國立東華大學

教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	模擬方法			學年/學期 Academic Year/Semester	113/1
課程名稱(英文) Course Name in English	Simulation Study				
科目代碼 Course Code	AM__72900	系級 Department & Year	博士	開課單位 Course-Offering Department	應用數學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/王家禮				
先修課程 Prerequisite					

課程描述 Course Description

As a technique, simulation is one of the most widely used in operations research and management science. In various surveys of related graduated students in America, simulation is always ranked among first three subject areas in terms of its value after graduation (See Harpell, Lane and Mansour: Operations Research in Practice, Interfaces, 1989). While the competition in business and industry is getting tough, we can safely assume that simulation ‘s value and usage are increasing, also due to improvements in computing power.
This course is an introduction to basic concepts of simulation modeling. In which, we use a computer to evaluate a model numerically, and data are gathered in order to estimate the desired true characteristics of the models.
In the first part of the course, we will introduce methodologies of creating simulation models for various systems in engineering, management sciences, social sciences and operations research. We then discuss how to determine whether a simulation model is an accurate representation of the actual system being studied, the validation techniques.
Later we move on to talk about statistical analysis of simulation output data, which will greatly enhance our ability in understanding what the output data really tells us. Then, we conclude the course by discussing a few variance reduction methods. These methods can help us to design better simulation experiments.

課程目標 Course Objectives

學習如何建立模擬系統、資料分析及增加編電腦程式之能力
This course is an introduction to basic concepts of simulation modeling. In which, we use a computer to evaluate a model numerically, and data are gathered in order to estimate the desired true characteristics of the models.

	系專業能力 Basic Learning Outcomes	課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.’s Education Objectives
A	具備專業知識及邏輯推理能力。Have well-founded expertise and be capable of logical reasoning.	○
B	具備學習其它學科的能力，以期能邁向跨領域研究。 Be able to study other fields of science so as to conduct interdisciplinary research in the future.	○
C	具備獨立思考與解決問題的能力。 Be capable of independent thinking and have the problem-solving skills.	●

圖示說明Illustration ：● 高度相關 Highly correlated ○中度相關 Moderately correlated

授 課 進 度 表 Teaching Schedule & Content		
週次Week	內容 Subject/Topics	備註Remarks
1	Uniform random number generation	
2	Non-uniform random number generation	
3	Non-uniform random number generation	
4	Creating simulation models	
5	Creating simulation models	
6	Creating simulation models	
7	Creating simulation models	
8	Validation techniques.	
9	Validation techniques.	
10	Statistical analysis of simulation output data	
11	Statistical analysis of simulation output data	
12	Variance reduction methods	
13	Variance reduction methods	
14	Variance reduction methods	
15	Variance reduction methods	
16	Two-sample test	
17	期末考試週 Final Exam	
18	Project Presentation	

教 學 策 略 Teaching Strategies

☑ 課堂講授 Lecture ☐ 分組討論Group Discussion ☐ 參觀實習 Field Trip

☐ 其他Miscellaneous:

教 學 創 新 自 評 Teaching Self-Evaluation

創新教學(Innovative Teaching)

☐ 問題導向學習(PBL) ☐ 團體合作學習(TBL) ☐ 解決導向學習(SBL)

☐ 翻轉教室 Flipped Classroom ☐ 磨課師 Moocs

社會責任(Social Responsibility)

☐ 在地實踐Community Practice ☐ 產學合作 Industy-Academia Cooperation

跨域合作(Transdisciplinary Projects)

☐ 跨界教學Transdisciplinary Teaching ☐ 跨院系教學Inter-collegiate Teaching

☐ 業師合授 Courses Co-taught with Industry Practitioners

其它 other:

學期成績計算及多元評量方式 Grading & Assessments									
配分項目 Items	配分比例 Percentage	多元評量方式 Assessments							
		測驗 會考	實作 觀察	口頭 發表	專題 研究	創作 展演	卷宗 評量	證照 檢定	其他
平時成績 General Performance									
期中考成績 Midterm Exam									
期末考成績 Final Exam	30%								
作業成績 Homework and/or Assignments	40%								
其他 Miscellaneous (Project)	30%								

評量方式補充說明
Grading & Assessments Supplemental instructions

教科書與參考書目（書名、作者、書局、代理商、說明）
Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

Simulation Modeling & Analysis --- Fourth Ed., A. M. Law and W. D. Kelton

課程教材網址(含線上教學資訊,教師個人網址請列位於本校內之網址)
Teaching Aids & Teacher's Website(Including online teaching information. Personal website can be listed here.)

其他補充說明 (Supplemental instructions)