國立成功大學 工資管所

一百一十二學年度第二學期授課大綱（進度）

課程名稱：網路最佳化管理
zuvio code: 10223728

授課教師： 王逸琳 I-Lin Wang
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課程網頁 請至 http://moodle.ncku.edu.tw/ 註冊
Teams 連結 （線上直播用： 需用 XXXX@off365.ncku.edu.tw 登入，XXXX 為學號）

開課班級： 工資管所碩博

教學時地： 授課：一 6~8 [61204] Office hr:四 2~3 [61324] or by appointment

教學目標： Train students to learn network optimization and algorithms

課程簡介： We will first introduce the foundations of graphs and algorithms, then go over each topic of network optimization.

教 科 書： Network Flows: Theory, Algorithms, and Applications by R. K. Ahuja, T. L. Magnanti, and J. B. Orlin, 1993, Prentice Hall, NJ. ISBN: 0-13-617549-X.

參考書籍：
1. Introduction to Linear Optimization, by Bertsimas and Tsitsiklis, 1997, Athena Scientific, ISBN: 1-886529-19-1
2. Combinatorial Optimization, by Papadimitriou and Steiglitz, 1998, Dover Pubns, ISBN: 0486402584
3. Network Optimization: Continuous and Discrete Models, 1998, Athena Scientific, ISBN: 1-886529-02-7
4. Linear Programming and Network Flows, 2nd Edition, by M.S. Bazaraa, J. J. Jarvis, and H.D. Sherali, John Wiley, ISBN: 0-471-63681-9

評分方式：

1.	Quiz (2 times: **03/18**, **05/06**, each time **10%**)	**20%**
2.	Midterm Papers Presentation (decided by **03/04**, submit by **04/08**, present after **04/08**)	**15%**
3.	Final Exam (**06/10**)	**25%**
4.	Homework (including programming assignments or projects)	**35%**
5.	Class Participation	**5%**

先修課程： Know how to program and some logic

對學生建議事項：
1. Each student has to present some academic papers related with this course
2. The computer program can be written by C or C++, and should run on unix environment (cygwin, Sun, Linux, or BSD)

預計進度：(18 週)
1. 02/19 Introduction, Applications
2. 02/26 Data Structure, Graph Search
3. 03/04 *Holiday* Decomposition 03/06 2 paper report (2pa)
4. 03/11 Shortest Path: Label-Setting Algorithms
5. 03/18 Shortest Path: Label-Correcting Algorithms, DLU
6. 03/25 1st Quiz
7. 04/01 Shortest Path: SLU
8. 04/08 *Holiday*
9. 04/15 Midterm paper report (mpa)
10. 04/22 Midterm paper report (mpa)
11. 04/29 Max Flow: augmenting path
12. 05/06 Max Flow: preflow-push, proportional augmenting
13. 05/13 2nd Quiz
14. 05/20 Min-cost Flow Lagrangian Relaxation
15. 05/27 Min-cost Flow: Network Simplex Algorithms
16. 06/03 Multicommodity Network Flows
17. 06/10 Lagrangian Relaxation
18. 06/17 Final exam (Final project)

附註： 對於以上內容或修課要求，授課老師可依實際修課情況加以修改。
詳細的評分標準請看「修課作業要求」。

修課作業要求

Class Participation (5%)

1. 學期中除第一堂課所發出的「修課學生背景調查」外(佔 1%)，將不定期發出另外數份問卷 或 簽名單(共佔 4%)。
2. 若無法當場上課繳交者，可以在課後 1 星期內向老師要來填寫（不過將僅得一半）。
3. 若課前有先行向老師打招呼並在課後 1 星期內向老師要來填寫者，仍可得到滿分。
4. 若課後 1 星期內尚沒有來填寫者，一律以 0%計算。
5. 此 5 分為額外加分用，老師將視情況決定是否使用或調整。

Paper Report (15% = 2% preview report + 7% written report + 6% presentation)

