國立東華大學

教學計劃表　Syllabus

課程名稱(中文) Course Name in Chinese	統計專論(三)			學年/學期 Academic Year/Semester		114/2
課程名稱(英文) Course Name in English	Topics in Statistics (III)					
科目代碼 Course Code	AM__56300	系級 Department & Year	碩士	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	/楊宏基					
先修課程 Prerequisite						

課程描述　Course Description

本課程以統計製程管制（Statistical Process Control, SPC）為核心，系統性介紹現代製程監控與品質改善之理論與實務方法。課程內容涵蓋管制圖理論、Phase I 與 Phase II 製程監控、變異來源分析、非獨立資料與多變量製程監控等進階議題，並配合實際案例與電腦軟體實作，培養學生將統計理論應用於實際製程與資料分析問題之能力。

課程目標　Course Objectives

由任課教師專長區分，設定個別目標。
Course objectives are subject to the expertise of the instructor.

	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	具備專業機率、統計知識與應用分析能力。Have well-founded expertise in probability and statistics, and good analytical ability in solving real problems.	●
B	具備程式設計與統計計算能力。Have the computer programming and statistical computing skills.	○
C	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.	○

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	Quality concepts, quality management, and the role of SPC	
2	Overview and organization of Statistical Process Control	
3	Population concepts and important continuous distributions	
4	Discrete distributions, data description, and graphical methods	
5	Parametric statistical inference: estimation and hypothesis testing	
6	Nonparametric statistical inference for SPC	
7	Univariate Shewhart control charts for variables	
8	Shewhart charts for attributes and process capability analysis	

9	Midterm Examination	
10	CUSUM charts for monitoring the process mean	
11	CUSUM charts for variance and exponential family distributions	
12	Self-starting and adaptive CUSUM charts; ARL theory	
13	EWMA charts for monitoring mean and variance	
14	Self-starting and adaptive EWMA charts	
15	Control charts based on change-point detection	
16	Multivariate statistical process control under normality	
17	Univariate and multivariate nonparametric SPC	
18	Final Examination	

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(含出缺席) General Performance (Attendance Record)	10%		✔	✔					
期中考成績 Midterm Exam	30%		✔	✔	✔				
期末考成績 Final Exam	30%		✔	✔	✔				
作業成績 Homework and/or Assignments	30%		✔						
其他 Miscellaneous (_____)									

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

General Performance (10%) is based on attendance and active participation in class discussions and in-class activities.

Midterm Exam (30%) evaluates understanding of core SPC concepts and methods, with emphasis on analytical reasoning and interpretation.

Final Exam (30%) assesses comprehensive knowledge of advanced SPC topics and the ability to integrate theory with practice.

Homework and Assignments (30%) focus on practical exercises and data analysis, emphasizing correct implementation and clear explanation of results.

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.)

Qiu, P. (2014). Introduction to Statistical Process Control. Chapman & Hall/CRC Press. Used as the primary textbook for this course.

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)