some) classroom notes should be helpful.</p> |

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| <p>六、教學進度</p> | <p>Detailed Contents:</p> <ol style="list-style-type: none"> 1. Unconstrained optimization 2. Constrained optimization 3. Lagrange multiplier methods, 4. Sequential quadratic programming methods 5. Interior-point methods 6. Related classes of problems |
| <p>七、成績考核</p> | <p>Homework 30%; Midterm Exam 30%; Final Project 40%</p> |
| <p>八、講義位址 http://</p> | |
| <p>九、核心能力達成指標</p> | <p>只要和課程有對應之核心能力, 每項核心能力需列出至少一項「核心能力達成指標」, 用以評量學生對核心能力的學習程度, 期末將請同學進行自評。請老師填完後於此課程大綱上方簽名。 以下列出三項系定核心能力之Rubrics範例供參考, 例填: 1, 2, 5</p> |

核心能力1: 工工專業與系統分析能力

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| <p>核心能力</p> | <p>1. 正確之工業工程與工程管理領域相關技術概念(50%)</p> |
| <p>達成指標</p> | <p>2. 應用工業工程與工程管理領域之各項數理工具或技能(50%)</p> |

核心能力2: 具備獨立研究及解決問題的實作能力

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| <p>核心能力</p> | <p>1. 學生思考及問題解決之流程具創新性(100%)</p> |
| <p>達成指標</p> | |

核心能力5: 具備國際觀視野、國際化互動與表達能力

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| <p>核心能力</p> | <p>1. 學生對於論文內容能收集國際產業新知並掌握全球化趨勢(50%)</p> |
| <p>達成指標</p> | <p>2. 運用全球化策略與國際觀點處理論文內容, 並與台灣現況作比較(50%)</p> |