2 papers preview report (by **2024/03/06**) **2%**

1. The 2 academic papers that you choose must be written in English (unless you can persuade me for exception). These papers must be related with Network Optimization. The papers you selected may require to be related with some specialized topics such as communication, bioinformatics,..etc. Further details will be announced later.
2. Submit a short report (both paper and pdf) for these 2 papers in which you should
   i. Briefly introduce these 2 papers, explain why you choose them to study (such as why it is related to the course, and what you want to learn from the paper ..etc)
   ii. Choose 1 of the 2 to be the midterm paper report, whether the other one will be used or not will be announced later in the semester, depending on how the course goes.
   iii. Detailed format for the submission will be announced on the web

Midterm paper report (present after **2024/04/15**) **13%**

1. Each student has to submit a paper report (around 15 pages), a pdf/doc file, and a presentation pdf/ppt file **before** the class of **2024/04/15**
2. A 15-30-min presentation will be held after **2024/04/15**.
3. Detailed format for the paper report will be announced later

Quiz/Exam (45% = 2*10% + 25%)

General rules

1. DO NOT try to cheat, or you will not only get 0%, but also get other penalties.
2. Unless you have a very good reason/excuse, a no show means 0%. Make-up exams will only be made for some very special cases. So, please inform the instructor much earlier if somehow you can not take the quiz/exam at that specific time.

2 quizzes (**2024/03/25, 2024/05/13**) **2*10%**

1. The quiz will be held on Tuesdays, about 2hr written quiz, and may be 1 more hr programming quiz or oral quiz, so you had better be on-time.

Final exam (**2024/06/17**) **25%**

Homework (35%)

1. There will be several homework assignments, or programming assignments.
2. Some homework may not need to submit, but will be likely to be in quiz/exams.
3. Discussion is encouraged, but copying other's homework is NOT allowed. Points will be taken out, together with other penalties, if such behavior is exposed.

Programming Assignments Requirements

1. Go to https://www.dropbox.com/s/y86zjuwmkv5wd94/programming.html?dl=0 for details.
2. Your codes have to be in C or C++. If you want to use another language, ask me in advance. In any case, VB is not allowed.
3. Having some programming experience will ease your life. However, it is not necessary that you have to know how to program to take this course. If you have never learned programming, but still want to take this course, come to see me,.
4. All the codes you write must be compilable and executable in unix environment.
5. All the codes must be commented detailedly.
6. All of your codes must be put in a directory, then you will have to zip the entire directory into a zip file, and upload it in the class web.

Final Notice & Reminder

Important Dates:

Dates	What	Grade (%)
2024/02/19	1st class, 1st questionnaire	1
2024/03/06	Submit 2-paper preview report (paper, pdf/doc)	3
	Midterm paper decided	
2024/03/25	1st quiz	10
2024/04/15	Midterm paper report (paper, pdf/doc)	7
	present (pdf/ppt)	5
2024/05/13	2nd quiz	10
2024/06/17	Final homework report	(grade in hw)
	Final exam	25
Some times	Homework, projects	35
some random dates	Questionnaires or sign-up sheet	4

	☑	HW 10%	Midterm paper 20%	Final paper 20%	Project 50%
COMMU	☑ Speaking		20%	20%	20%
	☑ Writing	50%	40%	40%	30%
CPSI	☑ Interdiscip. Competence/ Prob. Solving	40%	10%	10%	30%
	☑ Critical Thinking/ Innovation		10%	10%	10%
LEAD	☐ Leadership				
	☑ Ethical Reasoning		10%	10%	
GLOB	☑ Global Vision	10%	10%	10%	
VSP	☑ Teamwork				10%

Percentage	**Item**	**AACSB at IIM Criteria**				
		IT	**OC**	**PS**	**CI**	**VP**
20%	2 Quizzes			17	3	
15%	Midterm paper	4	10		1	
25%	Final exam			23	2	
35%	Assignments	15		20		
5%	Participation					5
		19%	10%	60%	6%	5%

