



## 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
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				
<p>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。</p>				
課程目標 Course Objectives				
<p>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.</p>				
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	Intro: Quality history & SPC organization (Ch. 1)			
2	Basic Stats: Continuous distributions (Ch. 2.1 - 2.3)			
3	Basic Stats: Discrete dist. & Graphics (Ch. 2.4 - 2.6)			
4	Parametric Inference: MLE & Bootstrap (Ch. 2.7)			
5	Nonparametric Inference: Rank tests (Ch. 2.8)			
6	Shewhart Charts for Variables ( $\bar{X}$ , R, s) (Ch. 3.2)			
7	Shewhart for Attributes (p, c, u) (Ch. 3.3)			
8	Process Capability Analysis (Cp, Cpk) (Ch. 3.4)			

9	Midterm Examination	
10	CUSUM: V-mask & Decision Interval (Ch. 4.1 - 4.2)	
11	CUSUM: Variance & Exp. Family (Ch. 4.3 - 4.4)	
12	Adaptive CUSUM & ARL Theory (Ch. 4.5 - 4.6))	
13	EWMA Charts for Mean & Variance (Ch. 5.1 - 5.3)	
14	Self-Starting & Adaptive EWMA (Ch. 5.4)	
15	Change-Point Detection (CPD) Charts (Ch. 6)	
16	Multivariate SPC ( $T^2$ , MCUSUM, MEWMA) (Ch. 7)	
17	Nonparametric SPC (Rank-based methods) (Ch. 8 - 9)	
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 Industry-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:

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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)									