2022학년도 1학기 교수계획표

Course Title	다변량통계학(I)	Course Code	ST27517	Section	032
Department	Statistics	Level	3	Credit - Theory - Practice	3.0 - 3.0 - 0.0
Class Hours & Classroom					
Lecturer	CHOI,YONG-SEOK	Office		Office Hours	1:00-2:00 PM
		Telephone		E-mail	
Methodology of Instruction	online Teacher-centered learning, ETC(With practice times, we will be experienced in results' interpretations and visualizations of mul				
Evaluation and Grading	Total Score = Attendance(10%) + Reports(20%) + Exam(40%) + Term Project(30%) * Students with disabilities can request an extension of the exam hour, and they can take exams by getting writing assistance or by using a computer.				
Prerequisites	- Matrix Algebra (I), (II) - R				
Course Objectives	In Multivariate Statistics (I) with R, our aim is to learn some statistical analysis and visualization techniques : Principal Component Analysis (PCA), Factor Analysis (FA), Cluster Analysis (CA) for multivariate data which are measuring the various social present situations by many variables and observations. Recently, multivariate statistics provides some absolute and essential techniques for Big data(Unstructured data, Structured data) and data mining. In this lecture, we have a good chance to raise our understanding multivariate data and to study some powerful analysis techniques. With R practices, we will be experienced in results' interpretations of data analysis. Next semester, Multivariate Statistics (II) with R will give some statistical analysis and visualization techniques : Discriminant Analysis (DA), Multidimensional Scaling (MDS), Correspondence Analysis (CRA) and Machine Learnings(SVM, ANN, DNN).				
Course Description	Lecture 1. Multivariate Data Analysis 1.1. Multivariate data analysis 1.2 Types of multivariate analysis techniques 1.3 Introduction and visualization of multivariate data 1.4 Matrix representation and descriptive statistics of multivariate data 1.5 Distances and Correlation of multivariate data 1.6 Multivariate normal distribution and its useful property 1.7 Wishart W-dist and Hotelling's -dist 1.8 Testing multivariate normality Lecture 2. Principal Component Analysis (PCA) 2.1 Comprehension of PCA 2.2 Concepts of pc 2.3 Algebraic inducement of pc 2.4 Selection and explanation of pc 2.5 Algebraic inducement of sample pc 2.6 Visualizations of PCA Lecture 3. Factor Analysis (FA) 3.1 Comprehension of FA 3.2 Conseptof common factor 3.3 Factor model 3.4 Estimation of factor model 3.5 Factor rotation and factor loadings plot 3.6 Application of factor scores 3.7 Visualizations of FA * Students with disabilities can negotiate with the Disabled Student's Academic Support Center regarding course materials and assignments.				

2022학년도 1학기 교수계획표

	Lecture 5. Cluster Analysis (CA) 5.1 Comprehension of CA 5.2 Similarity measures 5.3 Hierarchical clustering methods 5.4 Non-hierachical clustering methods 5.5 Numbers of Clusters * Students with disabilities can negotiate with the Disabled Student's Academic Support Center regarding course materials and assignments.

Relationship between Courses and Core Competencies

8 Core Competencies of PNU	Global- Cultural Competency	Communication Competency	Convergence Competency	Application Competency	Community Service Competency	Human Character Competency	Foundation Knowledge Competency	High-order Thinking Competency
		0	0	0		0	0	

Core Competencies Based on Courses and Educational Methods

	Core Competencies of Department	Educational Methods
1	Ability of applying statistical knowledge and software to solving problems	Practice Time with R/Home Work/Term Project
2	Ability of data analysis and statistical testing for the given hypothesis	Practice Time with R/Term Project
3	Ability of identifying statistical problems and their generalizations	Term Project
4	Ability of applying statistics to other academic fields	Examination/Term Project
5	Ability of contribution to solving statistical problems as a member of team	Term Project/Examination

Textbooks and References

Required Textbooks	Choi, Y.S.(2021). Multivariate Data Analysis with R, 1st Edition(2nd Printing), Kyungmoon, Seoul.
References	[1] Anderson, T.W.(1984). An Introduction to Multivariate Statistical Analysis (2nd ed.), John Wiley, New York. [2] Chatfield, C. and Collins, A. J. (1980). Introducton to Multivariate Analysis, Chapman and Hall, London. [3] Choi, Y.S. and Shin, S.M.(2013). Understanding of Biplot Analysis using R, Free Academy, Seoul. [4] Choi, Y.S.(2014). Understanding Statistics with R, Kyobo, Seoul. [5] Choi, Y.S.(2014). Walk in Multidimensional Scaling, Free Academy, Seoul. [6] Dillon, W. R. and M. Goldstein (1984). Multivariate Analysis -Methods and Applications-, John Wiley & Sons, New York. [7] Jobson, J. D. (1992). Applied Multivariate Data Analysis, Springer-Verlag, New York. [8] Johnson, R. A. and Wichern, D. W. (2002). Applied Multivariate Statistical Analysis, 5th Edition, Prentice Hall Inc, London. [9] Rencher, A. V. (1995). Methods of Multivariate Aanlysis. John Wiley & Sons, Inc., New York. [10] Srivastava, M.S. (2002). Methods of Multivariate Statistics, Wiley-Interscience, John Wiley & Sons, Inc., USA.

2022학년도 1학기 교수계획표

Weekly Schedule of Classes		
Week No.	Course Material	
Week 1	[Orientation and Education on Academic Misbehavior(e.g. Cheating, Plagiarism) and Safety Education on Experiment and Practice] Lecture Lecture 1. Multivariate Data Analysis 1.1. Multivariate data analysis 1.2 Types of multivariate analysis techniques	
Week 2	1.3 Introduction and visualization of multivariate data 1.4 Matrix representation and descriptive statistics of multivariate data	
Week 3	1.5 Distances and Correlation of multivariate data 1.6 Multivariate normal distribution and its useful property	
Week 4	1.6 Multivariate normal distribution and its useful property 1.7 Wishart W-dist and Hotelling's -dist 1.8 Test of multivariate normality	
Week 5	Lecture 2. Principal Component Analysis (PCA) 2.1 Comprehension of PCA	
Week 6	2.1 Comprehension of PCA ~ 2.3 Algebraic inducement of pc	
Week 7	2.2 Concepts of pc ~ 2.5 Algebraic inducement of sample pc	
Week 8	2.4 Selection and explanation of pc 2.5 Algebraic inducement of sample pc	
Week 9	2.6 Visualizations of PCA	
Week10	3.1 Comprehension of FA ~ 3.5 Factor rotation and factor loadings plot	
Week11	3.3 Factor model ~ 3.7 Visualizations of FA	
Week12	Lecture 5. Cluster Analysis (CA) 5.1 Comprehension of CA 5.2 Similarity measures	
Week13	5.3 Hierarchical clustering methods	
Week14	5.3 Hierarchical clustering methods 5.4 Non-hierachical clustering methods	
Week15	5.4 Non-hierachical clustering methods 5.5 Numbers of Clusters	
Week16	Final Examination	Submit your Term Project
Attachment		