IT: Information Technology

OC: Oral Communication

PS: Problem Solving

CI: Creativity & Innovation

VP: Values & Professionalism

Paper Report Format

1. Written in Chinese or English
2. For the paper version:
   i. Attach the paper that you use for your report
   ii. <15 pages, 1~1.5 line spacing, font size≦12pt
3. For the pdf/doc version:
   i. Create a directory (i.e. folder) named as NETFLOW2202_XX_YY which contains all your files(i.e. doc/tex and pdf), zip the directory as NETFLOW2202_XX_YY.zip, where XX=**2p** for 2 papers preview, XX=**mp** for midterm paper, YY is the number of your student ID (start with r , not R).
   ii. Upload the zip file to the iteach website before the deadline
4. For the 2 papers preview report, the format should be like
   i. Beginning with your name/email, titles of these 2 papers (paper 1, paper 2)
   ii. Paper 1:
      1. Title, authors, original abstract, where/when it was from
      2. Briefly explain why you choose this paper, what you expect to learn
      3. Decide whether you will use it as your midterm report or not
   iii. Repeat above step for paper 2
5. The midterm paper/pdf reports should have the following format: (in this order)
   i. Your name, email, date
   ii. Title, authors, original abstract, where/when it was from
   iii. Content: (section 1, section 2, section 3, section 4)
      1. why you choose this paper
      2. what it did, what you have learned from it,…etc
      3. add any your viewpoints, comments
      4. list any other reference that you have used

Present Report Format

1. You may use powerpoint or whatever (even hand writing) for the presentation slides
2. Whatever form you use, you should upload both your ppt and pdf version electronically (you may use scan or print to create pdf files. If you don't know how to do it, ask others)

修課學生背景調查

佔 1%

本表主要目的為幫助老師了解學生相關背景，以做為教材設計的調整參考，請務必確實填寫，謝謝！ ！注意！所有年度請以西元（如 1999、2001 等）填寫

課程名稱：**網路最佳化管理**

基本資料：

學生姓名： email: 手機：
所名／年級（碩?博?）: 校名（非成大學生請填）:
畢業之校、系、年度：
指導教授： 修本門課的意願： % （0~100）

修課原因：（請圈選，可複選）

老闆建議、研究需要、畢業需要（沒修就畢不了業）、無聊時間多、其他_____

對**網路最佳化**的了解：（請勿空白）

1. 何謂「最佳化」？（請以最多 3 句、最少 1 句話來回答）

   _____

   _____

   _____

2. 您以前曾修過那些相關課程？（請圈選，可複選）
   資料結構（大學？碩博？）、演算法（大學？碩博？）、作業研究或線性規畫（大學？碩博？）
   程式語言（大學？碩博？C？C++？其他_____）
   企業資料通訊網路、無線通訊
   其他_____

對這門課的期許：（請勿空白）

1. 您希望這門課教那些東西及其比例？
   (a)演算法、資料結構 _____% (b)通訊網路原理 _____%
   (c)其它（包括 _____%、 _____%、 _____%）
2. 那些東西是您覺得本課程非教不可的？(請勿空白)

   _____

   _____

其他高見：

Knowledge Background of Students

佔 1%

This form is used to help the lecturer have more in-depth understanding on the knowledge and experience of students who are taking or auditing this course. Then, the lecturer may adjust the materials to teach or the requirements for homework and projects.

Course title：**Optimization in Network Management**

Education Background：

Student Name： email:

Dept／Year（MS? Ph.D.?）： cellphone #:

Previous Degree: school name: department: year:

Thesis Advisor (Current/Previous)： % (0-100) to take this course: %

Reason to take this course：（please circle whatever applicable）

Advisor's suggestion, necessity for research, graduation requirement, just for fun,
any other reason (please specify):_____

Current understanding about **Optimization in Network Management**：

Explain what you know about "Optimization modeling"？

_____

_____

_____

Please circle those course you have ever taken in the following lists of related course,
Data structure (Undg? Grad?), Algorithm (Undg? Grad?), Discrete Math (Undg? Grad?)
Operations Research or Linear Programming (Undg? Grad?),
Coding experience: C/C++, Python, Other languages: _____
Any other course that you feel related but not listed above:_____

Expectation for this course：

Please tell us what materials you wish to learn and percentage:

(a) Algorithm, data structure _____%

(b) Mathematical programming theory and modeling techniques _____%

(c) Others:

Any other comments to the lecturer：